Scottish & Southern Electricity Networks

TRANSMISSION

Spittal to Loch Buidhe to Beauly 400 kV

OHL Connection

Environmental Impact Assessment

Volume 5 | Technical Appendix

Appendix 11.3 | Peat Carbon Assessment

July 2025

VOLUME 5: APPENDIX 11.3 - PEAT CARBON ASSESSMENT

1. INTRODUCTION

1.1 Background

1.1.1 Peatlands are environments in which waterlogged conditions prevent the complete decomposition of organic material, leading to the accumulation of peat. This process contributes to carbon sequestration, as the 'locking away' of peat or partially decomposed organic matter into the soil prevents the carbon from being released into the atmosphere as carbon dioxide (CO_2). Peatlands are therefore important environments when considering climate change mitigation, in addition to their importance in terms of biodiversity and the hydrological environment.

1.1.2 In the UK, peatlands cover approximately 12% of the nation's land area (approximately 3 million hectares), and store approximately 3.2 billion tonnes of carbon. Approximately 80% of these peatlands have been impacted by human activity, for example through drainage, peat harvesting, burn management and livestock grazing. However, the importance of these environments has started to be recognised more recently, and now the impacts of infrastructure developments on peatland and carbon-rich soils must be assessed in order to avoid possible disturbance to these environments where possible.

1.1.3 Infrastructure developments have the potential to adversely impact the amount of carbon sequestered / stored in peat through direct disturbance and excavation during construction, and through indirect impacts to peatland functioning. Peat restoration and reuse associated with infrastructure developments can also improve carbon stores. These impacts have implications for future climate change, as a reduction in carbon sequestration in peatlands allows more carbon dioxide to accumulate in the atmosphere, resulting in enhanced climate change, or vice versa, improvement of carbon stores in peatland can mitigate climate change.

1.2 The Proposed Development

1.2.1 The construction and operation of a new double circuit steel structure 400 kilovolt (kV) overhead transmission line (OHL) to connect into new substation sites at Banniskirk, Carnaig and Fanellan in Scotland, has the potential to impact peatlands and carbon-rich soils. Hereafter referred to as the Spittal to Loch Buidhe to Beauly 400 kV OHL Connection (the "Proposed Development"), proposed by Scottish and Southern Electricity Networks Transmission ("SSEN Transmission"), an Environmental Impact Assessment (EIA) has been undertaken to assess the potential significant effects of the Proposed Development. The findings of the EIA are presented in this EIA Report.

1.2.2 The Proposed Development is described in **Volume 2, Chapter 3: Description of the Proposed Development** and consists of works for which Section 37 consent under the 1989 Electricity Act and deemed planning permission under the Town and Country Planning (Scotland) Act 1997 ('the Planning Act') is sought:

- The installation and operation of approximately 96 km of new double circuit 400 kV OHL on steel lattice towers between the proposed Banniskirk and Carnaig 400 kV Substations;
- The installation and operation of approximately 77 km of new double circuit 400 kV OHL on steel lattice towers between the proposed Carnaig and Fanellan 400 kV Substations; and
- Permanent diversion works required to the existing 132 kV and 275 kV OHLs (referred to within this EIA Report as special arrangements), of approximately 18 km in total, to enable the construction of the Proposed Development, including the temporary diversion works required to construct the permanent diversions.

1.2.3 These new steel lattice towers, as well as the temporary tower pads required for their construction, have the potential to impact peat and carbon-rich soils through excavation and disturbance, and are therefore included in this peat carbon assessment.

1.2.4 The Limit of Deviation (LoD) for the OHL[1] represents the area within which impacts to peat are most likely, particularly from direct excavation and disturbance during construction. The LoD therefore forms the baseline area for the assessment, and is used to determine the baseline peat carbon characteristics of the Class 1, 2 and 3 peat (as defined by the Carbon and Peatland 2016 Map[2]) located within it that have the potential to be impacted by the Proposed Development. The assessment then considers the proposed infrastructure footprint within the LoD, where the infrastructure is located on Class 1, 2 and 3 peat, to determine the potential impact on peat carbon characteristics of the Proposed Development. This potential impact is compared with the baseline peat carbon characteristics of the Class 1, 2 and 3 peat within the LoD to determine the potential magnitude of change in peat carbon characteristics caused by the Proposed Development. The full assessment methodology is provided in **Section 3** below.

