Tangy IV Wind Farm

Environmental Impact Assessment (S36C)
Preliminary Peat Landslide Hazard and Risk Assessment

SSE Renewables Ltd

16 June 2026

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
Sean Taylor Principal Geotechnical Engineer	Katy McGowan Graduate Civil Engineer	David Raeside Associate Director	David Simpson Associate Hydrogeologist

Revision History

Revision	Revision date	Details	Authorized	Name	Position
P01	19/06/2026	S36C Submission	DS	David Simpson	Associate Hydrogeologist
P02	29/06/2026	Updated based on Client comment	DS	David Simpson	Associate Hydrogeologist

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

SSE Renewables Ltd

Prepared by:

AECOM Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

T: +44 (0)131 301 8600
aecom.com

Table of Contents

Inserts

Tables

Figures

1. Introduction

1.1 General

1.1.1 In September 2018 Scottish & Southern Energy Renewables (SSER), submitted an application (ECU Ref. ECU00000673) under Section 36 of the Electricity Act 1989 (UK Government, 1989) to the Energy Consents Unit (ECU) to redevelop the existing Tangy I and Tangy II Wind Farms in the west coast of the Kintyre Peninsula, Argyll and Bute, Scotland, approximately 9km northwest of Campbeltown, with this redevelopment labelled as Tangy IV. As part of this redevelopment, the existing turbines would be decommissioned and new turbines and infrastructure would be constructed. In December 2019 the Scottish Ministers granted consent to the proposed wind farm redevelopment (the 'Consented Development'). Subsequently in the years following the consent to the Consented Development, changes to the proposed wind farm, including increase in turbine size and supporting infrastructure updates, have been made. As such, SSER (the 'Applicant') is submitting a variation under Section 36C (S36C) to ensure all updates have been covered, with the complete development, inclusive of any changes made to the Consented Development, in this document referred to as the 'Proposed Varied Development'.

1.1.2 As part of the documentation submitted for the Consented Development was a Peat Stability Risk Assessment (PSRA) which generally identified a range of stability risk ratings ranging from insignificant to serious, although post mitigation the range was reduced to insignificant to significant. Due to the changes to the Consented Development, AECOM Ltd (AECOM) has been commissioned by the Applicant to carry out a Preliminary Peat Landslide Hazard and Risk Assessment (PLHRA) to update the PSRA previously completed for the Consented Development and inform the initial infrastructure design phase of the Proposed Varied Development.

1.1.3 An Environmental Impact Assessment Report (EIA Report) is being prepared in conjunction with this PLHRA on behalf of the Applicant for the Proposed Varied Development and may be referred to at various points within this report.

1.2 Site Location

1.2.1 The location of the Proposed Varied Development is shown in Appendix A, **Figure 1**.

1.2.2 The Site of the Proposed Varied Development is located on the west coast of the Kintyre Peninsula, Argyll and Bute, Scotland, approximately 9km northwest of Campbeltown. The Site currently comprises of the existing Operational Development (Tangy I and Tangy II Wind Farms) in the south with the land surrounding the existing Operational Development typically noted to be open moorland. To the north of the existing Operational Development and covering the majority of the Site, the land is currently used for commercial forestry with the trees varying in maturity across the area. Several access track and avenues are cut within the forestry to allow access into the woodland. As part of the consultation completed for the Proposed Varied Development, the Applicant has been made aware that parts of the commercial forestry have been felled and widespread peatland restoration has been completed by Forestry and Land Scotland (FLS). This is discussed in more detail as part of the baseline environment section of this document.

1.3 Proposed Infrastructure

1.3.1 The Proposed Varied Development layout is shown in Appendix A, **Figure 2**.

1.3.2 The Proposed Varied Development will comprise of the following:

- 16 no. turbines with associated crane pads, hardstandings, laydown areas and support crane infrastructure;
- 1 no. substation compound;
- 3 no. meteorological masts;
- 1 no. laydown area;
- 1 no. construction compound;

- 4 no. borrow pit search areas; and
- Upgrading of existing and construction of new access track (inclusive of sections of floating road).

1.3.3 Note, blasting may be required to form the borrow pits and as such has been taken into consideration in this document.

Proposed Peat Reuse

1.3.4 Construction of the Proposed Varied Development is expected to generate excavated peat which will require reuse within the Site. An Updated Preliminary Peat Management Plan is included as Technical Appendix 8.1 of the EIA and should be referred to for full details regarding peat excavation, handling, storage and reuse proposals including thicknesses and volumes. The preliminary proposals for peat reuse as part of the Proposed Varied Development are split into the following:

- Creation and dressing of access track, permanent hardstanding and permanent compound verges;
- Reinstatement of temporary hardstanding's; and
- Borrow pit restoration.

Dressing Verges

1.3.5 The creation and dressing of verges are not anticipated to create a significant peat landslide risk, as the size/thickness of these are likely to be minimal with the more stable acrotelm used for this purpose. Where these are used along areas of floating access tracks, the placing of the verge is not considered to increase the risk of a peat landslide above that of the placing of the floating access track itself which is considered as part of the assessment completed for this document. As such, this Preliminary PLHRA does not assess the potential peat landslide risk posed by reuse of the peat for these purposes. During the detailed design process the Designer shall ensure and, where a stability risk has been highlighted, prove the stability of the peat reused in the dressing of verges and shall present this as part of the updated PLHRA completed post-consent.

Reinstatement of Temporary Hardstandings

1.3.6 The reuse of peat to reinstate temporary compound areas will be undertaken when the compounds are no longer required, with the peat reinstated to previous levels. No excess peat is proposed to be reinstated within the temporary compounds at this stage and as such would not result in an increase in thickness. It is expected the peat would be reinstated using best practice methods, so for the purposes of this Preliminary PLHRA it is assumed the reinstatement of the peat would not result in an increased risk of peat instability above that which has been assessed for the peat in its current state. This Preliminary PLHRA therefore does not assess the reinstatement of peat within the temporary compounds as a separate item.

Borrow Pit Restoration

1.3.7 Peat reuse by deposition into borrow pits does have the potential to create a higher peat instability risk due to the depths of peat proposed to be deposited, and as these areas are primarily for catotelmic peat which is of low strength. The borrow pits are proposed to create a bowl like shape to contain the less stable catotelm with the acrotelm, then placed on top at stable angles to seal the catotelm. Therefore, it is anticipated the detailed design will ensure stability of the peat when reused within the borrow pits and as such would be revisited during the final PLHRA following completion of the detailed design. This preliminary PLHRA therefore does not assess the reuse of the peat within the relocation areas (borrow pits), as it is anticipated these will be designed to be stable during the detailed design process.

1.4 Scope of Report

1.4.1 The scope of this report comprises the following.

- A summary of the methodology used for the Preliminary PLHRA;
- A review and assessment of the baseline conditions emanating from available geological, hydrogeological and topographic information for the Site;
- An estimate of the geotechnical hazards and risks associated with peat slides during and post construction;

- A qualitative risk assessment in relation to the peat encountered;
- A summary and discussion of potential mitigation and control measures to reduce the risk caused by the presence of peat; and
- Conclusions and recommendations which can be drawn from the information and assessments undertaken as part of this Preliminary PLHRA.

1.4.2 Available information includes:

- digital topographic datasets showing the slope angles within the Site;
- aerial photography;
- geological datasets showing the published superficial and solid geology;
- British Geology Survey (BGS) solid and superficial geology mapping;
- The James Hutton Institute soil mapping (Macaulay Institute);
- site-specific peat depth probing data collected during multiple survey campaigns (2017-2018, 2024 and 2026);
- Environmental Impact Assessment Report (EIAR) for the Consented Development;
- information collected from site walkover surveys; and
- other relevant desk-based studies and publicly available datasets.

1.4.3 The PLHRA has been carried out in general accordance with the Scottish Government guidance document Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments [Scottish Government, 2017]. This guidance adopts a staged approach methodology in relation to peat stability risk as follows:

- preliminary assessment;
- hazard and risk rating;
- stability analysis (where required); and
- detailed quantitative risk assessment (where required).

1.4.4 In line with the guidance, a qualitative hazard and risk assessment has been undertaken as part of this Preliminary PLHRA for the Proposed Varied Development.

1.4.5 At present, the Proposed Varied Development is in the early stages of design. As such, minimal intrusive ground investigation (GI) has been undertaken, with peat depth estimated through peat probing. On this basis, a quantitative slope stability analysis to estimate Factors of Safety and a quantitative hazard and risk assessment have therefore not been undertaken. Following further development of the Proposed Varied Development, a targeted and planned GI shall be undertaken to inform the detailed design. Following the design development and completion of the GI, and if warranted by the findings of this Preliminary PLHRA and the findings of the GI for the Proposed Varied Development, a quantitative assessment may be completed which would be presented as part of the updated PLHRA submitted post-consent and during the detailed design stage.

1.4.6 As blasting may be undertaken to form the borrow pits, this has been taken into account as part of the assessment.

1.4.7 The reuse of peat is proposed as part of the Proposed Varied Development. However, this Preliminary PLHRA does not take into account the stability of the peat reuse areas (as discussed in the Section 0 of this report). Although peat reuse is not specifically taken into account in the analysis completed, a brief discussion on the reuse areas as relates to assessed peat slide Hazard is provided within Section 7.2 (mitigation measures) with any specific mitigation measures as relates to these provided there also. The stability of peat reuse areas will be assessed as part of the detailed design process with the assessment presented within the Updated PLHRA completed, post-consent. This preliminary assessment does assess the stability of peat surrounding the peat reuse areas, for the purposes of the construction until the peat is deposited.

1.4.8 The assessment completed as part of this Preliminary PLHRA does not cover the proposed decommissioning of the Operational Development (i.e. Tangy I and Tangy II). No change to the decommissioning of the Operational Development, from the previous Consented Development, is proposed and as such this does not form part of the scope of this report.

1.4.9 Development of this PLHRA will require to be undertaken, post-consent, considering the final design of the Proposed Varied Development (inclusive of the peat reuse areas) and considering any new further information (e.g. investigation data) becoming available. This PLHRA is therefore preliminary.

1.5 Limitations

1.5.1 AECOM shall not be responsible and/or liable as a result of or in connection with any copying and/or amendment to this document without AECOM's prior written consent and or for any use of this document for any purpose other than that for which it was prepared.

1.5.2 The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this document. The work described in this document was undertaken between March and June 2026 and is based on the conditions encountered and the information available during the said period of time. The scope of this document and the services are accordingly factually limited by these circumstances. AECOM shall not be liable for any change in the conditions after they were encountered by AECOM and/or any change in the information and/or assumptions based on which this document was prepared. AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting this document, which may come or be brought to AECOM's attention after the date of this document.

1.5.3 AECOM does not warrant or guarantee to any party in any way the completeness or accuracy of the documentary information submitted by third parties during the course of this study. Any assessment(s), interpretation(s), conclusion(s) or opinion(s) contained herein is or are made by AECOM in good faith based on information available at the time of compilation of the report and are made for the sole and exclusive use of the Applicant.

1.5.4 Where peat depth has been determined through peat probing, it should be noted that due to the nature of the probing and as no sample is recovered during the advancement of the probe, the peat depth recorded is only an estimate based on the judgement of the probe operator. More intrusive ground investigation (GI) techniques, where samples are recovered, is required to more accurately determine the peat depth and truth the probed depths.

1.5.5 Ground surveys indicate likely conditions but investigate only a relatively small volume of the ground in relation to the size of the Proposed Varied Development and can only provide a general indication of the Site conditions. The comments made and recommendations given in this report are based on AECOM's understanding of the ground conditions at the time of the preparation of this report. There may be exceptional ground conditions at the Proposed Varied Development which have not been disclosed, and which have therefore not been taken into account in this report.

1.5.6 The assessment of the peat slide hazard is based on the effect the proposed works could have on the surrounding peat in its current condition, situation and thickness. No allowance has been made for any change in peat thickness as a result of reuse or change in condition due to restoration works. The detailed design of the scheme will ensure stability of these aspects with the findings and any associated mitigation, where required, included in the Updated PLHRA, post consent and following design maturity.

1.5.7 Reference to historical Ordnance Survey (OS) maps and/or data provides invaluable information regarding the land use history of a site. However, it should be noted that historical evidence will be incomplete for the period pre-dating the first edition and between the release of successive maps and/or data.

1.5.8 Certain statements made in this document that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of this report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. AECOM specifically does not guarantee or warrant any estimate or projections contained in this document.

1.5.9 The assessment of the peat slide risk is based on the effects the Proposed Varied Development could have on the peat stability. As such, the assessment considers an influence zone surrounding the Proposed Varied Development where peat, if present, could be affected and result in peat instability. Areas out with this influence zone are not explicitly considered although these may be shown on the peat slide risk figure produced. Note that the runout distances considered as part of the assessment can

exceed this influence zone, more the influence zone considers the originating point of a peat slide resulting from the Proposed Varied Development itself.

2. Methodology

2.1 Desktop Review

2.1.1 An initial desktop review was undertaken, comprising the review and analysis of available information from sources as detailed below:

- BGS for geology, geological related hazards and hydrogeology (BGS 2026);
- Scotland's Soils for soil coverage (Scotland's Soils 2026);
- Centre for Ecology and Hydrology (CEH) National River Flow Archive (NRFA) (CEH 2026) for flows and rainfall;
- SEPA for river basin management plans and water quality (SEPA 2026a/2026b);
- aerial photography; and
- Ordnance Survey maps and Digital Terrain Model (DTM) for topography.

2.1.2 The desk study reviews were carried out by AECOM with full details provided in this document. Reference to the Preliminary Peat Slide Assessment Report (Technical Appendix 11.1-11.3 of the EIAR) completed for the Consented Development was also made in completion of the desk study review. A summary of the information relevant to this PLHRA Report can be found in the 'Baseline Environment' in Section 3 of this document.

2.2 Assessment Approach

2.2.1 A single stage assessment of the peat slide Hazard Ranking has been completed for the Proposed Varied Development. The Hazard Ranking is based on the output from Geographic Information Systems (GIS) software using a multi-criteria analysis as well as considering potential receptors present within influencing distance. The outputs generated from the GIS assessment are reviewed as part of the of the Hazard Ranking completed. This review considers the factors contributing to the peat landslide risk and consequence in more detail and rationalises the Hazard Ranking. The assessment of the Hazard Rankings inclusive of the review and any discussion considered appropriate is presented in Section 6 of this PLHRA.

2.2.2 The outputs from the assessment of the Hazard Rankings form the basis of the overall PLHRA outcome and to whether any specific mitigation measures are required.

2.3 Assessment Team

2.3.1 The assessment works were undertaken by a team of civil and geotechnical engineers all of whom have previous experience in working on projects within a peatland environment and specifically in undertaking peat assessments.

2.3.2 The team was led by a Chartered Engineering Geologist with 30 years industry experience and in particular, within the renewables energy sector. He has managed and assessed geotechnical risks and undertaken geohazard assessments within peatland environments.

2.4 Good Practice Guidance

2.4.1 The following good practice guidance was used to inform this document:

- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, 2017);
- SEPA Regulatory Guidance – Developments on Peat and off-site Uses of Peat (SEPA, 2017);
- Floating Roads on Peat (Scottish Natural Heritage (SNH) & Forestry Commission Scotland (FCS), 2010;
- Constructed Track in the Scottish Uplands (SNH, 2015);
- Good Practice during Wind Farm Construction (NatureScot, et al, 2024);
- Guidance on Developments on Peatland, Peatland Survey Scottish Government, SNH & SEPA, 2017;

- Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste (SR & SEPA, 2012);
- Advising on peatland, carbon-rich soils and priority peatland habitats in development management (NatureScot, 2026);
- Guidance on Design Principles for Renewable Energy Development on Peatland on the National Forests and Land (FLS, 2024);
- A risk-based approach to peatland restoration and peat instability (Mills, A.J. and Rushton, D., 2023); and
- Windfarms and blanket peat (Lindsay, R. and Bragg, O., 2005).

