Appendix 11.2 Outline Peat Management Plan

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1 Introduction

1.1 This Outline Peat Management and Restoration Plan (PMP) document has been prepared by ITPEnergised (ITPE) on behalf of the Applicant for the construction of the Proposed Development, located on the island of Hoy in the Orkney Islands. The site comprises moorland with coastal pastures in the east and south.

1.2 The infrastructure of the Proposed Development comprises approximately 1.2 km of existing track that would be upgraded and widened and 3.8 km of new excavated tracks, six wind turbine locations and associated crane hardstandings and laydown areas, one permanent substation and associated compound, a temporary construction compound, a meteorological mast and a single borrow pit search area.

1.3 The design of the Proposed Development has been undertaken as an iterative process to avoid areas of deep peat as much as possible to limit peat excavation and to limit the potential for peat slide, as presented in Chapter 2 of the EIA Report.

1.4 The PMP provides details on the approximate predicted volumes of peat that would be excavated during construction, the characteristics of the peat that would be excavated, and the principles of how and where this excavated peat would be stored, reused and managed. This PMP would be further developed and implemented subsequent to the Proposed Development receiving planning consent. Further details and specific plans would be determined during the detailed design process and once further pre-construction site investigations have been undertaken. These details would then be included in a detailed PMP as part of the detailed Construction Environment Management Plan (CEMP). The responsibility for the implementation of the PMP would be with the Principal Contractor.

1.5 The potential volumes of peat extracted and re-used has been calculated based on an infrastructure-specific basis using the Stage 1 and 2 peat survey data, with 3D modelling software used to determine the anticipated volume of peat to be excavated across the development footprint.

2 Objectives

2.1 The PMP 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 development.

2.2 The PMP has been developed to demonstrate that peat has been afforded significant consideration during the construction phase of the Proposed Development, should consent be granted. It aims to propose mitigation measures that would minimise any impacts and the long-term habitat restoration and management plans.

2.3 The PMP seeks to identify that appropriate proposals to re-use the surplus peat can be accommodated within the Proposed Development and associated Habitat Management Plan proposals, without significant environmental or health and safety implications, to minimise risk in terms of carbon release and human health.

Layout

2.4 The layout of the Outline PMP is as follows:

- summary of relevant policy and guidance;
- definition of peat, details of peatland characteristics and peat conditions at the site;
- potential impacts on peat and an overview of peat excavation principles;
- estimate of peat volumes to be excavated and reinstated;
- classification of the peat characteristics present at the site;
- peat excavations and handling methods/controls and temporary peat storage; and
- reuse in infrastructure construction restoration and habitat management proposals.

2.5 Tables are included showing:

- a summary of peat depth data;
- locations and quantities of excavated peat that would be generated, with summary information on interpreted peat depth, dimension and area details of the infrastructure areas;
- locations and available volumes for re-use of excavated peat; and
- a summary of the peat extraction and re-use balance.

3 Policy and Guidance for Peat Management

3.1 This PMP has been compiled in accordance with the following policy and best practice guidance:

- Good Practice during Windfarm Construction (Scottish Renewables, SNH, SEPA & Forestry Commission Scotland, 4th Edition 2019);
- Guidance on Developments on Peatland: Site Surveys (Scottish Government, Scottish Natural Heritage and SEPA, 2017);
- SEPA Regulatory Position Statement – Developments on Peat (SEPA, 2010);
- Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables and SEPA, 2012);
- Peat Landslide Hazard and Risk Assessments. Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017); and
- Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017).

4 Peat Conditions

Definitions of Peat

4.1 The Scottish Government Peat Landslide Hazard Best Practice Guide (2017) uses the following Joint Nature Conservation Committee (JNCC) report 455 'Towards an Assessment of the State of UK Peatlands' definition for classification of peat deposits:

- **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 Conditions at the Site

Desk Study

4.2 A desk study has been undertaken to review published geological conditions, based on British Geological Survey (BGS) mapping and the SNH Carbon and Peatlands Map (2016).

Site Survey

4.3 Following on from the desk study, field surveys were undertaken, to measure the peat depth and provide additional observations relating to slopes, general topography and ground cover. Peat survey work undertaken at the site is summarised below and further detail is provided in Appendix 11.1: Peat Slide Hazard and Risk Assessment.