2.5 Summary of Surveys

2.5.1 The following surveys have been undertaken for the Proposed Varied Development:

- Combined peat depth and ground condition surveys undertaken between September 2013 and June 2014 to establish baseline peat distribution and inform early design iterations;
- Phase I peat probing survey undertaken in 2017;
- Phase II peat probing survey undertaken in 2018 to refine infrastructure layout;
- Additional peat probing undertaken in 2024 to inform the Habitat Management Plan (HMP);
- Targeted peat probing undertaken in 2026 to support the Proposed Varied Development, focusing on areas that were altered for the Proposed Varied Development and also in areas where existing survey coverage and peat probe density were insufficient to support the proposed infrastructure and associated works; and
- Various site walkover surveys completed at different times for the various stages of the wind farm development.

2.5.2 In total, 3,004 peat probes have been recorded across the Site, comprising 2,555 probes for the Consented Development and an additional 449 probes for the Proposed Varied Development. The peat probing locations undertaken across the peat probing surveys completed are shown on **Figure 10 (Appendix A)**. Section 4 provides further details on the surveys undertaken and their findings.

2.5.3 Information derived from these surveys has been used to inform the PLHRA and is incorporated within the relevant sections of this report and associated figures.

2.6 Infrastructure Design

2.6.1 The peat depth assessment identified that peat depths ranging from 0m to 1.0m cover the majority of the Site, with large areas particularly towards the centre of the Site recording peat depths of up to 2.0m. More localised areas of up to 3.0m peat depth also are identified towards the centre of the Site, with isolated locations showing peat depths >4.0m. **Figure 11 (Appendix A)** presents the anticipated peat depth surface across the Site.

2.6.2 In general, the Proposed Varied Development is located in areas with peat depths up to 1.0m, although large sections are noted to be underlain by peat deposits up to 2.0m and localised small sections are noted with peat depth up to 3.0m.

2.6.3 It is acknowledged that deep peat has not been completely avoided as part of the Proposed Varied Development, however, given the presence of the peat deposits, the topography of the Site and other factors, this was not always possible. The presence of the peat deposits and their associated instability was taken into consideration in the layout of the Proposed Varied Development, with this document providing further mitigation, where required, where the infrastructure could not be moved further due to other constraints or considerations.

3. Baseline Environment

3.1 Topography and Slope Analysis

3.1.1 A Digital Terrain Model (DTM) was acquired for the Proposed Varied Development and is shown on Figure 4 within Appendix A, which includes a slope angle profile of the slopes within the works area. A brief summary of the elevation data and slope assessment is presented below.

3.1.2 The elevation data identifies that the Proposed Varied Development is defined by a central plateau, with slopes dipping away to the north and south. The plateau is generally between 180 and 200m AOD, however it is noted that it increases in elevation to the east, to a maximum height of 255m AOD. The southern extent of the RLB is recorded at approximately 115m AOD, which increases in elevation to meet the plateau to the north. The northern slope of the plateau dips away into a westward dipping valley, before increasing in elevation again towards the north-eastern edge of the RLB, reaching a maximum height of 230m AOD. The north-western edge is recorded at approximately 85m AOD.

3.1.3 In terms of slope gradient, the Proposed Varied Development has a range of assessed gradients based on location. Typically across the site, the slope gradient angle is between 2° - 5°, with the plateau recording between 0-2°. The northern slope has an average gradient of approximately 5° - 10°, with local variations present. Slopes of >15° are identified, generally in the immediate surroundings or watercourses.

3.2 Historic OS Mapping and Aerial Photography Review

3.2.1 Historic mapping and aerial photography were reviewed for the Proposed Varied Development in order to understand if there were any changes to the peat recorded to be present and if there were any historic clear signs of peat failure.

3.2.2 A review of the available historic Ordnance Survey (OS) maps available in the National Library of Scotland Map Viewer (2026), has not indicated that any signs of historic development has occurred within the Proposed Varied Development, except for the development of the existing Tangy I and Tangy II in the south of the Site.

3.3 Current Land Use

3.3.1 The current land use of the Proposed Varied Development has been assessed by mapping on recent OS mapping and aerial imagery, available through Bing Maps (Microsoft, 2026).

3.3.2 In terms of land use across the Site, Commercial forestry is present across part of the site, aside from in the regions of the existing windfarms and within areas of recent peatland restoration surrounding turbines T10, T11, T15 and T16. Large areas of the Proposed Varied Development have been subject to both historic and recent felling operations, resulting in a mosaic of clear-felled areas, forestry tracks, immature replanting, peatland restoration and remaining mature forestry. The central and southern parts of the forest area are largely characterised by previously felled forestry, while more extensive mature forest remains around the northern and eastern extents of the landscape. Additional forest felling is proposed within the Site, comprising of clear felling to facilitate the construction of the Proposed Varied Development followed by restocking in those areas outwith influencing distance of the Proposed Varied Development.

3.3.3 Areas of previously clear-felled forestry dominate much of the central sections of the Proposed Varied Development, while surrounding areas remain under mature commercial forestry.

3.3.4 In the south of the Site, the predominant land use is agricultural with the existing Tangy I and Tangy II Wind Farms (Operational Development) also present..

3.4 Geology and Soils

Superficial Geology (Drift Deposits)

3.4.1 A review of the BGS Onshore GeoIndex Viewer (BGS, 2026) indicates that the Proposed Varied Development is predominately underlain by Glacial Till deposits, with a large, isolated area of peat recorded within the central-western part of the Site. In addition, localised areas where no superficial deposits are recorded are present across the northern and southern extents of the Site, indicating that bedrock is likely to be at or close to ground level in these locations. The extents and distribution of the recorded superficial deposits across the Site and shown on **Figure 5** in Appendix A.

3.4.2 Although not specifically recorded by the BGS within the Site, the presence of watercourses and drainage features indicates that localised alluvium deposits may be present within the immediate vicinity of these channels. Similarly, although not mapped by the BGS, areas of Made Ground may also be locally present in association with existing infrastructure, forestry operations and access tracks.

3.4.3 The BGS provides the following descriptions of the recorded and anticipated superficial deposits.

- Glacial Till – the BGS do not provide a detailed description of these deposits; however, it is anticipated to consist of a variable proportion of clay, silt, sand and gravel with cobbles and boulders. Peat – "*partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps*."
- Alluvium – general term for clay, silt, sand and gravel deposited by a river, stream or other running water body. The deposit is typically described as "*soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel*."
- Made Ground – the BGS do not provide a description of made ground, however, this is likely to be highly variable in its composition, dependant on its source and may contain anthropogenic material.

3.4.4 The information obtained from the BGS was supplemented through review of the National Soil Map of Scotland Viewer (Scotland's Environment, 2026) was also undertaken. This source identifies the Site to be characterised by peaty gleys across the western part of the Site, Dystrophic Blanket Peat across the northern areas and eastern parts of the Site and noncalcareous gleys across the southern extent of the Site. The recorded soil extents are shown on **Figure 7** within Appendix A.

3.4.5 A review of the Carbon and Peatland 2016 Map layer of the National Soil Map of Scotland Interactive Map Viewer (Scotland's Soils, 2026) was also undertaken. This source indicated that the Proposed Varied Development is predominately underlain by Class 5 carbon-rich peatland soils, with more localised areas of Class 1, Class 2, Class 3, and Class 4 peatland soils recorded across the Site. The area of Class 1 peatland is present as a linear corridor extending west to east across the southern part of the Site. The area of Class 2 peatland is present at the south-eastern extent of the Site. The extents and distribution of the carbon and peatland classifications are shown on **Figure 6** within Appendix A.

3.4.6 The Carbon and Peatland 2016 Map provide the following descriptions of the recorded peatland classes.

- Class 1 – Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.
- Class 2 – Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential.
- Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.
- Class 4 – Predominately mineral soils where some peat soil may be encountered. The areas are unlikely to be associated with peatland habitats or wet and acidic type soils. The area is also unlikely to contain carbon-rich soils.
- Class 5 – Recorded as a peat soil, where the soil information takes precedence over the vegetation data. No peatland habitat is recorded within the area; however, the soils are likely to be carbon-rich and contain deep peat. Bare soils may also be present within the area.

3.4.7 Based on the available desk-based information, peat deposits are anticipated to be present across substantial areas of the Site, particularly within the central and northern extents where peatland restoration activities have been undertaken. Updated peat survey information and additional consultation with SEPA and Argyll & Bute Council (ABC) have refined the understanding of peat depth and distribution across the Site.

3.4.8 Taking cognisance of the available information, the underlying substrate is likely to comprise glacial till and weathered bedrock, with localised alluvial deposits potentially present adjacent to watercourses. The glacial till and alluvium are anticipated to behave predominately as fine-grained materials, whilst weathered bedrock may exhibit more course-grained characteristics.

3.4.9 A review of the landslide layer of the BGS GeoIndex Viewer indicates that no significant landslide features are recorded within the Proposed Varied Development. No evidence of instability or significant geohazards was identified during previous Site walkovers or desk-based assessments.

Solid Geology (Bedrock)

3.4.10 A review of the BGS Onshore GeoIndex Viewer (BGS, 2026) indicates the Proposed Varied Development to be predominately underlain by metamorphic bedrock of the Stonefield Schist formation to the west and the Glen Sluan Schist Formation to the east. The extents and distribution of the recorded bedrock geology are shown on **Figure 8** within Appendix A.

3.4.11 Traversing the central part of the Proposed Varied Development on a north-west to south alignment are narrow bands of Loch Tay Limestone Formation and the Neoproterozoic Basic Minor Intrusion Suite. These formations comprise sedimentary and igneous rocks respectively.

3.4.12 The BGS provides the following descriptions of the recorded bedrock formations.

- Stonefield Schist Formation – metamorphic rocks predominantly comprising schistose material with variable micra-rich horizons.
- Glen Slaun Schist Formation – metamorphic bedrock consisting predominantly of schist with locally variable mineral composition.
- Loch Tay Limestone Formation – sedimentary rock formations comprising limestone and calcareous strata.
- Neoproterozoic Basic Minor Intrusion Suite – igneous intrusions comprising basic intrusive rock material.

3.4.13 The bedrock geology underlying the Proposed Varied Development is therefore anticipated to comprise predominately metamorphic strata with more localised igneous and sedimentary intrusions through the central part of the Site.

Structural Geology

3.4.14 A review of the BGS Onshore GeoIndex Viewer (BGS, 2026) indicates that no mapped faults or other linear geological features directly intersect with the Proposed Varied Development. However, an inferred thrust fault is recorded approximately 2.2km of the east of the Site, trending in a north-east to south-west orientation.

3.4.15 No significant evidence of significant structural instability or recorded landslide activity has been identified within or immediately adjacent to the Site. The geological structure is therefore considered unlikely to present a significant constraint to the Proposed Varied Development.

3.5 Mining and Quarrying

Coal Mining

3.5.1 A review of the Mining Remediation Authority Interactive Map Viewer (Coal Authority, 2026) indicates that the Site is not located within a Coal Mining Reporting Area or Development High Risk Area. Furthermore, no mine entries, recorded underground workings or coal mining features are identified within the Site or in the immediate surrounding area.

3.5.2 The Mining Remediation Authority mapping further indicates that the underlying geological formations are not considered coal-bearing strata. Therefore, mining-related instability or risks associated with historic coal extraction are not anticipated to affect the Proposed Varied Development.

Quarrying

3.5.3 A review of available BGS mapping, historic OS mapping and aerial imagery indicates no active quarries are present within the Site. No evidence of significant historic quarrying activity was identified during the desk-based assessment or during previous site works.

3.5.4 Localised areas of disturbance associated with existing access tracks are present across parts of the Site. These may include small-scale borrow areas or excavations associated with historic infrastructure development. However, these are not considered significant in relation to the Proposed Varied Development.

3.5.5 A review of the Active Mines and Quarries layer of the BGS GeoIndex Viewer (BGS, 2026) indicates that there are no active mining or quarrying operations within the Site. No mining plans or quarry records are considered likely to affect the Site.

3.6 Hydrogeology

3.6.1 An estimation of the groundwater productivity of the superficial deposits recorded within the Proposed Varied Development was made using the guidance contained within the BGS Aquifer Productivity Report (BGS, 2015). The following aquifer productivity estimations were therefore made.

- Glacial Till – typically regarded as having a very low to low permeability and so are generally classed as not a significant aquifer;
- Alluvium – can have a varying permeability ranging from high to very low depending on the parent material making up the deposit. If the deposits are dominated by sand and gravel, then the deposits can be considered as a moderate to high productivity aquifer with potential yields from 1 to >10l/s. If the deposits are dominated by clay or silt, then they are likely to be classified as not a significant aquifer. However, in the context of this project, alluvium is considered to be localised to existing waterways, so won't be classed as an aquifer.
- Peat – peat is not covered within the guidance document; however, it is typically considered to have a relatively low permeability. Given this the peat is considered to not be a significant aquifer.

3.6.2 A review of the hydrogeology 1:625,000 scale layer of the BGS GeoIndex Viewer (BGS, 2026) indicates that the Proposed Varied Development is underlain by the Argyll Group and Southern Highland Group hydrogeological units.

3.6.3 The BGS describes the Argyll Group as a "*low productivity aquifer*" where groundwater flow occurs predominately through fractures and discontinuities, with "small amounts of groundwater in the near-surface weathered zone and fractures."

3.6.4 Similarly, the Southern Highland Group is classified as a low productivity aquifer with groundwater movement associated primarily with secondary permeability within fractures and weathered zones.

3.6.5 A review of SEPA's Groundwater Classification Map (SEPA 2026a) identifies the underlying bedrock strata beneath the Proposed Varied Development as "moderately low permeable." These formations are described as fractured or potentially fractured rocks that do not possess high primary permeability but may provide limited groundwater storage and local baseflow contribution to surrounding watercourses.

3.6.6 The Groundwater Vulnerability Mapping further indicates that the moderately permeable bedrock is partially overlain by low permeability drift deposits, reducing the vulnerability of the underlying groundwater environment.

3.6.7 A review of the Groundwater Vulnerability GIS dataset (BGS Open Report OR/11/064) indicates that the underlying groundwater vulnerability class is recorded as 4b. There it is stated that the groundwater is vulnerable to those pollutants not readily absorbed or transformed, which is more likely to have clay present in the overlying superficial deposits.

3.7 Hydrology

3.7.1 The watercourses present within the Proposed Varied Development, as identified from OS mapping and Site surveys, are shown on **Figure 3** in Appendix A.

3.7.2 The Proposed Varied Development is drained by a series of minor watercourses and drainage channels which generally flow towards the north-west. These drainage features ultimately contribute to the wider Kintyre Coastal catchment area (SEPA Catchment Number 104).

3.7.3 Several unnamed tributaries are present across the Proposed Varied Development as shown on **Figure 3** in Appendix A. Drainage patterns generally follow the broad Site topography, with run-off directed from the higher central areas towards lower ground to the north and west.

3.7.4 The presence of historical commercial forestry operations within parts of the Proposed Varied Development indicates that artificial drainage ditches and channels are likely to be present locally. In areas subject to peatland restoration, the drainage features have either been infilled or a series of full width dams installed as part of restoration works.

3.7.5 Scotland's Environment Interactive Map Viewer (Scotland's Environment, 2026) indicates that the Proposed Varied Development does not lie within a specific river catchment. Surface water run-off from the Proposed Varied Development is anticipated to drain via local tributaries into Tangy Burn, Allt a' Ghoirtein, Allt na Ceardaich, and Allt nan Creamh.

3.7.6 A review of SEPA's Water Classification Hub (SEPA, 2026) indicates that the principle downstream water environment within the catchment is classified overall as having 'good' ecological status. Although many of the smaller watercourses within the Proposed Varied Development are unclassified, they are considered likely to exhibit similar baseline water quality characteristics.

3.7.7 No large waterbodies are located within the Proposed Varied Development boundary; however, localised areas of standing water, bog pools and seasonally waterlogged ground are anticipated within peatland areas.

3.8 Climate

3.8.1 The rainfall data for the Proposed Varied Development is obtained through review of the catchment information tab relating to specific measurement gauges along watercourse, available from the UK Water Resource Portal (UK Centre for Ecology & Hydrology, 2026). This source indicated one river flow station within 15km of the Proposed Varied Development:

- Carradale at Dippen

3.8.2 **Table 1** shows the annual average rainfall recorded from the river flow station.

Table 1 Average Rainfall, Carradale at Dippen

Catchment	Grid Ref	Gauge ID	Period of Record	Annual Average Rainfall (mm)
Carradale at Dippen	NR 797376	88001	1991-2020	1,772

3.8.3 According to the Met Office (Met Office, 2026) the annual average of rainfall at Machrihanish in Scotland, approximately 8.5km south-west to the Proposed Varied Development over the same period of time was 1229mm. Therefore, the records show for the Carradale at Dippen there tends to be a higher than average rainfall in this area. Given the rainfall data recoded at Machrihanish and at the Carradale at Dippen Station, there is the potential for the Site to have a higher than average rainfall.

3.9 Flooding

3.9.1 The SEPA Flood Maps (SEPA 2026b) and associated desk study information have been reviewed to assess potential flood risk within the Proposed Varied Development, which are summarised below.

- River Flooding – The majority of the Proposed Varied Development does not lie within areas identified by SEPA as being significant risk of river flooding. Localised areas adjacent to existing

watercourses and drainage channels may be susceptible to periodic fluvial flooding during high rainfall events; however, these areas are generally limited in extent and associated with existing surface water features.

- Coastal Flooding – The Proposed Varied Development is located inland and at elevated topography and is therefore not considered to be at risk from coastal flooding.
- Surface Water Flooding – SEPA flood mapping indicates localised areas across the Proposed Varied Development to be susceptible to surface water flooding, particularly in topographical depressions, peatland hollows and adjacent to drainage pathways. Areas of flatter terrain associated with peatland restoration may also exhibit localised ponding and saturated ground conditions following prolonged rainfall events.
- Groundwater Flooding – Susceptibility across the Proposed Varied Development is generally considered low due to the limited groundwater productivity of the underlying bedrock and superficial deposits. However, shallow groundwater and perched water tables may locally occur within peat deposits and poorly drained superficial materials.

3.9.2 The above does not constitute a formal flood risk assessment, just a collation of the available information relating to the topic.

3.10 Geomorphology

3.10.1 The geomorphology of the Proposed Varied Development is dominated by the topography and resulting drainage pattern, which can be seen on **Figure 9** in Appendix A.

3.10.2 The Proposed Varied Development generally rises from approximately 155m AOD in the south to around 220m AOD at the easternmost extent of the current proposed development area. The landform is characterised of gently undulating terrain with broad slope transitions and limited abrupt topographic breaks.

3.10.3 The drainage network and peat distribution across the Proposed Varied Development appear closely associated with the topography. Flatter, lower-gradient areas across the central and northern parts of the Proposed Varied Development provide conditions conducive to peat accumulation and the development of waterlogged ground. This interpretation is consistent with both the BGS superficial geology mapping and peat survey data.

3.10.4 Areas of glacial till are anticipated to reflect historic glacial deposition processes, whilst localised bedrock outcrops and shallow rockhead are likely to occur within higher ground and steeper areas where superficial cover is absent or limited.

3.10.5 The restored peatland areas surrounding turbines T10, T11, T15 and T16, together with areas surrounding the proposed substation, are likely to exhibit locally modified surface morphology associate with peat restoration measures including drain blocking and rewetting.

3.10.6 Overall, the Proposed Varied Development geomorphology is considered typical of upland glaciated terrain in western Scotland, with peatland development strongly controlled by topography, drainage and superficial geology.

4. Site Surveys

4.1 Walkover and Peat Probing Surveys

4.1.1 Four Site surveys were undertaken within the Site between September 2013 and March 2026 to inform the GI, EIA and design process the Proposed Varied Development. These surveys comprised the following phases.

- **Initial Baseline Survey (Sep 2013 – Jun 2014):** A combined peat depth and ground conditions survey was undertaken, including a baseline 100m grid, detailed peat surveys and final probing phases to inform early design iterations.
- **Phase I Peat Probing (2017):** 54 probes were completed, with peat depths ranging from 0m – 4.7m (avg. 1.4m, max 4.7m).
- **Phase II Peat Probing (2018):** 1,878 probes were completed to refine infrastructure location, with depths 0m – 5.0m (avg. 0.6m, max 5.0m).
- **Habitat Management Plan (HMP) (2024):** 623 probes targeted habitat management and restoration areas, with depths 0m – 3.7m (avg. 1.1m, max 3.7m).
- **Additional Probing by AECOM for Proposed Varied Development (2026):** 449 probes were undertaken to address infrastructure and areas with insufficient previous coverage (avg. 0.8m, max 3.4m). Probing regimes included 50m centres with 10m offsets along new/proposed access tracks and 50mx50m grids on new infrastructure areas, in consultation with SEPA. Areas where previous surveys had already confirmed peat depths of <0.5m at a sufficient probe density were not subject to further probing.

4.1.2 Across all phases, 3,004 peat probes have been undertaken for the Proposed Varied Development.

4.1.3 The walkover confirmed features identified in Section 1.2 and Section 3 of this PLHRA. Much of the central part of the Site consists of previously clear-felled forestry, with areas of ongoing peatland restoration, commercial conifer plantation.. The northern and peripheral areas of the Site continue to be dominated by mature forestry, with additional feeling proposed in localised areas associated with the Proposed Varied Development infrastructure. Ground conditions across the Site area comprise a combination of forested terrain, recently felled areas, forest rides, open peatland habitats and agricultural land.

4.1.4 Ground conditions were typically variable in response to topography and land use, with steeper slopes characterised by firmer ground and minimal soil development and flatter areas exhibiting wetter, softer conditions indicative of underlying peat deposits. The majority of peat probing was undertaken within forested or recently felled areas (where deeper peat deposits were anticipated), with more limited coverage within open ground.

4.1.5 The central part of the Site, to the west and northwest of proposed turbine T14, comprises a large bog area characterised by very soft, waterlogged ground conditions, with bog depths estimated >1.0m, making the area very difficult to traverse.

4.1.6 No evidence of active peat instability, including cracking, slumping or large-scale peat failure was observed during any of the survey phases.

4.1.7 Bedrock exposures were identified locally within the western part of the Site, while drainage ditches were commonly encountered along historic firebreaks and forestry management corridors. These features generally follow the natural topography but are frequently obscured by vegetation and forestry debris.

4.1.8 Existing access tracks, constructed from granular aggregate with plastic drainage pipes present, were observed predominantly in the western and southern parts of the Site. These were generally in good condition, with no significant evidence of settlement or structure failure.

4.2 Peat Probing and GI Summary

4.2.1 A total of four peat probing surveys has been undertaken across the Proposed Varied Development. Two surveys were completed between 2017 and 2018 to inform the original consented scheme, with

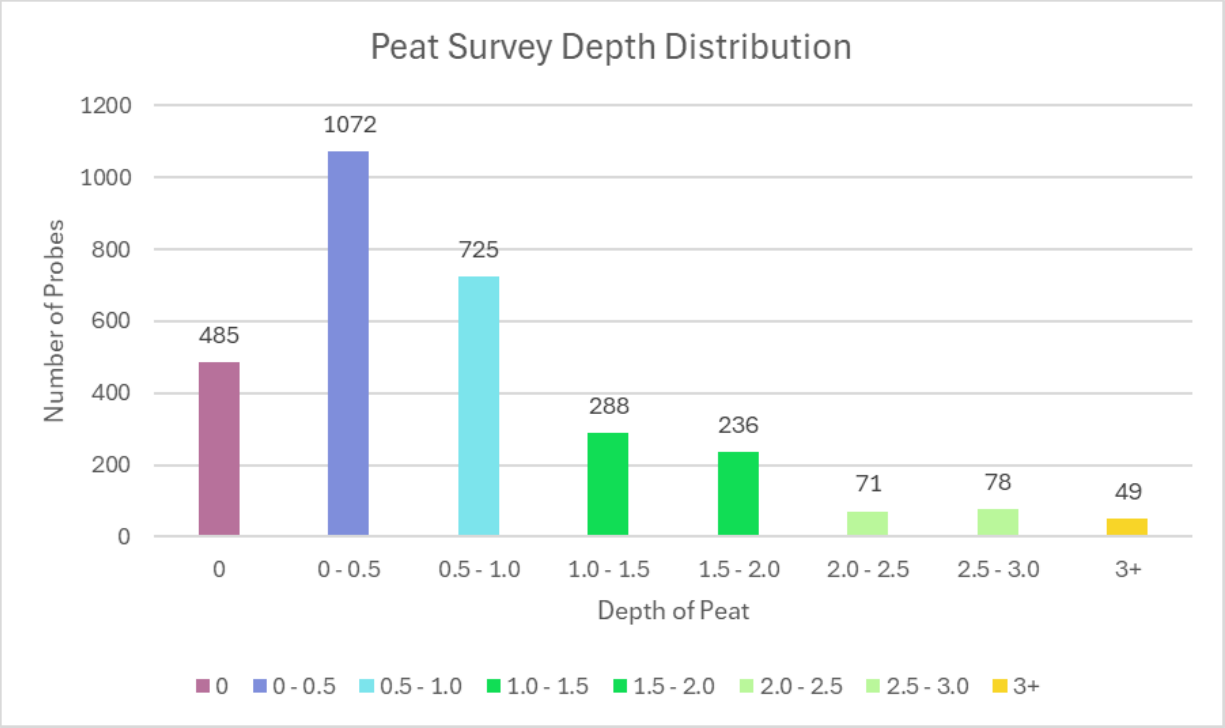
subsequent survey undertaken in 2024 and 2026 to support the Habitat Management Plan (HMP) and S36C. These surveys collectively provide comprehensive spatial coverage variability in peat depth across both Consented and Proposed Varied Development layouts.

4.2.2 A total of 3,004 peat probes have been undertaken across the Site through multiple survey phases between 2017 and 2026. The results of these investigations confirm that peat is present across the majority of the Site, with variability in both depth and distribution influenced by topography and historical land use. These surveys are summarised in Table 2 below.

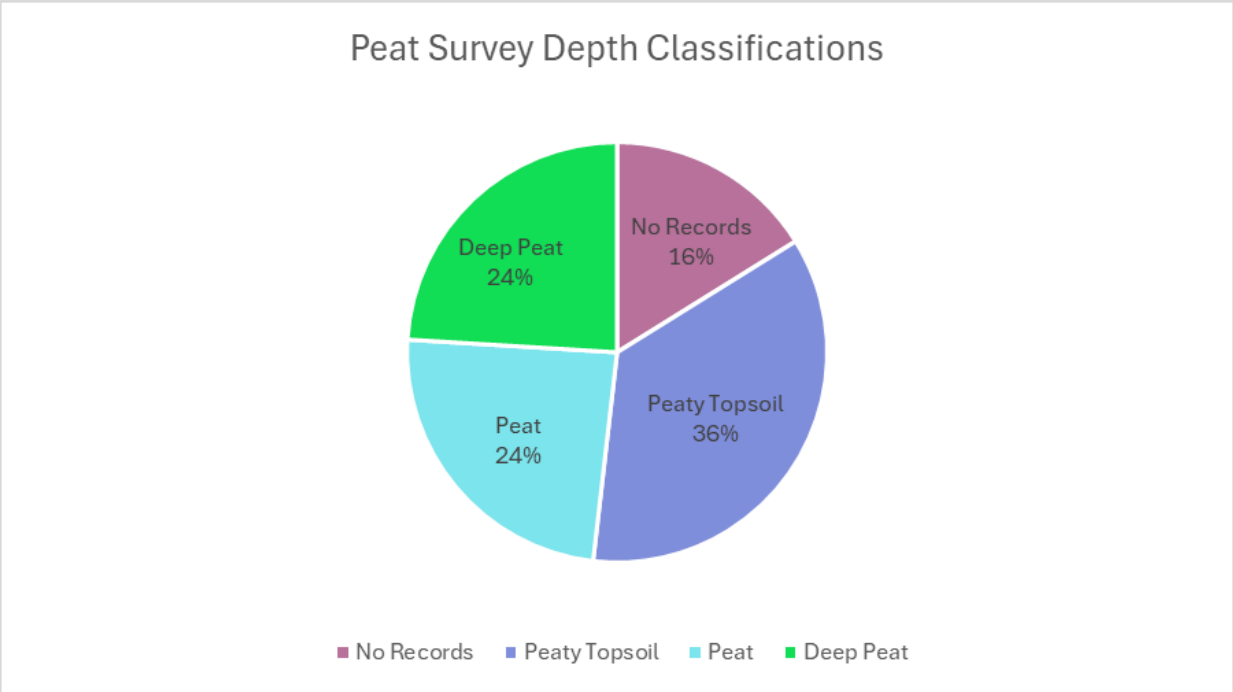
Table 2 Peat Probing Summary

Peat Probing Exercise	Number of Probes	Maximum Depth Recorded (m)	Average Depth (m)
2017	54	4.7	1.4
2018	1,878	5.0	0.6
2024	623	3.7	1.1
2026	449	3.4	0.8
Total	**3,004**		

4.2.3 Insert 1 and Insert 2 below, present the distribution of peat depths identified across all phases of investigation and the percentage split of peaty topsoil / peat / deep peat / no peat encountered.



Insert 1 Peat Survey Distribution by Depth



Insert 2 Peat Survey Classification by Depth

4.2.4 The distribution of peat depths indicates the following.

- No Records, (where peat depths of 0 are recorded) are locally present in areas throughout the Site.
- Peaty Soils or peaty topsoils as identified in **Insert 2** (with a depth of <0.5m) are widespread across steeper and disturbed ground.
- Intermediate peat depths or peat as identified in **Insert 2** (≥0.5m but ≤1.0m depth) are generally associated with transitional slopes.
- Deeper peat deposits or deep peat ad identified in **Insert 2** (>1m) are more localised, typically occurring within flatter, lower-lying areas.

4.2.5 Overall, the majority of peat deposits across the Site are less than 1m in thickness, although isolated deeper accumulations are present in discrete areas, particularly within flatter terrain and former undisturbed peatland pockets.

4.2.6 Peat depth interpolation mapping (**Figure 11** in Appendix A) indicates that peat deposits are distributed across the Site in a pattern broadly consistent with topographic controls, with deeper deposits generally aligned within lower-lying ground and shallower or absent peat associated with steeper slopes and areas of historical forestry disturbance.

4.2.7 **Figure 10** in Appendix A, shows the locations of the peat probes completed and the estimated depths of peat encountered. **Figure 11** in Appendix A then used the results of the peat probes and their locations to create a peat depth interpolation plan for the Proposed Varied Development using the Inverse Distance Weighing (IDW) methodology.

4.2.8 The Peat Depth Interpolation shows that peat deposits are present across the north, east, south-east and centre of the Proposed Varied Development, in areas of gentler slopes, with shallow or no peat present along the west and south of the Proposed Varied Development.

5. Peat Stability

5.1 General Information on Peat

5.1.1 The BGS describe peat as a “partially decomposed mass of semi-carbonised vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps.” (BGS, 2026).

5.1.2 Peat is characterised as generally having an extremely high water content, high organic content, low bulk and dry densities, low shear strength and very high compressibility (O’Kelly, 2017). The Scottish Government guidance document (Scottish Government, 2017) provides further information on the characteristics of peat indicating that dry peat is typically 90 – 95% organic matter and that it has special hydrological properties with water contents of around 90%.

5.1.3 Peat deposits are split into two layers an upper acrotelm and a lower catotelm. The acrotelm is where there is a living root system which helps to loosely bind the plant remains together with a normal level of water table fluctuations also within the layer. The catotelm is a more decomposed layer which is below the water table level and is waterlogged (O’Kelly, 2017). The position of the water table therefore partly controls the level of acrotelm and catotelm deposits which therefore control the stability of the peat deposits.