4.4 Stage 1 peat depth probing was undertaken in October 2019, aiming to provide a 100 m spaced grid, as per the above-noted guidance.

4.5 Data obtained from the peat depth surveys were used to plot the presence and distribution of peat across the proposed infrastructure development areas at the site, create a contour plan, and feed into detailed design iteration.

4.6 Following extensive design iteration work (refer to Chapter 2 of the EIA Report), a "design chill" was agreed, considered by the project team to represent the best possible turbine and infrastructure layout to optimise yield whilst minimising environmental effects, including effects on geology, hydrology, hydrogeology and soils resources.

4.7 Stage 2 detailed peat survey work was then undertaken in July 2020, targeting the proposed turbine and infrastructure locations and track routes in line with guidance. The data obtained from the Stage 2 peat survey were used to supplement the Stage 1 data, to clarify peat depths across the development footprint and calculate anticipated volume of peat that will need to be excavated to construct the development.

4.8 It should be noted that the Stage 1 survey identified relatively shallow peat across much of the site, and taking account of the extent of other technical and environmental constraints guiding layout and design decisions, those other constraints have largely over-ridden potential impacts associated with encountering localised pockets of deeper peat. Although it has been possible to avoid siting most infrastructure on deep peat (>1 m), it has not been feasible to entirely avoid all localised instances of deeper peat, while taking account of other technical and environmental constraints and delivering sufficient capacity to ensure a commercial viable renewable energy generation development project.

Peat Survey Results

4.9 The peat depth survey identified that, as expected following the desk study and reconnaissance walkover, much of the site area is underlain by peat deposits. However, substantial areas of the site were identified as having peat depth less than 50 cm and most of the remainder of the area within which proposed infrastructure is sited was found to have peat depth less than 1 m. Pockets of peat with depth over 1 m were identified in parts of the north and central site area, and wider areas of deep peat were identified towards the south, on the flatter ground near the Burn of Ore (particularly towards the west).

4.10 Peat thicknesses recorded at the site, from Stage 1 and Stage 2 surveys combined, are summarised in Table 1.

Table 1 – Distribution of Peat Depth Recorded at the site

Peat Depth Interval (m)	Number of Occurrences	% of Probes
Nil	76	9.8
0.01 to 0.49	300	38.9
0.50 to 0.99	233	30.2
1.00 to 1.49	86	11.1
1.50 to 1.99	58	7.5
2.00 to 2.49	13	1.7
2.50 to 2.99	2	0.3
3.0 or more	4	0.5
Total	**772**	**100**

5 Potential Impacts on Peat During Construction

5.1 The initial construction phase for wind energy projects will often include soil and peat stripping and excavation activities associated with constructing the foundations for turbine bases, crane pads, access tracks, control compound and substation, temporary construction compounds, and borrow pits.

5.2 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 gullying, 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.

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

6 General Excavation Principles

6.1 The Proposed Development design required to take account of a number of environmental and technical constraints. The design sought to avoid areas of known or potential deep peat where possible, taking into account other environmental and technical factors such as ecology, ornithology, archaeology, watercourse stand-off buffers, topography, telecommunications links, and efficient operation of the turbines. Where it has not been possible to site infrastructure in areas

of <1 m of peat due to these other factors, efforts have been made to minimise the footprint of site infrastructure on deep peat as far as practicable.