5.1.4 BS 5930 (BSI, 2020) provides a means for describing peat in the field in the form fibrous peat, pseudo-fibrous peat and amorphous peat. Fibrous peat is described as having clearly recognisable plant remains with the deposits also retaining some tensile strength. Pseudo-fibrous peat is described as a mixture of plant fibres and amorphous peat. Amorphous peat is described as having no recognisable plant remains with the deposits also having a ‘mushy’ consistency. The degree of decomposition of the peat can be further estimated in the field by applying the Von Post Scale of humification which ranges from H1 (no decomposition) to H10 (totally decomposed) (Von Post, 1924).

5.1.5 The Scottish Government Guidance document (Scottish Government, 2017) records three different naming conventions depending on the depth of the peat deposits. These are listed as follows:

- Peaty Soil – a peat or surface organic soil with a depth of <0.5m;
- Peat – a peat of ≥0.5m but ≤1.0m depth and which has an organic matter content of >60%; and
- Deep Peat – a peat that is >1.0m depth.

5.1.6 The Scottish Government Guidance document (Scottish Government, 2017) also identifies three different types of peat deposits; raised bog, blanket bog and fen bog. The Wildlife Trust (Wildlife Trust, 2026a) records that a raised bog is formed of deep peat which can be several metres higher than the surrounding ground level and covered with a surface layer of vegetation. Generally, raised bogs are significantly wetter than the surrounding land and are fed almost entirely by rainwater. The Wildlife Trust (Wildlife Trust, 2026b) records that a blanket bog is generally an upland habitat with peat that has accumulated to a depth of at least 0.5m, typically on flat or gently sloping land where drainage is poor, and the peat is predominately fed by rainwater. The International Peat Society (International Peat Society, 2026) records fen peatlands as being located in depressions which have strong connections with groundwater that have been in contact with mineral bedrock or soil.

5.1.7 Peat accumulations are typically thickest in reasonably flat lying areas or topographic hollows where surface and groundwater drainage is often concentrated and thins as the local slope angle increases. On steep slopes the conditions are generally considered too steep for thick peat to form, although some peat may be present.

5.2 Factors Controlling Peat Instability

5.2.1 The Scottish Government Guidance document (Scottish Government, 2017) indicates that peat instability can manifest in a number of ways, which generally fall into two categories: minor instability and major instability. Minor instability are features which may be warning signs of major instability or possibly just simply represent a response to the land against drainage and gravity (e.g. creep). Localised and small tension cracks, tears in the acrotelm, compression ridges or bulges and thrusts in the peat deposits represent some features which represent minor instability. Major instability comprises an actual peat landslide which can vary in form and scale.

5.2.2 The Scottish Government Guidance document (Scottish Government, 2017) records that peat instability can be caused by a number of factors which can be split into two groups: preparatory factors and triggering factors. Preparatory factors increase the susceptibility of peat to become unstable (i.e. fail) without necessarily causing a peat landslide. As such, preparatory factors can influence peat stability over a long period of time. Triggering factors have an immediate or rapid effect on the peat changing its stability from stable to unstable. As such, triggering factors can be considered as being the cause of failure.

5.2.3 The main preparatory factors, which reduce the overall stability of peat include:

- Increase in the mass of peat (e.g. through vertical accumulation of peat, increase in water content and through afforestation within the peat);
- Reduction in shear strength of the peat or substrate through physical changes in its structure (e.g. creep or vertical fracturing), chemical or physical weathering or by clay dispersal in the substrate;
- Loss of surface vegetation (e.g. through burning, pollution or through deforestation) causing reduction in tensile strength;
- Increased buoyancy of the peat through increase in sub-surface water or wetting of desiccated areas; and
- Afforestation, which will reduce the water content of the peat body and increase the likelihood in the formation of desiccation cracks which are likely to be infiltrated by rainfall.

5.2.4 Triggering factors can be split into two types; natural events and man-made. Triggering factors covering the two types include:

- Natural Events:
  - High intensity and prolonged rainfall, in particular following a dry period, or melting of snow / ice causing a short-term high pore-water pressure at pre-existing or potential rupture surfaces;
  - Earthquakes causing rapid ground acceleration;
  - Erosion at the toe of a peat slope, reducing support to the upslope peat mass; and
  - Increased loading on the peat mass (e.g. through previous peat landslide debris).

- Man-made Events:
  - Alteration of hydrological regime by changing natural drainage paths;
  - Rapid ground accelerations caused by works (e.g. through blasting or vibrations of plant);
  - Extraction of peat at toe of slope, reducing support to the upslope peat mass;
  - Increased loading on the peat by plant, structures or overburden;
  - Earthworks including excavating, filling, stockpiling and embankment of material; and
  - Ground subsidence associated with mining.

5.2.5 While peat failures are often considered to originate in thick or extensive accumulations, it should be noted that instability can still occur in areas of limited peat thickness. The nature of the peat and the interface between the separate layers can also influence its stability. The plane of failure can be located at the interface between the upper, periodically saturated acrotelm layer and the underlying permanently saturated catotelm layer. The plane of failure can also be located at the interface between the peat and the underlying substrate.

5.2.6 Failure can occur due to heavy or prolonged rainfall or due to melting snow or ice which can cause short-term high pore-water pressure along pre-existing or potential rupture surface (e.g. between the substrate and the peat) and can increase the mass of the peat accumulation. This can be exacerbated by drying out of the peat (in summer months for example) leading to the formation of desiccation cracks which can in turn fill with water during rainfall resulting in a short-term increase in pore-water pressure and potentially cause failure. The influence of rainfall on potential peat failure is considered to be heavily dependent on the natural drainage regime within the peat. It should be noted that peat failures often occur after heavy rainfall events after the peat slope has been conditioned to fail after other processes. Given the effect of global warming and the anticipated greater frequency of extreme weather conditions, including more intense storms with heavy rainfall, the rainfall trigger of peat instability may be of more significant concern in the future.

5.2.7 Peat extraction can generate new drainage pathways, leading to a concentration of surface and / or groundwater flow and subsequently result in either increased erosion or concentration of water within localised areas of the accumulation, which can potentially increase the instability of the peat mass. Extraction or erosion can also have the effect of releasing the confining pressures acting on the peat,

which can lead to the development of tension cracks in adjacent peat accumulations as a result of the loss in lateral support. Extraction or erosion of the peat mass at the toe of a slope also reduces the support to the upslope material which can result in peat slope failure.

5.2.8 Loading of peat causes an increase in the shear stress applied to the peat mass and can also generate the formation of tension cracks through compression and bulging of underlying or adjacent peat soils. In the case where tension cracks are formed, depending on the topography, the strength of the peat may be dramatically reduced and due to the alteration in loading, rainfall may not be required to initiate a failure.

5.2.9 Ground subsidence associated with the collapse of shallow underground workings and / or abandoned mine shafts may trigger localised peat slumps. Peat failures initiated by mining subsidence could be expected to typically involve peat slumping in towards the area affected by subsidence and their scale would be dependent on a number of factors including the depth of the peat deposits, the nature of the local hydrological regime and the topography of the surrounding area.

5.2.10 Rapid ground accelerations caused by either man-made vibrations or earthquakes increases the shear stresses within the peat mass and may trigger a peat landslide.

5.2.11 Tree felling (even where affected areas are subsequently re-planted) and permanent deforestation can impact upon the hydrogeological regime of the peatland area through reduced groundwater extraction and altered drainage pathways. This can lead to increased peat erosion and focused drainage and short-terms high pore-water pressures within pre-existing or potential rupture surfaces in the peat accumulation, both of which can increase the risk of peat failure. Also, removal of trees can remove the potentially stabilising root systems, which can reduce the tensile strength of the peat mass.

5.2.12 Alteration of the hydrological regime can have long-term and far-reaching effects on the stability of peat accumulations. Alteration by diverting or blocking either man-made or natural surface drainage pathways or the development of new ditches can transport and concentrate water into areas which can cause potential peat instability.

5.2.13 Within peat accumulations, groundwater will generally flow more readily within the upper acrotelm layer relative to the underlying less permeable catotelm. Excavations within peat will influence existing drainage paths and local permeability. The construction of a wind farm will potentially generate an area of hydrological sensitivity due to the free draining nature of the construction stone.

5.2.14 It should be noted that peat is a natural feature which under the correct conditions will increase in detph. It is likely that, on sloping ground and where the peat has increased in depth, there will be a time when the stabilising forces (e.g. internal strength of the peat and the interface with the underlying substrate) will be outweighed by the destabilising forces (e.g. weight of the peat mass) and the peat accumulation will fail.

5.3 Peat Failures

5.3.1 Areas that have experienced historic peat instability are more likely to experience future instability issues during and post construction. It is therefore essential to identify and record any signs of past instability (e.g. cracking of the peat surface, any debris from past failures, peat creep, etc) as part of any peat instability assessment.

5.3.2 Peat failures can occur on gentle slopes, just as on steeper slopes, depending on the loading, drainage conditions and the condition of the peat structure. Changes in gradient, including the subsurface gradient of underlying strata, can also contribute to peat failure due to the potential short term excess pore-water pressures they can create within both concave and convex slope profiles and the gravitational effects on the peat mass.

Types of Peat Failure

5.3.3 Table 2.1 of the Scottish Government Guidance document (Scottish Government, 2017) identifies a number of different types of peat failures, as follows:

- Bog Bursts – failure of a raised bog which involves the emergence of liquid basal peat followed by the settlement of the previously overlying residual peat. Typically recorded to occur on slopes with gradients between 2° and 5° with a typical peat thickness of between 2m and 5m;

- Bog Flow – failure of a blanket bog which involves the emergence of highly humified (decomposed) basal peat from a clearly defined source followed by the settlement of the previously overlying residual peat. Typically recorded to occur on slopes with gradients between 2° and 5° with a typical peat thickness of between 2m and 5m;
- Bog Slide – failure of blanket bog involving the sliding of the peat along a shearing surface within the peat mass. Typically recorded to occur on slopes with gradients between 5° and 8° with a typical peat thickness of between 1m and 3m;
- Peat Slide – failure of blanket bog involving sliding of entire peat mass on a shearing surface at the peat / substrate interface leading to a transitional type failure. Typically estimated to occur on slopes with gradients between 5° and 8° with a typical peat thickness of between 1m and 3m;
- Peaty Debris Slide – Transitional failure in which the shearing surface is entirely located within the substrate. The covering layer of peat is part of the failure; however, the peat is only considered to be a secondary influence on the failure. Typically recorded to occur on slopes with gradients between 4.55° and 32° with a typical peat thickness of <1.5m; and
- Peat Flow – any other failure not covered by one of the above, in any other peat deposit (e.g. fen, basin bog, etc) and by any other failure mechanism.

6. Peat Landslide Hazard and Risk Assessment

6.1 General

6.1.1 Due to the presence of peat accumulations >0.5m within the Proposed Varied Development site and as slope gradients >2° are identified, in accordance with Figure 1.1 of the Scottish Government Guidance document (Scottish Government, 2017), a PLHRA is considered required and has been carried out to assess the risks posed by such soils to the Proposed Varied Development.

6.1.2 Peat slides can represent a significant hazard and can occur during the construction, operation and decommissioning phases of a development. The nature of electricity generation developments in Scotland often situates them in areas where peat moorland is typically found, and it is inevitable that some alteration of the local hydrological regime of a site will occur due to the design and construction practices of such a development.

6.1.3 It is widely considered that development in areas of peat accumulation can have an effect on the stability of these soft soils through alteration of the drainage regime, alteration of loadings (both temporary loads during construction and final working loads), alteration of land use (e.g. removal of surface vegetation) and alteration of the topography. Any proposed development within such an area requires a PLHRA to characterise the development, identify issues and develop the required construction mitigation measures to reduce the risk of a failure occurring within the peat.

6.1.4 The key considerations of this assessment are that:

- Existing, historical or potential areas of instability are identified; and
- The Proposed Varied Development, including construction works, does not result in an unacceptable risk of peat failure.

6.2 Triggering and Preparatory Factors Relevant to the Proposed Varied Development

6.2.1 The following provides a summary of the relevant triggering and preparatory factors which relate to the Proposed Varied Development.

- Rainfall is not a controllable factor. However, the assessment considers the potential effects of heavy rainfall at the Proposed Varied Development;
- Peat loading, and peat extraction are potential hazards. However, both will be mitigated through best practice working methodologies to be embedded by the Contractor as part of the site-specific construction methodology documents to be prepared by the Contractor prior to construction;
- The topography of the Proposed Varied Development is characterised by relatively elevated and sloping terrain, and the assessment should take cognisance of the combined topography and peat thickness;
- The creation of new drainage paths may lead to the potential channelling and ponding of run-off in areas of the Proposed Varied Development, posing a potential hazard. This hazard will be minimised through the adoption of best practice methodologies;
- The creation of rapid ground acceleration through plant and construction methods. This hazard will be reduced through the adoption of best practice working methodologies and practices for peatland;
- The removal of surface vegetation (i.e. through tree felling and vegetation clearance). This hazard will be reduced by only removing vegetation where required to complete the Proposed Varied Development; and
- Working methodologies / mitigation measures referred to above will be presented in detail in the site specific construction methodology documents prepared in the Construction Phase PMP and CEMP and are discussed further in the ‘Mitigation Measures’ Section of this report.

6.3 Consequences of Peat Failure

6.3.1 A key part of the risk assessment process is to identify the potential scale of peat failure should it occur and identify the receptors of the consequences. For the Proposed Varied Development, the key potential sensitive receptors of peat failure are considered to be the following:

- The Proposed Varied Development (e.g. turbines and associated hardstandings, new substations, new access tracks and upgrades to existing access tracks, construction compounds, laydown areas, met masts, etc.);
- existing infrastructure (i.e. existing forestry access track existing public access road to south of Operational Development);
- site workers and plant (risk of injury / death or damage to plant);
- wildlife and ecological designated sites (disruption or destruction of habitat);
- watercourses and aquatic fauna;
- site drainage (blocked drains / ditches leading to localised flooding / erosion);
- archaeological designated sites; and
- visual amenity (scarring of landscape).

6.4 Risk Assessment

6.4.1 The stability of peat deposits is a complex matter of which there are various inter-relationships affecting the peat mass that can affect its stability with these expected to vary depending on the Proposed Varied Development. Two different methods are available for assessing the stability of a peat mass with those being a qualitative and a quantitative assessment. A quantitative assessment relies on numerical inputs typically to determine a factor of safety on the stability of the peat mass. The completion of a largely numerical analysis cannot account for those inputs which are not entirely quantifiable and hence a comprehensive peat stability assessment cannot be completed. A qualitative assessment is based on those conditions upon which historic peat instability has been observed and uses the factors which are noted to contribute to those to build a model. Using this method, although not directly accounted for, may inherently allow for those factors which are not fully quantifiable. As such, a purely quantitative assessment should not be completely relied upon and a qualitative assessment should be completed to provide an understanding on the likely peat instability areas, based on previously recorded conditions of instability, to inform the final recommendations and any mitigation considered required.

6.4.2 The Scottish Government Guidance (Scottish Government, 2017) provides an overview and guidance to be referred to in respect to peat landslides and the consequences which could be considered. The guidance provided is noted as being for “illustrative purposes only and should not be taken as prescriptive or used as a substitute for the developer’s preferred methodology.” It further notes that in all cases the risk assessment methodology utilised should be clearly explained and incorporate consideration of the likelihood of peat instability and the consequence should this occur.

6.4.3 Based on the above explanation, this PLHRA consists of a qualitative assessment based on an examination of available topographical maps and aerial photography, topographic information obtained from DTM data, observations made during site visits, an assessment of peat probing results, and engineering judgement.

6.4.4 The Qualitative Risk Assessment (‘Hazard Ranking’) was undertaken by identifying the factors that can cause landslide events and estimating the impact of such events on the Proposed Varied Development and any other receptors present. The Hazard Ranking has been undertaken in accordance with the Scottish Government Guidance.

6.4.5 The Hazard Ranking was calculated using the following equation (Eq. 3 from the Scottish Government Guidance):

Hazard Ranking = Hazard x Exposure

6.4.6 The terms Hazard is defined in this case as “the likelihood of the peat landslide event occurring.” The term Exposure is defined in this case as “the impact and consequences that the event may have” or its

"adverse consequences." Therefore, the following equation can be considered for the assessment completed:

Hazard Ranking = Peat Slide Likelihood x Consequence of Peat Failure

6.4.7 The Peat Landslide Likelihood Scale used in this assessment is shown in Table 3, which is based on the scale recommended in Table 5.1 of the Scottish Government Guidance.

Table 3 Peat Landslide Likelihood Ranges of the Lifetime of the Proposed Varied Development

Peat Landslide Liklihood Scale	Likelihood	Probability of Occurrence
5	Almost certain	> 1 in 3
4	Probable	1 in 10 – 1 in 3
3	Likely	1 in 10^2 – 1 in 10
2	Unlikely	1 in 10^7 – 1 in 10^2
1	Negligible	< 1 in 10^7

6.4.8 The Consequence scale used in this assessment is shown in Table 4**Error! Reference source not found.**, which is based on the scale recommended in Table 5.2 of the Scottish Government Guidance. Note the various receptors shall be assigned a Consequence ranking later in this document.

Table 4 Peat Landslide Consequence Ranges over the Lifetime of the Proposed Varied Development

Peat Landslide Consequence Scale	Consequence	Impact as % damage to (or loss) of receptor	Example Consequences
5	Extremely high	> 100% of the asset	Loss of life or serious injury, major pollution incident, complete destruction of property or infrastructure or public road, major loss of habitat.
4	Very high	10% – 100%	Minor or non-serious injury, significant damage to property, significant pollution incident or significant loss of habitat.
3	High	4% – 10%	Minor pollution incident, minor damage to property or temporary closure of infrastructure, destruction of access track locally, significant delay to construction, localised loss of habitat.
2	Low	1% – 4%	Temporary closure of forest roads, minor delay to construction.
1	Very low	< 1% of the asset	Minor remediation of infrastructure or habitat.

6.4.9 Once all areas which could be affected by a peat landslide as a result of the Proposed Varied Development been assigned a peat landslide Likelihood and degree of Consequence, a Hazard Level can be estimated. The indicative Hazard Levels used in this assessment are shown in Table 5, which is based on the scale recommended in Table 5.3 of the Scottish Government Guidance.

Table 5 Indicative Hazard Levels

Peat landslide Likelihood	Peat Landslide Consequence				
	Extremely High	Very High	High	Low	Very Low
Almost Certain	High	High	Moderate	Moderate	Low
Probable	High	Moderate	Moderate	Low	Negligible
Likely	Moderate	Moderate	Low	Low	Negligible
Unlikely	Low	Low	Low	Negligible	Negligible
Negligible	Low	Negligible	Negligible	Negligible	Negligible

6.4.10 Where the Hazard Level for a zone is moderate or high, avoidance or specification of mitigation measures would normally be the only means by which project infrastructure could be considered acceptable within that zone at the Proposed Varied Development.

6.4.11 The need for specification of mitigation measures should be a function of the Hazard Levels present on the Proposed Varied Development. The Risk Levels and suggested actions used in this assessment are shown in Table 6, which is based on the scale recommended in Table 5.4 of the Scottish Government Guidance.

Table 6 Hazard Ranking and Suggested Actions

Hazard Ranking	Action suggested for each zone
High	Avoid project development at these locations
Moderate	Project should not proceed unless risk can be avoided or mitigated at these locations, without significant environmental impact, in order to reduce risk ranking to low or negligible.
Low	Project may proceed pending further investigation to refine assessment and mitigate hazard through relocated or re-design at these locations.
Negligible	Project should proceed with monitoring and mitigation of peat landslide hazards at these locations as appropriate.

Estimating the Peat Landslide Likelihood

6.4.12 It is clear that the stability of peat is a complex matter with various factors and relationships which can affect its stability. These factors are also likely to vary from site to site. From a literature review the following factors are noted as those which could affect the stability of a peat mass:

- Slope angle;
- Peat depth;
- Signs of relic failure or instability;
- Nature of the substrate;
- Slope form;
- Peat morphology;
- Hydrology considering drainage;
- Presence and management of forestry; and
- Land use.

6.4.13 Considering the factors above and the complexity in assigning inter-relations, only the main controlling factors, which are considered by the assessor to be slope angle, peat depth, signs of relic failure or instability features and substrate are used as part of this assessment. Without a suitable peat depth or slope angle, a peat landslide would not occur. Furthermore, the presence of relic peat instability or instability features would indicate conditions have been met for a failure and the land is susceptible to this. Finally, the nature of the substrate may provide an indication as to whether the landslide would occur within the peat itself, at the interface with the substrate or potentially within the substrate itself.

6.4.14 Whilst it is recognised that commercial forestry operations can have significant effects on the structure and hydrological properties of peat soils, there was no evidence of peat instability within forested areas noted during the site walkovers or peat probing completed across the various stages. Furthermore, discussions with the operator of the Operational Development and with FLS, have clarified that no known landslides have been identified within the Site. As the land use throughout the Proposed Varied Development will largely remain the same, apart from the felled zones, and mitigation will be included to ensure existing drainage continues to operate, no change to peat stability is anticipated as a result of the forestry and hydrology. Therefore, these factors are not considered to be main controlling factors.

6.4.15 It is recognised the peatland restoration works in the areas surrounding turbines T10, T11, T15 and T16, together with areas surrounding the proposed substation, are likely to exhibit locally modified surface morphology associate with peat restoration measures including drain blocking and rewetting. The works completed as part of the restoration of the peatland by FLS and SSE are forest to bog techniques, as per the Peatland Action Technical Compendium (NatureScot, 2024), and as such ground smoothing and drain blocking were completed. This is not expected to have significantly

changed the peat depth as recorded by the probing and as such the probing is still considered to be valid in these areas. Although the condition of the restored peat may result in the increase in peat instability as the restored peat stabilises, it is considered that as best practice relates to restoring the peat is expected to have been followed (i.e. use of Peatland Action Technical Compendium) and as by the time of construction of the Proposed Varied Development the peat will be more settled with surface vegetation, that there would be no significant increase in peat slide risk. As such, the peat restoration areas have not specifically been taken into consideration in the GIS analysis undertaken (**Figure 12** within Appendix A). However, as there is potential for increased peat slide risk in the areas of the peatland restoration which interact with the Proposed Varied Development, the potential instability associated with the peatland restoration has been discussed in the assessment completed for each component which could impact this (see Table 13) and may result in a change in the assessed peat slide likelihood assigned. Note, the condition of the peat in the peat restoration areas will be confirmed during the ground investigation for the Proposed Varied Development with the risk posed by the restored peatland considered and assessed in more detail as part of the updated PLHRA, completed post-consent, once further details are confirmed.

6.4.16 The selection of the ranges for ranking of these inputs was based on a literature review, site evidence and engineering judgment. A discussion on the rankings chosen for each of the main factors considered is given in the following subsections.

Slope Angle

6.4.17 Gravity is the primary driving force of all landslides and as such, slope angle is a significant factor in controlling the stability of peat soils.

6.4.18 Peat failures are noted to have occurred on both relatively gentle sloping ground as well as more steep lying ground. The typical slope angles for which peat failure has been recorded to occur varies depending on the type of peat deposit present and therefore the likely peat failure to occur. As noted in Section 5.3, for the broader failure type of bog bursts, which are generally related to raised bogs, typical peat failure gradients are of 2° to 5°. For the broader failure type of peat slides, which are generally related to blanket bogs, typical peat failure gradients are of 5° - 15°. In order to provide a full assessment considering all types of peat and the various peat failure types present, the ranking factors assigned to slope gradients needs to take cognisance of all peat types and failures modes.

6.4.19 From the literature review completed it is clear that deeper peat deposits generally form on shallower slopes, while shallower peat deposits generally form on steeper slopes. The driving force of slope gradient in peat instability is therefore considered to be less influential as slope gradients shallow, with peat depth then becoming more influential in this. Considering raised bog deposits are not expected to be present within the Proposed Varied Development, in accordance with the Scottish Government Guidance document, slopes shallower than 2° (the minimum slope angle considered required for blanket bog failure) are not required to be considered. Therefore, a graduated scale from 2° to >15° (the maximum slope gradient peat slides are recorded to typically occur) has been assigned.

6.4.20 Assigned rankings relating to slope angle vary between 0º (where slopes are basically flat) and 5º (where the steepest slopes are present), as presented in Table 7.

Table 7 Slope Angle Ranking (Ranking Factor 1)

Slope Angle (°)	Ranking
0 – < 2	0
2 – 5	2
> 5 – 10	3
> 10 – 15	4
>15	5

6.4.21 The slope gradients across the Site have been determined based on the DTM file obtained for the Proposed Varied Development as presented on **Figure 4** within Appendix A. Note the gradient data shown on **Figure 4** is based on the average gradient over a 5m grid (i.e. each cell is 5m square).

Peat Thickness

6.4.22 Section 5.3 highlights typical peat thicknesses upon which peat failures have been recorded to occur. As is indicated, peat failures have been linked to various thicknesses, although in general the risk of peat failure increases as thickness of peat increases. As is noted for slope angle above, the shallower the depth of peat the more the slope angle is the driving force, whereas as the peat thickness increases it is expected the slope angle would reduce (as steep slopes are not conducive to deep peat accumulations) and therefore peat thickness plays more of a driving force in peat failure.

6.4.23 Peat failure may be facilitated through the development of weak layers within the peat mass which may either form naturally or by hydrological factors. Peat has a natural anisotropic strength due to the process by which it is formed. In particular, the nature of the interface between the distinct layers within a peat mass is defined by hydrology. These distinct layers are:

- An upper vegetative mat consisting of the living vegetation of herbaceous plants, grasses and mosses;
- The acrotelm, which is the surface layer of an active peat forming mire; and
- The catotelm, which is the lower layer of an active peat forming mire.

6.4.24 The Joint Nature Conservation Committee (JNCC, 2011) considered that the nature of the boundary between the acrotelm and catotelm, and between the catotelm and the underlying substrate (e.g. mineral soil, weathered rock) influence the strength of the peat mass.

6.4.25 Peat stratification and thickness are associated with one another. This is because thin deposits of peat are unlikely to have a catotelm and may mainly be composed of a vegetative mat and acrotelm. As such, with inherent strength because of a more fibrous morphology, peat thicknesses of less than 0.5m are not reported to fail catastrophically. However, thicker deposits are more likely to contain weaker layers or bands of pseudo fibrous / amorphous peat, which are more likely to fail.

6.4.26 Based on the above it is clear the risk of peat failure increases with increasing peat thickness. Therefore, to account for this and the various peat failure types that can occur depending on peat type, a graduated scale from ≤0.5m to >3.0m has been applied. The ranking increases with depth with increasing values relating to more onerous conditions and reflecting the tendency for 'weaker' peat to be present as thickness increases, in addition to the presence of a greater disturbing force as a consequence of the increasing thickness. The ranking adopted for peat thickness is given in Table 8.

Table 8 Peat Thickness Ranking (Ranking Factor 2)

Peat Thickness (m)	Ranking
≤ 0.5	0
>0.5 - 1.5	2
>1.5 - 2.5	3
>2.5 - 3.5	4
> 3.5	5

6.4.27 Note the lower bound of the ranking (i.e. peat deposits ≤0.5m) has been assigned a ranking of 0 as, in accordance with Section 5.1, these deposits would classify as an organo/peaty mineral soil rather than peat with failures being a peaty-debris slide rather than a peat slide or bog burst and hence are outside of the scope of this assessment. The stability of these deposits would be assessed as part of the general stability assessment completed as part of the detailed design process. The upper bound of the ranking (i.e. peat depths >3.5m) relates to the maximum typical peat depths upon which peat or bog slides occur in literature and so greater than this thickness would typically relate to bog bursts or bog flows.

6.4.28 The peat thickness across the Proposed Varied Development has been determined based on the peat depth data recorded from Site (i.e. peat probing) as presented on **Figure 10** within Appendix A which has been interpolated to give a peat surface across the Proposed Varied Development Infrastructure as shown on **Figure 11** within Appendix A. Note the peat depth data shown on **Figure 11** within Appendix A is based on an interpolated surface using the inverse distance weighting method with the maximum peat depth search distance set at 100m.

Evidence of Peat Instability

6.4.29 Evidence of previous or incipient peat instability may provide an indication that conditions at that location are favourable to peat instability and therefore the area may be prone to further instability. As such, it is considered that areas with evidence of peat instability will have a higher risk of failure than areas where no stability issues have been identified.

6.4.30 For the purposes of this assessment, where no peat instability is identified through the desk-based study, site visit or the peat investigation activities, a ranking of 1 is applied. Where failures or instability features are identified, a ranking of 3 is used, as indicated in Table 9.

Table 9 Signs of Relic Failure Ranking (Ranking Factor 3)

Signs of Relic Failure in Vicinity	Ranking
Absent	1
Evidence of instability	3

6.4.31 No peat instability features have been identified within the Site and as such for the purposes of this assessment have been assumed to be absent.

Substrate

6.4.32 As noted in the peat thickness section above, it is considered that the nature of the boundary between the acrotelm and catotelm, and between the catotelm and the underlying substrate (e.g. mineral soil, weathered rock) influence the strength of the peat mass. The nature of the substrate can therefore play a part in the level of stability of a peat mass.

6.4.33 Where fine-grained deposits (e.g. clay or silt) are present at the interface, there is likely to be weathering and softening of the clay due to the peat likely being saturated, with poor or non-existent vertical drainage paths. This will result in a reduction of the undrained shear strength or effective shear strength parameters of the fine-grained deposits. This means failure could occur within the peat mass itself, at the interface with the fine-grained deposit or within the fine-grained deposit.

6.4.34 Where coarse-grained deposits (e.g. sand, sand & gravel or gravel) are present at the interface, the effective shear strength parameters are likely to be comparatively high compared to the fine-grained deposits. Where coarse-grained deposits are present failure is likely to occur in the peat mass itself.

6.4.35 Rock provides a high strength substrate, where encountered, however, the rock surface may be smooth and as such can provide a weak interface with the peat. Failure of the peat may therefore occur within the peat mass itself or at the interface with the rock. For the purposes of this preliminary assessment any rock interface has been given a higher risk rating similar to that of the fine-grained interface.

6.4.36 Table 10 presents the ranking for the possible substrates which can be encountered at the Proposed Varied Development.

Table 10 Substrate Ranking (Ranking Factor 4)

Substrate	Ranking
Coarse-grained (fine to coarse sand, sand & gravel, Gravel)	1
Fine-grained (silt or clay) & very clayey/silty fine to medium sand	2
Rock	2

6.4.37 The selection of the substrate present underlying the Site is based on the understanding of the geology from the BGS Geoindex shown on **Figure 5** within Appendix A. Given the majority of the Site is indicated to be underlain by peat (which is assumed to be underlain by glacial till), glacial till or rock, it is assumed the whole site is underlain by either fine-grained material or smooth rock substrate with an associated ranking of 2. GI will be undertaken post-consent for the detailed design of the Proposed Varied Development and will be taken into account as part of the updated PLHRA, undertaken following the detailed design, post consent.

Generation of Peat Landslide Likelihood Score

6.4.38 Considering each of the contributing factors discussed above, the peat landslide likelihood is determined as the product of each (i.e. Peat Landslide Likelihood = Slope Angle x Peat Thickness x Evidence of Peat Instability x Substrate). The likelihood scores were then converted into descriptive likelihood classes, from Negligible to Almost Certain, and corresponding numerical scale range, from 1 to 5, to match the Scottish Government Guidance document. Table 11 presents the assessed score which relates to each likelihood class.

Table 11 Likelihood of Peat Landslide

Peat Landslide Score	Scale	Likelihood	Probability of Occurrence
> 30	5	Almost certain	> 1 in 3
20 – 30	4	Probable	1 in 10 – 1 in 3
10 – <20	3	Likely	1 in 10^2 – 1 in 10
5 – <10	2	Unlikely	1 in 10^7 – 1 in 10^2
< 5	1	Negligible	< 1 in 10^7

6.4.39 In order to determine the scoring that would equate to an equivalent likelihood class, judgement was made based on the typical recorded conditions that peat landslides have occurred. Based on the recorded peat landslide data available it is clear that in comparison to the amount of peat present, peat landslides are not common occurrences. Although there are typical slope angles and peat depths where peat landslides occur, as presented in Section 5.3, it is considered that due to the recorded frequency of these failures there is likely to be other factors in play (i.e. in this assessment signs of relic failure and substrate). Therefore, when considering the score relating to the likelihood class, when the slope angle and peat thickness are within a typical range for peat failure this does not necessarily result in a 'likely' likelihood throughout the typically recorded slope angle and peat depth range and may require one of the other factors (signs of relic failure or substrate) to have their highest ranking in order to result in a 'likely' likelihood.