6.2 The result is that most infrastructure has been sited outside areas of deep peat, as summarised below:

- Based on the average depth of peat recorded by probes at each proposed turbine location, three of the six turbines are sited on 'peaty soil' rather than peat, i.e. average peat depth less than 0.5 m thick.
- One turbine (T2) is sited on peat recorded at 0.5 m thick at the turbine centre, with thicknesses recorded in the close vicinity resulting in an average of approximately 0.6 m.
- Two turbines (T3 and T4) are sited on deeper peat.
    - The peat depth at the T3 turbine centre location was recorded as 1.5 m, with variable depths in the close vicinity resulting in an average of approximately 1.3 m. Peat depths in close vicinity to the east are slightly shallower, however moving the turbine centre to that location may in fact increase the volume of peat which would need excavated to build the associated hardstanding.
    - The peat depth at the T4 turbine centre location was recorded as 1.35 m, with variable depths in the close vicinity resulting in an average of approximately 1.5 m. There is good potential for micro-siting the turbine centre very slightly to the east/southeast to reduce the total volume of peat to be excavated for the turbine and hardstanding location, however this would be subject to findings from detailed pre-construction site investigation works and analysis of required inter-turbine spacing to ensure suitable turbine performance and electricity generation.
- Based on the average depth of peat recorded by probes at each proposed turbine hardstanding, all are sited outside deep peat except the hardstanding associated with T4, where the average peat depth recorded was approximately 1.55 m. As noted above, it may be possible to micro-site the hardstanding (and turbine) to reduce the average depth of peat across the development footprint, and therefore the volume of peat to be excavated.
- The proposed permanent substation, borrow pit search area, and temporary construction compound are all sited outside areas of deep peat, with average peat depths being less than 0.5 m and therefore deposits defined as 'peaty soil'.
- The measured depth of peat at the proposed met mast location is 0.5 m, i.e. not deep peat.
- The majority of proposed new cut access tracks are sited away from deep peat, with only a short stretch approaching T3 and a shorter stretch approaching T6 traversing localised pockets of deep peat. The stretch approaching T3 is approximately 140 m long across peat with average depth greater than 1.0 m. It is considered likely that at least part of this stretch could be micro-sited via a slightly change in orientation of approach and minor shift to the south. The stretch approaching T6 is approximately 55 m long and similarly, there is good opportunity to micro-site slightly to the south to avoid any deep peat in this area. Micro-siting would be subject to findings from detailed pre-construction site investigation works and advice by the geotechnical engineering supervisor during construction works.

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

6.4 Ground disturbance areas around excavations will be kept to a minimum and will be clearly defined on-site. Access to working areas during construction will be restricted to specified routes, comprising constructed tracks.

6.5 Cable routes will in general follow access tracks. Any peat excavated will be replaced. Therefore, this has not been included within the excavation volumes; however, it will still need to be managed on-site and the details of this will be provided within the Detailed PMP for the Proposed

Development, which will be prepared by the Applicant and the contractor and agreed with OIC, SEPA and SNH.

6.6 Peat/peaty soil and topsoil excavated at the temporary construction compound will be stored and also reinstated. Therefore, peat generated from this area has not been included within the excavation volumes; however, it will still need to be managed on-site. The details of site-specific storage methodology and locations will be provided within the Detailed PMP, which will be produced following preconstruction investigative works at site.

6.7 Temporary laydown areas adjacent to the hardstandings at each turbine location will be restored using excavated peat, following erection of the turbines. The volume of peat to be used in restoring these laydown areas has been taken into account in the calculations of peat excavation and reuse detailed below.

6.8 Stretches of existing track will require widening, which will entail excavation of peat, where present, along the widening corridor. However, it is reasonable to assume that excavated peat can be used for restoration locally i.e. road verges along the widened track. Therefore, peat generated from road widening has not been included within the excavation volumes; however, it will still need to be managed on-site.

7 Estimation of Peat Volumes to be Excavated

7.1 The construction period for the proposed Development would be approximately 18 months on-site. The programme, phasing and nature of construction activities are described in Chapter 3: Proposed Development. Those activities which would generate volumes of peat are as follows:

- establishment of the temporary construction compound, which would include stripping of topsoil, peat/peaty soil (noting peat depths recorded in this area average well below 0.5 m) and remaining sub-soil and careful stockpiling of the material for later reinstatement in accordance with the CEMP which would be prepared in advance by the appointed Principal Contractor;
- formation of cut track (as shown on Figure 3.1 of the EIA Report), which would involve the removal and temporary storage of turves, as appropriate, followed by excavation down to formation level;
- construction of the turbine foundations and crane hardstandings, which would require the excavation of peat and subsoil to expose underlying bedrock or other suitable founding stratum, and in some cases excavation of rock to form a suitable level platform for construction. The depth of the excavation in superficial soils would be dependent on the ground conditions and depth to bedrock, but it has been assumed that the full depth of peat would be excavated from the full development area of each turbine, hardstanding, and associated excavation footprint modelled by the project civil engineer;
- excavation of trenches for underground cabling between the turbines and the substation, which would be up to 3 m wide and approximately 1.2 m deep. These would be carefully reinstated with the stored peat once the cables have been laid; and
- construction of the permanent substation compound and permanent met mast.

7.2 Table 2 below provides an estimate of peat volumes to be excavated, based on 3-D modelling undertaken by the project civil engineer, incorporating all recorded peat depths from Stage 1 and Stage 2 survey work.

7.3 Table 2 also provides an estimate of volumes of acrotelmic and catotelmic peat to be disturbed, with further information on the classification of materials provided below the table.

Table 2 – Calculated Peat Volumes to be Excavated

Infrastructure	Area (m2)	Total Volume (m3)	Volume Acrotelm (m3)	Volume Catotelm (m3)	Assumptions
Turbines, tracks and hardstandings	10,8990	65,447.0	36,093.2	29,353.8	Zones based on anticipated footprint excavation area taking account of cuttings required due to slopes. Assumes full depth of peat will be excavated. Volume based on 3-D model incorporating all peat depth records from Stage 1 and 2 surveys.
Substation	2,154	296.8	296.1	0.6	Assumes 1,375m^2 area for substation and compound, excavation depth full depth of peat.
Met mast	1,000	366.7	249.3	117.4	Assumes 25m x 25m base, excavation depth full depth of peat.
Borrow Pit Area	N/A				Average peat depth at borrow pit search area is <50cm, therefore deposits are classified as peaty soils rather than peat. No excavation of peat anticipated to be required.
Total		**66,110.5**	**36,638.6**	**29,471.8**	

Classification of Excavated Material

7.4 There are two distinct layers within peat, the upper acrotelm and the lower catotelm. The acrotelm is the fibrous surface to the peatland, which exists between the growing peat surface and the lowest position of the water table in dry summers.

7.5 Peat soil generally below 0.5 m to up to 1 m in depth is classified as the catotelm, moderately decomposed with a high fibrous content and moderate water content. There are various stages of decomposition of the vegetation as it slowly becomes assimilated into the body of the peat.

7.6 The excavation volumes of acrotelm and catotelm presented in Table 2 are based on a simple assumption of the upper 0.4 m of peat being acrotelm and any deeper peat being catotelm.

7.7 It should be noted that laboratory results for three peat samples collected from 0.5 m depth and two collected from 1.0 m depth at the site all exhibited characteristics more aligned with acrotelmic peat or peaty soils, rather than catotelm. Moisture content at 40^{o}C ranged from 81.5 to 90%, mostly below or at the low end of the range that would be expected for peat (typically 85 to 95%). Furthermore, Total Carbon content of the samples ranged from 43.6% to 50.7% by volume, lower than the typical value of 55% for peat. The assumption of all peat deeper than 0.4 m at the site being catotelm is therefore considered to be quite conservative, with much of the volume of peat to be excavated actually likely to be drier, denser, exhibiting higher shear strength, and with lower carbon content than catotelmic peat. It should, however, be noted that the state of decomposition will increase as depth increases.

8 Peat Management Measures

Peat Protection Ahead of Soil Stripping

8.1 The development layout has already taken into account constraints relating to sensitive areas, including ecological, ornithological and archaeological receptors as well as geology/peat characteristics. The Proposed Development layout, including working areas and access track routes, would be marked on an Access Plan and would be demarcated on the ground as appropriate. Off-road tracking of heavy plant would not be permitted outside the marked area.

8.2 The Access Plan and the route of the access tracks would provide a designated controlled route and a permissible corridor within which service vehicles and plant can operate prior to peat and topsoil stripping. The purpose of the Access Plan would be to protect in situ peat in areas that are not affected by the development and to prevent unnecessary vehicle and plant tracking across these areas. The following rules would apply to the Access Plan:

- There would be no vehicle access to site areas outside the area marked on the Access Plan and demarcated as appropriate on the ground;
- There would be no stopping of vehicles outside the area marked on the Access Plan;
- Servicing or refuelling activities would only take place within clearly designated areas within the Access Plan, identified in the CEMP; and
- Laydown of materials (either construction materials or waste materials) would take place only within designated areas within the Access Plan. There would be no laydown, unless identified in the construction drawings, of any type of materials either within the access route corridors or anywhere outside of designated areas. All laydown areas not already considered would be subject to a peat slide risk assessment prior to their designation.