Peat Landslide Likelihood Results

6.4.40 To estimate the peat landslide likelihood across the Proposed Varied Development and produce the Peat Slide Assessed Risk plan, the assessment was carried out using Geographic Information Systems (GIS) software. Note that when looking at the peat landslide likelihood associated with the Proposed Varied Development, a 25m buffer has been considered beyond the infrastructure, to take account of the potential zone of influence where the Proposed Varied Development and its construction may affect the peat stability.

6.4.41 **Figure 12** presents the assessed peat slide likelihood across the Proposed Varied Development. As can be seen from this figure, much of the Proposed Varied Development is either assessed with a peat landslide likelihood of Negligible or Unlikely. This generally owes to the fact that peat depths <0.5m have been recorded across many of the steep slopes and as such are not considered as peat (more a peaty soil/organo-mineral soil) with the failure an organo-mineral debris flow which is not part of the scope of this report. This also owes to the point that where deeper peat accumulations have been recorded, these are generally on slopes of slacker gradient. Although much of the Proposed Varied Development is categorised as having Negligible or Unlikely peat slide likelihood, frequent and large areas of Likely peat slide likelihood are indicated throughout the Proposed Varied Development affecting numerous aspects of the Proposed Varied Development. More isolated areas of Probable peat landslide likelihood are indicated also. One area of Almost Certain peat slide likelihood is indicated underlying the hardstanding of T10, however, given the size of this is only 5m x 15m this is not considered large enough to represent a true landslide risk and therefore not representative of the area and as such is neglected as part of this assessment.

6.4.42 Note that the peat slide likelihood presented on **Figure 12** is based on a 5m grid (i.e. each cell is 5m square). Given the detail of the slope gradients determined for the Proposed Varied Development (based on the topographic survey completed) this slope model has picked-up very small and subtle differences in the slope gradient which may not necessarily translate into a greater risk of peat instability. Given the detail of the slope model, very small areas of varying peat slide likelihood have been identified within areas otherwise dominated by another peat slide likelihood class. Therefore, for the purposes of the assessment, only peat slide likelihoods of at least 20m x 20m (size considered to

be sufficiently small to define credible landslide size) or where there are frequent individual cells of higher peat slide likelihood in close proximity have been considered for inclusion in the assessment.

6.4.43 Blasting is being considered as part of the Proposed Varied Development to facilitate formation of the borrow pits. Blasting may increase the probability of a peat landslide through initiation of ground accelerations through the peat which could cause the structure to destabilise. Estimating the effects blasting can have on the structure of the peat and its risk in relation to stability is complex. As such, for the purposes of this assessment, it is considered where blasting will be undertaken, this will increase the peat slide hazard in that area by a ranking factor of one, e.g. 'unlikely' would become 'likely'. Blasting is not taken into account as part of the Geographic Information Systems Multi-criteria Analysis described above. Instead, the increase in peat slide hazard will be assigned as part of the assessment. The effects of blasting will not affect all areas, instead blasting is considered to affect the areas where it is undertaken and any receptors which are downslope within influencing distance. Areas where the effects of blasting have been taken into account are explicitly highlighted within the assessment (see Table 13). The effect of the blasting will only be considered as part of the assessment on the actual infrastructure to which it is being considered, e.g. on the borrow pits assessment. A more detailed assessment would be undertaken as part of the updated PLHRA undertaken post-consent following GI, design maturity and further understanding of the blasting that may be required.

Estimating the Exposure

6.4.44 Various receptors are present within runout distances which may be impacted by a peat landslide resulting from the works as presented on **Figure 3** within Appendix A. The runout distance assessed is influenced by the slope and changes in elevation and particularly within part of this Site with the presence of forestry. In forested areas where trees, stumps and replanting are present the runout distances are expected to be significantly reduced.

6.4.45 These receptors are listed below along with an assessment of consequence associated with each depending on their size and sensitivity. Consequence ranking for each of the receptors identified within influencing distance of the Proposed Varied Development are presented on Table 12.

Table 12 Receptor Consequence Score

Peat Landslide Consequences Scale	Consequence	Receptor
5	Extremely high	Proposed Wind Farm Infrastructure – Loss of Life / Serious injury to personnel, existing infrastructure (inclusive of the Operational Development)/buildings - Loss of Life / serious injury to public Scheduled monuments
4	Very high	SSSIs, SPAs, listed buildings
3	High	Watercourses or waterbodies, turbines and associated hardstandings, proposed substation, existing infrastructure for the Operational Development (excluding access tracks), floating access tracks, Class 1 peatland habitat (undisturbed by commercial forestry), farm buildings
2	Low	Proposed access tracks (excluding floating) and existing access tracks for the Operational Development, construction compounds and laydown area, Class 1 peatland habitat (which is degraded and disturbed already by the commercial forest currently present), met. masts
1	Very low	Proposed borrow pits, existing forest access tracks

6.4.46 The Proposed Varied Development is relatively remote; however, existing infrastructure is present (e.g. existing forest tracks and the Operational Development). Both the existing infrastructure and the Proposed Varied Development would be affected should a peat landslide occur. The effects of a peat landslide would be mostly likely during the construction of the Proposed Varied Development at which point construction personnel for the Proposed Varied Development and Operational Development and staff for the commercial forest would be using the access tracks for extended periods of time. During the construction farm buildings, outwith the Site boundary but within potential runout distances would also be being used by members of the public. Whilst the commercial losses as a result of a peat landslide are a concern for the Applicant, the loss of life or injury to personnel would be of more significant concern. As such, wherever any infrastructure/buildings (existing or proposed) is present

which could be subject to a peat landslide the highest Exposure Score of 'extremely high' (Exposure rating of 5) would apply. However, loss of life would be considered to be very unlikely and there are limited records of any loss of life as a result of a peat landslide. Therefore, it is considered that for the Proposed Varied Development, the risks to life can be mitigated through good practice and safe systems of work adopted by the Contractor during the construction phase. This would have the impact of reducing the overall exposure and consequently, the risk to life. As these mitigation measures would be expected to be implemented by the Contractor in their safe system of work, the risk to life has not been explicitly included as part of the assessment conducted in Table 13. Details of the good practices to be adopted as mitigation specifically in relation to site safety have been included within Section 7.

6.4.47 Although Table 13 assigns consequence scores to receptors, these scores may be reduced where the risk of the potential peat landslide runout from identified areas is unlikely to reach the receptor or insignificant volumes of failed material would be realised at the receptor. Factors which would be considered for this are the distance from the identified peat landslide likelihood to the receptor, the elevation difference inclusive of changes in slope angle between the peat landslide likelihood and the receptor, and the presence of obstructions to the peat landslide debris (e.g. forestry).

6.5 Hazard Level Assessment

6.5.1 The qualitative assessment undertaken for the Proposed Varied Development, considers each peat landslide likelihood within influencing distance of the proposed infrastructure and the potential receptor they can impact. The process for determining the Hazard Level is outlined below and on the following page with details of the assessment presented in Table 13.

- Column 1 identifies the location of the risk area being considered as shown in **Figure 12**;
- Column 2 presents the Assessed Level of Risk for that area assigned in **Figure 12**;
- Column 3 identifies the key receptors of a potential peat landslide from those identified on Figure 3 and taken forward to **Figure 12**;
- Column 4 presents the consequence assigned to the worst-case receptor;
- Column 5 then combines the consequence and likelihood ranking to estimate a Hazard Level in accordance with Table 6; and
- Column 6 provides comments or notes associated with each receptor and the Hazard Level assigned.

6.5.2 As the proposed infrastructure and associated works are over a limited footprint area within the Site boundary, it would seem unreasonable to consider peat landslide likelihoods which are far reaching from the works' areas as these would not have any direct effect and be a triggering factor. As such, when considering the Proposed Varied Development and the influence zone from which the works may trigger a peat landslide, for the purposes of this assessment, a 25m buffer has been applied out from the Proposed Infrastructure. Note the run-out lengths for peat landslides considered are longer than the 25m buffer considered, however, this is discussed further within the assessment, where necessary.

6.5.3 Where blasting is considered, an influencing distance of 100m from the proposed borrow pit location has been assumed for this Preliminary PLHRA.

6.5.4 Where **Figure 12** within Appendix A has identified areas of Negligible or Unlikely peat landslide likelihood, no specific mitigation would be required and therefore a Hazard Ranking assessment is not required to be completed. However, even in those areas of Negligible or Unlikely peat slide likelihood best practice as relates to peat should be used for the design and construction of the works, to ensure the risks remain low, as presented in Section 7. Table 13, therefore presents a Hazard Ranking assessment for those areas assessed with a Likely or higher peat slide likelihood, which may result in specific mitigation measures being specified.

Table 13 Qualitative Assessment of Peat Landslide Hazard Ranking

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
Refer to Figure 12 for identification of likelihood location areas and associated receptors					
1 North T01 along proposed access track upgrade	Likely	Class 1 Peatland Proposed Turbine T01 Existing Turbines Watercourses Existing and proposed access tracks Met mast	High	Low	Large areas of Likely peat slide likelihood present surrounding proposed access track. Area is within open grassland surrounding the Operational Development. Receptors identified fall within 1km of the of the peat slide likelihood identified with elevation drop of 45m from area of peat slide risk identified to receptors at Site entrance. A farm residence is present further downslope within potential runout distance of a peat landslide, however, the farm is on the other side of a watercourse and surrounding by a small woodland on the upslope side, so a peat landslide is not expected to reach this. Given the distances and elevation change to potential receptors from the peat landslide likelihood identified, no reduction in the assessed worst-case consequence is considered. The combining of the peat slide risk with the worst-case consequence (from the area of Class 1 peatland, Proposed Turbine T01, Existing Turbines and Watercourses), results in a **Low** Hazard Ranking
2 West of the proposed construction compound adjacent to proposed access tracks	Likely	Watercourse Existing and proposed access track	Low	Low	Small area of Likely peat slide likelihood present just to the west of the proposed construction compound. Given the topography is flowing to the watercourse present with any peat slide to follow this, the receptors have been reduced to the watercourse and the track immediately downstream. It is not considered likely that a peat landslide would runout to affect any other receptors than these. Given the size of the likely peat landslide and the peat surrounding is typically <0.5m, large volumes of peat are not anticipated to flow into the watercourse and therefore the worst-case consequence rating has been reduced to Low. The combining of the peat slide risk with the worst-case consequence (from the Watercourses), results in a **Low** Hazard Ranking
3 Along access track from T14 to T04	Likely	Watercourse Existing turbines Existing and proposed access track Proposed construction compound	Low	Low	Small areas of Likely peat slide likelihood present on the upslope and downslope side of the proposed access track. Area is within open grassland surrounding the Operational Development. Runout distances to receptors are within 250m with an average drop in elevation over this length of approximately 10m. Given this relatively small drop in elevation, equating to approximately 2° and as the peat depth across this length is generally <0.5m it is not considered significant volumes of peat would runout for large distances and as such, receptors within 250m are considered suitable at this stage. Although existing turbines and watercourses are present within assessed runout length, due to the depths of peat along this and the general small drop in elevation, as discussed large volumes of peat are not anticipated as a result of a peat landslide. The worst-case consequence has therefore been reduced to Low for this area. The combining of the peat slide risk with the worst-case consequence (from the Watercourses), results in a **Low** Hazard Ranking.
4	Likely	Watercourse SSSI & SPA	Very High	Moderate	Areas of likely surrounding the proposed access track and met mast. Area is within open moorland within minimal obstructions to reduce runout lengths.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
Along access track to met mast southeast of T04		Proposed access track Met mast Class 1 peatland (disturbed by forestry)			Receptors identified are those within 400m as these represent the most significant and a peat slide would terminate at Tangy Loch if occurred with forestry also present here to prevent any further peat runout. Elevation changes start steeply along the proposed access track where the Likely peat slide likelihood is identified, however, shallow out towards the met mast where the deeper peat deposits become more regular. Given the runout length to enter the SSSI is approximately 250m and as peat depths >0.5m are recorded towards the SSSI even though on shallower slope gradients, given the small runout length required to enter SSSI and the potential for deep peat no reduction in the consequence scoring is considered appropriate at this stage with this to remain Very High. The combining of the peat slide risk with the worst-case consequence (from the SSSI), results in a **Moderate** Hazard Ranking
5 Borrow pit at Turbine T05	Probable	Watercourse SSSI & SPA Turbine T05 Proposed access track Met mast Class 1 peatland (disturbed by forestry)	High	Moderate	Areas of Likely noted upslope of the proposed borrow pit within 100m. As blasting may be completed to form the borrow pit the peat slide likelihood has been increased to Moderate. The borrow pit itself sits on the boundary with the worst-case receptor which is the SSSI, however, the Likely peat slide likelihood identified is approximately 200m from the receptor with 40m elevation change noted. The Likely peat slide identified to the north and north-west of the borrow pit would need to traverse over approximately 200m of land where <0.5m of peat is identified, or over land where peat would be stripped as a result of the borrow pit works and therefore the consequence scoring here could be reduced to High or even Low as large conveyances of peat would not be anticipated to flow into the SSSI or watercourses or to the turbine location. However, to the east of the borrow pit location, the Likely peat slide is recorded with areas of deeper peat to the Site boundary and SSSI. This is, however, in an area of forestry which would help to stabilise the peat and where a peat slide occurs reduce areas of runout, even if this was to be felled and replanted. As such, for this area the consequence scoring has been reduced to High. The combining of the peat slide risk with the worst-case consequence (from the SSSI), results in a **Moderate** Hazard Ranking
6 Turbine T14	Likely	Watercourse Proposed and existing access tracks Existing turbines	High	Low	Small areas of Likely peat slide likelihood present on surrounding hardstanding of the proposed turbine. Area is within open grassland surrounding the Operational Development. Runout distances to receptors are within 100m with an average drop in elevation over this length of approximately 5m to 10m. It is understood that runout distances from a peat slide here could be longer, however, it is not considered that receptors further downslope within potential runout distance would result in a greater consequence scoring than assessed here. Given the relatively small runout length to the existing turbines and watercourses which could be affected by a peat slide, within 50m of an area of Likely peat slide no reduction in the consequence scoring is considered relevant. The combining of the peat slide risk with the worst-case consequence (from the Watercourses and existing turbines), results in a **Low** Hazard Ranking.
7 East of proposed laydown area	Likely	Watercourses Proposed laydown area	Low	Low	Small areas of Likely peat slide likelihood present to the east of the proposed laydown area. Located within an area which is currently used for commercial forestry and is in a felled state at present, although replanting would be anticipated.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
		Turbine T14 Proposed access track			Given the topography (<5° generally down to T14 and potential watercourses which would be the worst-case consequence) over the runout lengths required to reach the T14 (~250m) and the watercourses (~500m) and the elevation changes (5m to T14 and 15m to the closest watercourses) it is not considered that there would be a large conveyance of peat from the Likely peat slide identified, considering the peat depths from the Likely peat slide are also ranging from <1.0m to <0.5m over the runout lengths. As such, the consequence scoring has been reduced to Low accounting for the laydown area and access track where a larger conveyance of peat may occur and a reduced conveyance of peat at T14 and the watercourses further downslope. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
8 Turbine T13	Likely	Turbine T13 Watercourse Proposed access tracks	High	Low	Small areas of Likely peat slide identified surrounding the proposed turbine. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Given this the runout lengths from the Likely peat slide identified would be constrained and less than could be anticipated for areas where no forestry is present. In any case the worst-case consequence of High remains due to the Likely peat slide identified being immediately upslope of the proposed turbine. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
9 Along access track between T13 and T12	Likely	Proposed access track Borrow pit Watercourses Turbine T05 Class 1 peatland (disturbed by forestry) SSSI	High	Low	Small areas of Likely peat slide likelihood present on the upslope and downslope side of the proposed access track. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Given this the runout lengths from the Likely peat slide identified would be constrained and less than could be anticipated for areas where no forestry is present. On the downslope side much of the peat depths identified are <0.5m in thickness and therefore the conveyance of large volumes of peat to the potential worst-case receptors of the SSSI, turbine T05 and watercourses would not be anticipated. As such, the worst-case consequence has been reduced by a ranking of one from what it would have been for the SSSI to High. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
10 Turbine T12	Likely	Proposed access track Watercourses Turbine T12 Class 1 peatland (disturbed by forestry) SSSI	High	Low	Areas of Likely peat slide likelihood Surrounding turbine. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Given this the runout lengths from the Likely peat slide identified would be constrained and less than could be anticipated for areas where no forestry is present. Although there is a significant elevation change of approximately 45m over the runout length to the SSSI of approximately 400m, where the significant change in elevation occurs peat depths are recorded to be <0.5m which would somewhat reduce the conveyance of significant volumes of peat. Given the presence of the forestry operations which are anticipated to continue post construction, the consequence scoring for the SSSI has been reduced to High, in line with that