8.3 Access routes and working areas would be clearly delimited throughout the construction phase to ensure that peat compaction and damage in areas not directly involved in the works would be avoided. The construction works would be phased to ensure that peat was stripped in each part of the site ahead of mineral subsoil (if present).

Handling of Excavated Material

8.4 Excavation of soils would be undertaken in such a manner as to avoid cross-contamination between distinct acrotelmic and catotelmic horizons, where possible and if applicable (i.e. where catotelmic peat is present). The different horizons would be kept and stored separately for use at a later date.

8.5 During and after excavation, the storage, haulage and reuse of excavated material would be planned to minimise material movement around the site. Where possible, immediate reuse is preferred to temporary storage. For example, excavated peat to form access tracks will be used to form verges alongside the new tracks, thereby minimising the need for stockpiling and storage. The detailed construction works programme, setting out excavation and reuse proposals for each element of the build, will be set out by the Principal Contractor but will adhere to the principles presented in this Outline PMP and the Outline CEMP (Appendix 3.1).

8.6 Turves would be stripped and handled with care and stored with the vegetation side upward, such that damage to the living vegetation mat would be prevented or minimised as far as possible.

8.7 To ensure the minimum amount of damage to peat during stripping activities, strict procedures would be adopted for heavy plant access, stripping and handling/transport of surface, intact, peaty turf, and subsurface wetter peat (where present). Antecedent moisture conditions are critical for this and peat stripping, and handling would not take place if there are heavy rainfall conditions.

8.8 Peat stripping and excavation would generally follow the methodologies recommended for mineral soil by MAFF (2000) and Defra (2009). However, peat is a very different material from mineral topsoils and subsoils. For example, it is recognised that subsurface wet peat lacks strength and its consistency in many cases is that of a slurry. Hence, the stripping and excavation method(s) to be

used in each part of the site would be agreed in advance with the Environmental Clerk of Works (ECoW) and Geotechnical Engineer, taking account of the recorded peat depths and characteristics both from surveys undertaken to date, and from detailed pre-construction site investigation works.

8.9 Wherever possible, a 360° excavator would be used to permit stripping of large-scale peat turves, with their vegetation intact. Ideally these should be a minimum of 0.5 m deep and up to 1 m^2. However, the depth and scale would depend on the depth, consistency and condition of the surface peat at each location and the plant used for stripping. Where practicable, the largest possible turves that allow for the turves to remain intact would be stripped. This assists in maintaining the structural integrity of each excavated turf.

Temporary Storage

8.10 Temporary storage may be required where material is not needed for immediate reinstatement. To minimise handling and haulage distances, where possible, excavated material would be stored local to the site of excavation and/or local to the end–use site where it would be required for re-profiling, landscaping or structural purposes. The exact storage locations would be agreed with the Geotechnical Engineer and ECoW prior to commencement of the main phase of works. Details would be provided on a plan to accompany the PMP and relevant Method Statements, for agreement with SNH and SEPA.

8.11 It should be noted that some excavated peat is intended for use in habitat restoration works off-site (in close proximity to the south), further detail on which is set out in the outline Habitat Management Plan, Appendix 8.5. Peat to be used for this proposed restoration will therefore require to be stored on site prior to loading onto lorries and removing to the proposed restoration area. The duration of stockpiling and storage on site will be minimised as far as practicable through careful construction programme management.

8.12 Any temporary peat storage locations would be appropriately located and designed to minimise impact to sensitive habitats and species, prevent risks from material instability and runoff into watercourses.

8.13 Stripped materials would be carefully separated to keep peat and other soils apart and stored in appropriately designed and clearly defined separate piles. Peat would be excavated as turves which would be as large as possible (see Paragraph 8.9) and kept wet in order to minimise desiccation during storage.

8.14 Stockpiles would be isolated from any surface drains and a minimum of 50 m away from watercourses, and stockpiles would not be located on areas of deep peat, in order to avoid peat slide risks associated with additional loading. Stockpiles would include appropriate bunding to minimise any pollution risks where required. Excavated topsoils would be stored on geotextile matting to a maximum of 1 m thickness.