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
					considered for the turbine T12 which would remain due to the peat slide risk being identified immediately upslope. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
11 Access track between T11 and T06	Likely	Proposed access track (including floated section) Watercourses Existing turbines Turbine T03	High	Low	Areas of Likely peat slide likelihood present on the upslope and downslope side of the proposed access track. Area is within open grassland within minimal obstructions to reduce runout lengths, although topography is relatively shallow (generally <5° and often up to 2°). Potential runout length therefore not considered with receptors noted typically within 250m. Note, if runout lengths were longer the consequence scoring would not increase as no worse receptors are noted downslope. Worst case receptors therefore considered to be existing and proposed turbines, watercourses and the section of floating access track which would completed demolish if a peat slide were to occur. These are assessed within a consequence rating of High. Note, although the floating access track could increase peat slide risk due to increased loading on the peat, the access track is generally proposed on slope gradients which are consistent with where floating access tracks are generally constructed over deep peat deposits. The floating access tracks are also expected to be constructed using best practice and guidance with the detailed design to ensure stability. As such, these are not expected to increase peat slide risk beyond what has been estimated. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
Borrow pit to the west of T06 Borrow Pit to the south of T02 Borrow Pit to the south of T04	Negligible	-	-	-	The borrow pits noted are in areas assessed within negligible peat slide likelihood owing to the peat depth being <0.5m. As such, even within an increase in the peat slide likelihood due to blasting this is not anticipated to create an unacceptable risk and therefore not required to be assessed further as part of this Preliminary PLHRA.
12 Turbine T07	Likely	Turbine T07 Proposed Substation	Very Low	Negligible	Small areas of Likely peat slide likelihood identified underlying and downslope of turbine. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Although peat slide risk is identified at the proposed turbine, as this is downslope and underlying it is not considered these will affect the turbine itself as if underlying will be removed and if downslope will runout away from the turbine. The substation is located approximately 400m from the peat slide identified, however, due to the presence of the forestry operations which are anticipated to continue and as the peat depth leading to the substation is typically <0.5m, the runout of the peat slide as a result of the turbine is not anticipated to reach the substation. As such, a consequence of Very Low has been assigned. The combining of the peat slide risk with the worst-case consequence, results in a **Negligible** Hazard Ranking.
13 Access track from T07 to T08	Likely	Turbine T08 Proposed access track	Low	Low	Areas of Likely peat slide likelihood present on the upslope and downslope side of the proposed access track.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
		Watercourse			Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Although the runout distances to the worst-case receptors of the turbine T08 and the watercourse, are within 350m and the topography is generally up to 10°, the presence of the forestry and the lack of peat depth across the runout lengths (generally <0.5m with peat noted to be absent at T08), it is considered appropriate to reduce the consequence to Low to reflect the anticipated reduced peat volume that would reach these worst-case receptors if a peat slide were to occur. This is in line with the consequence scoring assigned to the access track itself which would be affected by the peat slide. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
14 Substation and access track to T08 from the substation	Likely	Watercourse Substation Access Track	High	Low	Areas of Likely peat slide likelihood identified. These components are also noted to be in an area where peat restoration has been completed. Given the peat depths recorded here are typically <0.5m with the areas identified to be >0.5m typically small, it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. The worst-case receptors associated with the likely peat slides identified are the substation and the watercourse which are either immediately downslope or within 100m, with no obstructions to reduce runout length. As such the no reduction in the consequence ranking is applied with this assessed to be High. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
15 T08 and access track to T09	Likely	Watercourse Turbine T08 Access Track (including floating section)	High	Low	Large area of Likely peat slide identified. The small areas of Probable peat slide shown are not considered large enough to be representative and result in an overall increase in peat slide and have been neglected. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations. Given the area of Likely peat slide are immediately upslope of the turbine location and the turbine location is within 100m of the watercourse with the Likely peat slide extending to the watercourse, no reduction in the consequence has been applied with the worst-case of High assigned. Note, although the floating access track could increase peat slide risk due to increased loading on the peat, the access track is expected to be constructed using best practice and guidance with the detailed design to ensure stability. However, this access track section is on sloping ground closer to the limits of what is recommended for floating roads and consideration as to removing this small section, if cannot be proven to be stable, should be given to ensure stability. The floating section of access track has not been considered in terms of increasing peat instability, however, the mitigation presented here shall be carried forward into the mitigations section for further development following the GI for the Proposed Varied Development and the detailed design and be presented in the Updated PLHRA, post-consent. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
16 T09 and immediate surrounding access track	Likely	Watercourse Turbine T09 Access Track	High	Low	Large area of Likely peat slide identified. Located in an area of forestry which would be felled as part of the construction, however, outwith corridor for the permanent works would be anticipated to be replanted and continued to be used for commercial forestry operations.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
					Given the area of Likely peat slide are immediately upslope of the turbine location and the turbine location is within 100m of the watercourse with the Likely peat slide extending to the watercourse, no reduction in the consequence has been applied with the worst-case of High assigned. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
17 Access tracks surrounding T10, T11 and T16	Likely	Watercourses Access tracks (including floating) Turbine T09 & T10	High	Low	Large areas of Likely peat slide both upslope and downslope of the access track section. These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. Due to the reduced forest in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although this would be constrained once the commercial forestry in operation is met. In any case, as the distances to the worst-case receptors are typically within 100m (watercourses, turbine T10 and the floating access track section) no reduction in the consequence has been applied. Note, although the floating access track could increase peat slide risk due to increased loading on the peat, the access track is generally proposed on slope gradients which are consistent with where floating access tracks are generally constructed over deep peat deposits. The floating access tracks are also expected to be constructed using best practice and guidance with the detailed design to ensure stability. As such, these are not expected to increase peat slide risk beyond what has been estimated. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
18 Turbine T10	Probable	Watercourses Turbine T10	High	Moderate	Large areas of Likely peat slide surrounding the turbine location. However, underlying the temporary hardstanding is a small area of Probable, which although it doesn't meet the exact requirements to be considered credible, due to a smaller area of Almost Certain likelihood also being identified, it is considered appropriate to consider at least the Probable likelihood identified. These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. Due to the reduced forestry in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although this would be constrained once the watercourse to the west is reached due to the topography. In any case, as the distances to the worst-case receptors are typically adjacent or within 100m (watercourses and turbine T10) no reduction in the consequence has been applied. The combining of the peat slide risk with the worst-case consequence, results in a **Moderate** Hazard Ranking.
19 Turbine T11 and access track immediately to the west	Likely	Watercourses Turbine T10 and T11 Access tracks (including floating Sections)	High	Low	Large areas of Likely peat slide surrounding the turbine location. These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
					Due to the reduced forestry in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although the topography and elevation change in the surrounding of T11 are generally <5° and may be limited by this slope gradient. In any case, as the distances to the worst-case receptor as relates to the turbine and floating access track are typically adjacent to the Likely peat slide identified no reduction in the consequence has been applied. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
20 Turbine T16	Likely	Turbine T16 Watercourse Access Tracks (including floating Section)	High	Low	Areas of Likely peat slide surrounding turbine location. These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. Due to the reduced forest in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although the topography and elevation change in the surrounding of T16 are generally <5° and may be limited by this slope gradient. In any case, as the distances to the worst-case receptor as relates to the turbine, floating access track and watercourse are typically adjacent or within 150m to the Likely peat slide identified no reduction in the consequence has been applied. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
21 Access track section between T16 and T15	Likely	Watercourse Access Tracks (including floating Section) Turbine T09	High	Low	Areas of Likely peat slide upslope and downslope of access track. These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. Due to the reduced forestry in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although the topography and elevation change in the surroundings are generally <5° and may be limited by this slope gradient. Also, the forestry operations start to affect the run-out lengths as approaching T09 as in this area this is not currently proposed for peat restoration with it anticipated forestry operations will continue with only the permanent corridor left in place for the Proposed Varied Development. A such, T09 would have less impact from a peat slide and the consequence could be reduced to Low. However, considering the floating access track is adjacent to the likely peat slide identified and the watercourse present within 100m, no reduction in the consequence is considered. Note, although the floating access track could increase peat slide risk due to increased loading on the peat, the access track is generally proposed on slope gradients which are consistent with where floating access tracks are generally constructed over deep peat deposits. The floating access tracks are also expected to be constructed using best practice and guidance with the detailed design to ensure stability. As such, these are not expected to increase peat slide risk beyond what has been estimated. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.
22	Likely	Turbine T15	High	Low	Areas of Likely peat slide surrounding turbine location.

Location	Peat Slide Risk Rating	Receptors	Worst-case Consequence Rating	Hazard Ranking	Notes
Turbine T15					These components are also noted to be in an area where peat restoration has been completed. Given the slope gradients are not steep here <5° typically it is not anticipated the peat restoration works will increase the peat slide likelihood beyond what has already been assessed. This will require confirmation following GI to assess the condition of the peat and to assess the progress of the peat restoration works. Due to the reduced forest in the area and the restoration works completed, it is likely the runout lengths resulting from a peat landslide in this area will be longer and hence reach more receptors, although the topography and elevation change in the surroundings are generally <5° and may be limited by this slope gradient. However, within 100m downslope of the turbine location are the forestry operations which it is understood are to remain in place. As the forestry operations and the presence of the forest would limit the run-out, and as the next receptors downslope of the turbine location are ~400m away it is not anticipated the runout of a peat slide resulting from T15 would reach these receptors further downslope. As such, the worst-case receptor is considered to be the turbine itself with a consequence of High applied with no reduction due to the likely peat slide being identified immediately adjacent. The combining of the peat slide risk with the worst-case consequence, results in a **Low** Hazard Ranking.

6.5.5 The qualitative assessment has identified one area of Negligible Hazard Ranking, three areas of Moderate Hazard Ranking and eighteen areas of Low Hazard Ranking. The areas of the Proposed Varied Development where no Hazard Ranking assessment has been completed, did not require these due to not being assessed with a peat slide likelihood high enough that a significant Hazard Ranking would materialise and specific mitigation would then need to be specified.

7. Mitigation Measures

7.1 General

7.1.1 The infrastructure of the Site has, as far as reasonably practical, been designed to avoid the adverse characteristics which give rise to a significant risk of peat slide. However, as the Proposed Varied Development is on a Site where peat is present, there is a risk of peat instability which requires both general and location specific mitigation measures. These are discussed within this section.

7.1.2 Construction activities (e.g. excavation, drainage, etc.) are known to have a potential destabilising effect on peat deposits. The design of the Proposed Varied Development will consider the weak and susceptible nature of peat.

7.1.3 Although no historic peat instability has been noted within the Site, appropriate good practice and, where required, mitigation measures will be used to minimise the destabilising effects on the peat and its habitat.

7.1.4 The following good practice will be adopted to specifically ensure and provide focus on the site safety and the risk to life during construction;

- Maintaining and updating a Geotechnical Risk Register throughout the works;
- Provision of a Geotechnical specialist on-site during the construction phase to undertake advance inspections, carry out regular monitoring and provide advice when required;
- Supervision of construction work by suitably qualified and experienced personnel;
- Identification and awareness of peat instability and pre-failure indicators (see also Section 7.3) to be incorporated in site induction and training for site staff including emergency procedures;
- Monitoring of slope and peat stability both in the vicinity and down slope of infrastructure (both existing and proposed) during construction by suitably experienced and qualified personnel;
- Identification of areas of deep peat, physical demarcation of such areas and instruction to site personnel to avoid these areas or minimise activities in these locations, where practical;
- Emergency procedures should include steps to be taken on detection of an incipient peat slide or of the event occurring; and
- Protocols in place to stop work due to adverse weather that may trigger instabilities within the peat.

7.1.5 Furthermore, as part of the Proposed Varied Development, a Construction and Environment Management Plan (CEMP) has been prepared incorporating good practice measures for the construction of electricity generating schemes in peatland environments. These good practice measures and documents will continue to be updated through pre-construction and construction in accordance with good practice guidance.

7.1.6 It should be noted that further Ground Investigation (GI) will be carried out prior to construction of the Proposed Varied Development to inform the detailed design. The GI information will also be used to update the PLHRA, following the Scottish Government Guidance (Scottish Government, 2017).

7.2 Mitigation Measures

7.2.1 Mitigation measures and good practice procedures are ultimately the responsibility of the Contractor. During the construction phase, suitable mitigation measures must be employed such that the risk of peat landslide or failure is minimised as far as practicable. The list of mitigation measures below may be considered, but is not limited to the following:

- Identification of approved areas for stockpiling of any excavated rock or soils including peat;
- Side-casting of material during construction only in appropriate areas identified following risk assessment and agreed with all relevant parties (Environmental Clerk of Works (ECoW) / Geotechnical Clerk of Works, SEPA, NatureScot etc.);
- Avoid placing excavated material or other forms of loading on breaks of slope or other potentially unstable slopes;

- Any excavations in peat should be risk assessed, and measures adopted to minimise the risk of failure within excavation side slopes and surrounding materials;
- Excavation on side slopes within peat should be as shallow an angle as possible and care should be taken to stabilise sides;
- Upslope drainage ditches should be included on all earthworks which are constructed through side-long ground;
- The camber of the access track should be such as to encourage surface water drainage to the upslope drainage ditch;
- The construction plant should minimise the extent and duration of open excavations and bare ground;
- Earthmoving activities should be restricted during and immediately after heavy and prolonged rainfall events;
- Establish / re-establish vegetation as soon as possible to improve slope stability and provide sediment transport control;
- Design and construction of a suitable drainage system for tracks and hardstandings that does not significantly affect the hydrological regime of the peat and would require minimal maintenance;
- Include measures to ensure drainage systems (including existing) are well maintained, including identification of sensitive drainage areas;
- Prevent artificial drainage from concentrated flows onto slopes or into excavations;
- Where deep peat excavations require dewatering, discharges of the pumped water will require to be controlled in a manner which does not adversely affect habitats on-site (due to potential silt content etc.) and does not lead to the creation of saturated, and hence very soft, areas of peat. Locations of discharge points are to be agreed in advance of any dewatering activities with the ECoW.;
- Design of appropriate sediment control measures including the use of silt traps / barriers where necessary and cut-off ditches in particular at appropriate locations along site tracks and earthworks;
- Identification of drainage areas and areas of run-off which could potentially be affected by the Proposed Varied Development and appropriate stand-off distances established;
- Appropriate track construction methods to take cognisance of local topography, peat thickness and peat features (such as peat pipes, slumps, hags, etc.);
- Development of working methodologies that ensure that any exposed peat is protected to limit the potential for degradation, erosion or failure of the accumulation;
- Where excavated tracks are constructed, the peat and any soft soils should be removed and replaced with granular material placed in layers and compacted;
- Where floating tracks are constructed, a suitable geogrid and separator geotextile (where required) should be laid over the existing ground surface with graded stone (nominally 75mm down) placed over this in layers and compacted. However, a geotextile specialist should be sought regarding this;
- Any floating track design should take into account the properties of the peat soils at the Proposed Varied Development;
- Temporary storage of peat should be minimised. However, where required peat should be stored at no greater than 2m in height and should be located directly adjacent to or near access tracks; and
- Peat should be stored on ground appropriate for storage of materials, i.e. dry flat ground, a minimum of 50m away from any watercourse, and out with any areas where there is a likelihood of peat instability or the potential to initiate a peat slide.

7.2.2 In addition to the mitigation measures noted above, as blasting is highlighted as typically increasing the overall peat slide likelihood surrounding the borrow pits, the Contractor shall determine the minimum amount of explosive required and/or consider the use of lower disturbance methods (e.g. lower vibration measures), where possible. Where blasting is completed, design of the blast required should consider the surrounding peat conditions and the likelihood for a potential peat landslide. The design of the blast should therefore look to minimise ground accelerations which may influence the peat stability.

7.2.3 Where ‘Probable’ or ‘Likely’ peat slide Hazards are present within influencing distance of the blast, these are to be stripped thereby removing the higher Hazard areas. The influencing distance of the blast will be determined by the Contractor based on their blast design, considering estimated ground accelerations. Prior to the blasting itself, all personnel and plant will be moved from the area and the access tracks in the vicinity closed in-case a peat slide is detected. Following the blasting activities, the peat surrounding the area shall be monitored and inspected by a suitable qualified and experienced geotechnical engineer for any signs of potential peat failure prior to opening the access tracks and borrow pits for works/traffic.

7.2.4 As noted in Table 13, within the area of no. 15 on the access track from T08 to T09 there is a section of floating access track which is proposed on an area where the slope gradient is close to the limits of where floating access tracks would be considered typical. This may create an area of instability that should be investigated further as part of the detailed design with specific ground investigation completed in this area. However, where further detailed assessment does not prove the stability of the peat underlying the floating access track through the detailed design process, this section of floating road should be removed or a further engineering solution implanted to ensure its stability. This will be covered in further detailed within the updated PLHRA completed post-consent.

7.2.5 As noted in Section 1.3, areas where peat will be reused are not expected to create an increase in the peat stability risk beyond that which has been identified as part of the assessment completed in Table 13. Based on the assessment completed as part of Table 13 and considering the proposed peat reuse, no specific areas of concern are identified. This will be confirmed further following the GI and the detailed design process and presented in the updated PLHRA, post-consent.

7.2.6 Many of the measures provided above serve both to mitigate and reduce the likelihood of a peat slide occurring, as well as being good construction practice. As detailed in Table 13, there are three areas that have a potential 'Moderate' Hazard Ranking. Further targeted engineering measures that could be used for each 'Moderate' Hazard Ranking area identified are presented below and in Table 14.

- Installation of drainage - Installation of targeted drainage would aim to isolate the areas of peat from upslope surface water. Specific consideration should be given to those areas identified with 'probable' or 'likely' peat slide Hazard. If applicable, re-routing surface (flushes/gullies) and subsurface (pipes) drainage around critical areas will also help control surface water. Drainage measures need to be carefully planned to minimise any negative impacts;
- Monitoring of water levels within existing watercourses, drainage channels and groundwater levels throughout the Proposed Varied Development during construction; and
- Monitoring of slope and peat stability both in the vicinity and down slope of proposed infrastructure during construction and at regular intervals post construction, especially after extreme rainfall or snow events, by suitably experienced and qualified personnel.

  – Catch Wall Fences – Installation of catch wall fences for areas in which the peat landslide will affect watercourses or where 'Moderate' peat slide Hazard cannot be avoided by micrositing should be considered. These fences will need to be engineered in such a way that they are adequately founded into the bedrock and should be inspected periodically and, if required, debris removed.

  – Catch Wall Ditches - A softer engineering approach to catch wall fences are catch ditches. These could be installed between the watercourse or 'Moderate' peat slide Hazard (where this cannot be avoided by micrositing) and proposed infrastructure.

Table 14 Targeted Mitigation for Each Development Area Identified with 'Moderate' Hazard Ranking

Location	Peat Slide Risk Rating	Receptors	Worst Case Consequence Rating	Hazard Ranking	Mitigation	Revised Hazard Ranking
4 Along access track to met mast south-east of T04	Likely	Watercourse SSSI & SPA Proposed access track Met mast Class 1 peatland (disturbed by forestry)	Very High	Moderate	Mitigation measures as detailed Section 7.2 prior to this table to be followed and considered. Where risk cannot be controlled further targeted engineering measures relating to installing drainage to isolate the areas of likely peat slide from upslope water and the construction of catch ditches or catch fences around the key receptors (e.g. the SSSI) to reduce and /or prevent the peat runout reaching the receptor.	Low
5 Borrow pit at Turbine T05	Probable	Watercourse SSSI & SPA Turbine T05 Proposed access track Met mast Class 1 peatland (disturbed by forestry)	High	Moderate	The assigning of the Moderate Hazard Ranking was mainly due to the increase in peat slide likelihood as a result of blasting. By following the mitigation measures as detailed in Section 7.2 and in particular paragraphs 7.2.2 & 7.2.3 which specifically relate to blasting the Hazard Ranking should be able to be controlled and reduced.	Low
18 Turbine T10	Probable	Watercourses Turbine T10	High	Moderate	Mitigation measures as detailed Section 7.2 prior to this table to be followed and considered. The areas of Probable peat slide liklihood are underlying the temporary hardstanding of the turbine and the access trackand therefore for the construction, the areas of probable peat landslide should be stripped in advance of the rest of the construction works, with the excavation works working upslope of the Probable likelihood to reduce the effects of peat slide affecting the workers. This would remove the risk during construction. On completion of the construction, the temporary area would be reinstated with the peat excavated, however, during the detailed design phase this area should be looked at in more detail with a specific peat stability check completed of the reinstated peat. Where it cannot be proven there is stability of the peat when reinstated, engineering measure to ensure stability should be implemented. These can include installing drainage to isolate the areas of probable peat slide from upslope water and the construction of a bund on the upslope side of the proposed permanent infrastructure to provide a structure to stop peat flow affecting sensitive receptors. This bund would need to be constrcuted on sutibale founding starta below the base of the peat.	Low

– c

7.3 Potential Peat Slide Indicators

7.3.1 During the site works (i.e. Construction works), site staff will be made aware of the slope failure indicators, how to recognise them and the importance and mechanism for reporting these. They will also receive training and instruction in emergency procedures in the event of a peat slide. This will minimise the impact should a peat slide occur.

7.3.2 There are a number of recognised indicators for slope failures, and these can also indicate the potential of a peat slide event. The factors below are particularly applicable to low velocity events:

- The development of tension cracks across the slope or in semi-circular patterns showing progressive development;
- Boggy ground or new springs appearing at the base of slopes;
- Sudden reactivation / drying up of spring lines, drainage channels or streams;
- Creep and bulging of ground;
- Displacement and leaning of trees, fence posts, dykes, etc.; and
- Breaking of underground services.

8. Conclusions

8.1.1 The general approach to the infrastructure design has been to design the Proposed Varied Development to avoid areas of deep peat deposits (i.e. >1.0m thickness) wherever possible.

8.1.2 As indicated in Figure 12, in Appendix A**,** the peat slide likelihood for the Site is generally assessed to be either 'Negligible' or 'Unlikely'. However, large parts of the infrastructure components of the Proposed Varied Development are located in areas of Likely peat slide likelihood.

8.1.3 The assessment has also taken into consideration blasting activities which may be undertaken to form the borrow pit. The effects of blasting resulted in the increase in peat slide Hazard localised to the immediate surroundings of the borrow pits generally increasing the peat slide likelihood from Negligible to Unlikely, although in one borrow pit this was increased from Likely to Probable.

8.1.4 From the qualitative assessment (Table 13) of the construction components within the Site, 22 areas were assessed as they were affected by peat slide likelihoods of Likely or above. From these, 1 no. was assessed with a Hazard Ranking of Negligible, 3 no. with a Hazard Ranking of Moderate and the rest with a Hazard Ranking of Low.

8.1.5 As the majority of the proposed infrastructure is located in areas assessed as having a Hazard Ranking of 'Low' or less, this means that the project can proceed as long as further investigation to refine the assessment and mitigate the hazard is undertaken.

8.1.6 As components were assessed with a 'Low' or 'Moderate' Hazard Ranking, AECOM have outlined mitigation measures that could be implemented to reduce the peat slide likelihood and consequence. The decision on whether further analysis is undertaken and/or the selection and details on the mitigation measures used shall be determined by the Principal Contractor of the Proposed Varied Development. For the areas identified with a 'Moderate' Hazard Ranking, AECOM have provided further worst-case mitigation which can be applied specifically relating to the key receptors and the higher peat slide Hazards, to address the risk and reduce the overall Hazard to more acceptable levels (i.e. 'Low'). An updated PLHRA shall be carried out for the Proposed Varied Development by the Principal Contractor, using additional information collected during the ground investigation, post consent, and considering the design development of the scheme after this reaches design maturity. As part of the updated PLHRA, it is considered that the Hazard Ranking at several locations could be reduced following the provision of further information and a more detailed quantitative assessment, where required.

8.1.7 As highlighted the Proposed Varied Development will include the reuse of peat in some form as part of the works. Based on the proposals for the peat reuse, is it not anticipated these will create a significant peat instability risk beyond that identified as part of the assessment completed. This will require to be confirmed following the GI for the Proposed Varied Development and once the design has reached fully maturity. This will then be presented in the updated PLHRA, post consent.

8.1.8 The Principal Contractor will be required to produce a Construction Method Statement (CMS) for the construction of the Proposed Varied Development. This should include the results of the updated PLHRA, which will be a further development of this preliminary PLHRA. The updated PLHRA will provide detailed procedures and methods intended to be used by the Principal Contractor to minimise any environmental impact, including the risk of any peat slide events.

9. References

Boylan. N., Jennings. P., and Long. M (Boylan, et al.) (2008) Peat Slope Failure in Ireland, Quarterly Journal of Engineering Geology and Hydrogeology, V. 41, No. 1, p. 93-108, February 2008.

British Geological Survey (BGS) (2015) User Guide: Aquifer Productivity (Scotland) GIS datasets, Version 2. Revised Report, February 2015.

British Geological Survey (BGS) (2026) Onshore Geoindex, available: https://mapapps2.bgs.ac.uk/geoindex/home.html, accessed May 2026.

British Standards Institute (BSI) (2020). Code of practice for ground investigations, BS 5930:2015 + A1:2020, BSI Standards Limited, May 2020.

Carling, P (1986). Peat Slides in Teesdale and Weardale, Northern Pennines, July 1983: Description and Failure Mechanisms. Earth Surface Processes and Landforms, Vol. 11, pp. 193 - 206.

Centre for Ecology and Hydrology (2026) National River Flow Archive, available: www.ceh.ac.uk/data/nrfa, accessed May 2026.

Coal Authority (2024) Mining Remedial Authority Interactive Map, available; https://datamine-cauk.hub.arcgis.com/, accessed May 2026.

Dochartaigh, B.O., Doce, D.D., Rutter, H.K. & MacDonald, A.M. on Behalf of the British Geological Survey (BGS) (2015). User Guide: Aquifer Productivity (Scotland) GIS datasets, Version 2, Revised Report, Open Report OR/15/003

Forestry and Land Scotland (2024) Guidance on Design Principles for Renewable Energy Development on Peatland on the National Forests and Land, Final V1, January 2024.

International Peat Society (2026). Types of Peatland, available: https://peatlands.org/peatlands/types-of-peatlands/, accessed May 2026.

Joint Nature Conservation Committee (JNCC) (2011). Towards an Assessment of the State of UK Peatlands, JNCC Report No. 445.

Lindsay, R. and Bragg, O. (2005) Windfarms and Blanket Peat: The Bog Slide of 16 October 2003 at Derrybrien, Co. Galway, Ireland. University of East London.

Met Office (2026) Location-specific long-term averages, available: https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/gcuurcg7q, accessed May 2026.

Microsoft (2024) Bing Maps, available: https://www.bing.com/maps?cp=51.512917%7E-0.108859&lvl=7&style=r; accessed May 2026.

Mills, A.J. and Rushton, D. (2023) 'A risk based approach to peatland restoration and peat instability', Proceedings of the ICE – Geotechnical Engineering, 176(4), pp. 345–360.

National Library of Scotland (2026) Map images - National Library of Scotland

NatureScot (2026) Advising on peatland, carbon-rich soils and priority peatland habitats in development management, March 2026 [online], available: https://www.nature.scot/doc/advising-peatland-habitats-and-carbon-rich-soils-development-management [accessed May 2026].

NatureScot (2024) Good practice during wind farm construction, July 2024 [online], available: https://www.nature.scot/doc/good-practice-during-wind-farm-construction [accessed May 2026]

NatureScot (2024) Peatland Action – Technical Compendium [online], available: https://www.nature.scot/doc/peatland-action-technical-compendium [accessed May 2026].

NatureScot (2026) SiteLink Interactive Map, available: https://sitelink.nature.scot/map, accessed May 2026.

O'Kelly, B.C. (2017). Measurement, interpretation and recommended use of laboratory strength properties of fibrous peat, Geotechnical Research, Volume 4 Issue GR3, ICE Publishing, October 2017

Scotland's Environment (SE) (2026). Online Interactive Map Viewer, available: https://map.environment.gov.scot/sewebmap/, accessed May 2026.

Scottish Environment Protection Agency (SEPA) (2017). SEPA Regulatory Guidance – Developments on Peat and Off-site Uses of Waste Peat, SEPA Guidance, WST-G-052. Version 1., May 2017

Scottish Environment Protection Agency (SEPA) (2026a). Water Classification Hub, available: https://www.sepa.org.uk/data-visualisation/water-classification-hub/, accessed: May 2026.

Scottish Environment Protection Agency (SEPA) (2026b). Scottish Flood Hazard and Risk Information, available: https://map.sepa.org.uk/floodmaps/FloodRisk/Search, accessed: May 2026.

Scottish Government (2017). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments, Prepared for Energy Consents Unit Scottish Government, Second Edition, April 2017.

Scottish Government, Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) (Scottish Government, SNH & SEPA) (2017). Guidance on Developments on Peatland - Peatland Survey, On-line Version Only, 2017.

Scottish Natural Heritage (SNH) (2015). Constructed Tracks in the Scottish Uplands, 2nd Edition, September 2015.

Scottish Natural Heritage and Forestry Commission Scotland (SNH & FCS) (2010). Floating Roads on Peat, A Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments in Scotland, August 2010.

Scottish Renewables (SR) and Scottish Environment Protection Agency (SEPA) (SR & SEPA) (2012). Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste, Version 1, January 2012.

Scotland's Soils (2026). National Soil Map of Scotland, available: https://map.environment.gov.scot/Soil_maps/?layer=1#, accessed May 2026.

UK Centre for Ecology & Hydrology (2026) UK water Resources Portal, available: https://ukwrp.ceh.ac.uk/, accessed May 2026.

UK Government (1989) UK Legislation – Electricity Act 1989, 1989 Chapter 29, 27th July 1989 [online], available: https://uk-legislation.com/electricity-act-1989 [accessed May 2026]

Von Post, L. (1924) Das genetische System der organogenen Bildungen Schwedens, Comite International de Pedologie, IV Commission. No. 22., 1924.

Wildlife Trust (2026a). Raised Bog, available: https://www.wildlifetrusts.org/habitats/wetlands/raised-bog, accessed May 2026.

Wildlife Trust (2026b). Blanket Bog, available: https://www.wildlifetrusts.org/habitats/wetlands/blanket-bog, accessed May 2026.

UK Centre for Ecology & Hydrology (2026) Station 88001 – Carradale at Dippen [online], available: NRFA station catchment information for 88001 - Carradale at Dippen

UK Centre for Ecology & Hydrology (2026) UK Water Resources Portal [online], available: UK Water Resources Portal

Met Office (2026) UK Climate Station: Machrihanish [online], available: Machrihanish Location-specific long-term averages

Appendix A Figures

Prepared for: SSE Renewables Ltd