8.15 The maximum height of any peat stockpiles would be carefully controlled in accordance with peat slide risk assessment considerations and nature of the material being stored, under the supervision of the ECoW and Geotechnical Engineer. Turf would be stockpiled separately. Peat would not be stockpiled for more than six months, unless otherwise agreed with SEPA.

8.16 Turves would be stored turf side up and would not be allowed to dry out. The condition of stored turves would be monitored by the ECoW.

9 Estimation of Peat Volumes to be Reinstated

9.1 Excavated peat from the construction process will be reused in the following ways:

- Reinstatement of temporary infrastructure (temporary construction compound, temporary laydown areas);
- Appropriate landscaping and bunding of new infrastructure e.g. track sides, turbine base batters, and substation compound batter;
- Reinstatement of the borrow pit excavation area;
- Restoration of peatland habitat on site which has been degraded/ damaged by peat cutting/ removal and is suitable for restoration by emplacement of excavated peat (close proximity to proposed infrastructure to avoid substantial transport or storage requirements, slopes <6°, absence of identified archaeological assets), illustrated on Figure 1; and
- Restoration of peatland habitat at an identified area off-site but in close proximity, which similarly has been degraded/ damaged by peat cutting and which has been assessed as being suitable for restoration using peat excavated from the construction of the development.

9.2 More information on the above-noted peatland restoration proposals is provided in the outline Habitat Management Plan, Appendix 8.5.

9.3 Table 3 shows estimated volumes of peat that can be used to reinstate infrastructure and provide appropriate landscaping, in line with the current best practice listed above. This also provides an indicative breakdown of estimated volumes of acrotelmic and catotelmic peat.

Table 3 - Calculated Restoration Volume Available for Reuse of Excavated Peat

Infrastructure	Total Area (m^2)	Average Depth (m)	Total Volume (m^3)	Max Catotelm depth (m)	Remainder (acrotelm) (m)	Volume Catotelm (m^3)	Volume Acrotelm (m^3)	Assumptions
Turbine - base batters	282.6	1.0	282.6	0.7	0.3	197.8	84.8	Assumes base circumference of 47.1 x 1m high (average) x 1m wide. Acrotelm (turves) for upper 0.3m.
Hardstanding landscaping batters	9,000.0	0.7	6,300.0	0.4	0.3	3,600.0	2,700.0	Assumes 500m length of each batter, 3m wide x 1.5m high at highest end, grading down to ground level (0.7m average height). Acrotelm (turves) for upper 0.3m.
Dressing/ reinstatement of temporary hardstanding areas	7,914.0	0.3	2,374.2	0.0	0.3	0.0	2,374.2	Assumes reinstatement of turbine laydown areas using 300mm of excavated peat (acrotelm).
Substation landscaping batter	480.0	1.0	480.0	0.7	0.3	336.0	144.0	Assumes base circumference of 310m x 1m high x 2m wide

Infrastructure	Total Area (m^2)	Average Depth (m)	Total Volume (m^3)	Max Catotelm depth (m)	Remainder (acrotelm) (m)	Volume Catotelm (m^3)	Volume Acrotelm (m^3)	Assumptions
Cut and Widened Track Verges - up-gradient side	15,000.0	0.5	7,500.0	0.2	0.3	3,000.0	4,500.0	Verge either side of 5km of new and widened tracks. Assumes 3m wide verge on up-gradient side x max. 1m high, grading down to ground level. On down-gradient side, allows for additional visual mitigation provided by landscaping, via up to max 4m width and 1.5m height, grading down to ground level. Acrotelm (turves) for upper 0.3m.
Cut and Widened Track Verges - down-gradient side	20,000.0	0.8	15,000.0	0.5	0.3	9,000.0	6,000.0	
Borrow Pit	2,500.0	2.0	5,000.0	0.7	1.3	1,750.0	3,250.0	Assumes max excavation area 50m x 50m, max fill of 2m. Max of 0.7m catotelm given likely high water content and low strength.
On-site peatland restoration - cut/degraded areas in northern part of the site (3 opportunity areas identified)	10,929.0	1.5	16,393.5	0.7	0.8	7,650.3	8,743.2	Total area for 3 on-site restoration sites estimated based on site observations and high-resolution aerial photography. Estimated average depth 1.5m based on typical peat depth recorded in the vicinity. Max of 0.7m catotelm given likely high water content and low strength.
Total volume of excavated peat that could be reused			66,110.5			29,471.8	36,638.6	
Total reinstatement volume available for reusing excavated peat			53,330.3			25,534.1	27,796.2	
Remaining Excavated Peat			**12,780.2**			**3,937.7**	**8,842.4**	

9.4 It can be seen from the above table that the total estimated volume of peat that could be reused on the development site for reinstatement, landscaping and habitat restoration is approximately 12,780 m^3 less than the total volume of peat estimated to be excavated to construct the site.

9.5 As noted in Paragraph 9.1 above, an area of land off-site, in the close vicinity to the south, has been identified as being suitable for peatland habitat restoration activity, with high potential to realise substantial habitat enhancement benefits. It is therefore proposed that the remaining excavated peat which is not used for restoration and landscaping on-site, is removed and delivered to the proposed off-site restoration area for use in habitat management works there.

9.6 It has been estimated that a greater volume of peat could reasonably and effectively be used in habitat restoration works at the identified off-site habitat management area (up to 20,000 m^3 could be accommodated with anticipated beneficial peatland restoration effects). However, there is a desire to balance the beneficial peatland restoration works at this off-site location, with the requirement to move large quantities of peat off-site. The above proposals are considered to strike an effective balance, optimising the potential for realising substantial peatland restoration objectives at a suitable nearby location, while still reusing as much excavated peat as is practicable and reasonable on-site, and therefore minimising the need for storage and transportation of peat.

9.7 Taking account of all the on-site reuse of excavated peat set out in Table 3, together with the use of peat in restoring an off-site area of damaged peatland habitat, it is estimated that all excavated peat from the Proposed Development construction can be effectively used for these purposes.

9.8 Given the conservatisms employed in assumptions regarding acrotelmic and catotelmic peat, the opportunities to micro-site infrastructure away from deeper peat following detailed pre-construction site investigations, and the capacity of the off-site habitat restoration area to use more excavated peat if required, it is considered that there is in-built contingency in the above calculations.

10 Monitoring and Inspection

10.1 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.

10.2 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, incorporating of sediment fencing if required, light re-grading to correct any areas of surface erosion, etc.

10.3 Regular, frequent inspections of peat conditions during construction and restoration phases of work would be carried out by the Geotechnical 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.
- The physical condition of peats would be retained as carefully as possible both at the peat storage and the peat restoration stages. This is particularly important for vegetation establishment.

11 Conclusion

11.1 This Outline PMP provides the guiding principles which would be applied to the detailed PMP for the Proposed Development. The detailed PMP would be prepared for agreement with SEPA and SNH and would form part of an overarching CEMP.

11.2 This Outline PMP addresses the following peat-related issues:

- the volumes of peat that are predicted to be excavated;
- the capacity to reuse the peat on-site and at an identified off-site peatland restoration (habitat management) area;
- peat handling and temporary storage; and
- restoration and monitoring of peatland habitat.

11.3 The calculations provided above illustrate that there are sufficient opportunities to utilise arising peat for reinstatement on-site and at the identified off-site habitat management area, following methods described in best practice guidance.

11.4 The various calculations presented here would be updated and expanded upon as part of detailed design works, taking account of pre-construction site investigations and micro-siting, to confirm actual quantities of arising peat. The Applicant would achieve an actual balance between arising peat and reinstatement by prioritising the areas for reinstatement, following advice from the project ECoW and Geotechnical Engineer. It is anticipated that a detailed, construction phase PMP would be conditioned, and maintenance and updating of this plan in conjunction with an updated geotechnical (peat) risk register by a Geotechnical Engineer would also be conditioned.

11.5 The implementation of the detailed PMP would ensure a robust commitment to excavating, storing and reinstating peat in a manner that follows best practice and ensures the protection of peat throughout the construction and post-construction phases. The detailed PMP and the CEMP for the Proposed Development would also include detailed Construction Method Statements and a 'live' Geotechnical Risk Register. These documents and the associated management and monitoring onsite would ensure the active consideration and protection of peat in all aspects of the construction process.

12 References

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