1.2.5 The following works, also of relevance to the potential impact on peat and carbon-rich soils, are required as part of the Proposed Development, or to facilitate its construction and operation:

- The formation of access tracks (permanent and temporary) and the installation of bridges and culverts to facilitate access;
- Formation of flat areas from which the conductor will be pulled during construction, which will contain earthed metal working surfaces referred to as Equipotential Zones (EPZs); and
- Working areas around infrastructure to facilitate construction.

1.2.6 Within this EIA Report, **Volume 2, Chapter 11: Geological Environment** and **Volume 5, Appendix 11.2: Outline Peat Management Plan (OPMP)** details the surveys and assessments undertaken to consider peat depth, and peat excavation and reuse. **Volume 2, Chapter 8: Ecology and Nature Conservation** considers potential impacts to blanket bog habitats, and **Volume 2, Chapter 10: Water Environment** considers potential impacts on hydrological connectivity and water resources. This Appendix takes into account information from these chapters in order to assess the potential impact of the Proposed Development on carbon storage along the full route of the OHL.

1.2.7 The peat carbon assessment utilises a methodology that can evaluate the potential impact of the Proposed Development on peat carbon storage which is defined as the total quantity of carbon stored within the peatland, measured in tonnes of carbon dioxide equivalent (tCO_2e).

1.2.8 The methodology can also calculate the peat carbon flux rate, using information on the condition of the peatland which influences the amount of carbon emitted (loss) or sequestered (uptake) naturally over time (the peat carbon flux rate), measured in tonnes of carbon dioxide equivalent per five years (tCO_2e per 5 years). However, data was not available on the peatland condition within the LoD of the Proposed Development, and therefore an assessment of the impact of the Proposed Development on the peat carbon flux rate has not been included in the assessment (see Paragraph 3.1.3).

1.2.9 This Appendix also includes a specific peat carbon assessment completed for the extent of the Proposed Development which passes through The Flow Country World Heritage Site (WHS). This site was inscribed by the United Nations Educations, Scientific, and Cultural Organisation (UNESCO) in July 2024 (List Entry: 1722). Located in Caithness and Sutherland, the WHS was inscribed for its Outstanding Universal Value (OUV) under UNESCO WHS Criterion ix, representing an *'outstanding example of an actively accumulating blanket bog*

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[1] Defined as the maximum extent within which the Proposed Development can be built, and consisting of an approximately 200 m wide corridor (100 m either side of the proposed OHL centre line), although this is extended in areas where ground conditions are more uncertain.

[2] Scotland's Soils and NatureScot (2016) Carbon and Peatland 2016 Map. [Online] Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ (Accessed: May 2025)

landscape'. Carbon sequestration and storage is one aspect of this Criterion, and therefore a specific peat carbon assessment has been completed for the area of this WHS impacted by the Proposed Development. This assessment is detailed throughout this Appendix (see **Sections 3.3, 4.2** and **5.2**), and a full assessment of the potential impacts of the Proposed Development on The Flow Country WHS is provided in **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact Assessment Report**.

2. RELEVANT POLICY, GUIDANCE AND CONSULTATION

2.1.1 Relevant policy and guidance documents have been reviewed and considered as part of this assessment.

2.2 Policy

National Planning Framework 4

2.2.1 National Planning Framework 4[3] (NPF4) is the Scottish Government's national spatial strategy, which sets out spatial principles, regional priorities, national developments, and national planning policy. Adopted in February 2023, it emphasises the importance of peatland and carbon-rich soils in sustainable development through changes to the national planning policy.

2.2.2 Policy 5 – Soils; aims to protect carbon-rich soils, restore peatlands and minimise disturbance to soils from development:

"c) Development proposals on peatland, carbon-rich soils and priority peatland habitat will only be supported for:

i) Essential infrastructure and there is a specific locational need and no other suitable site;

[…]

d) Where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:

i. the baseline depth, habitat condition, quality and stability of carbon rich soils;

ii. the likely effects of the development on peatland, including on soil disturbance; and

iii. the likely net effects of the development on climate emissions and loss of carbon."

2.2.3 Previously, applications for planning permission for OHL have rarely needed to consider potential impacts on peatland, carbon-rich soils, and in particular the potential loss of carbon from these carbon stores. This Policy indicates new understanding and consideration of these potential impacts and their association with climate change. This Appendix has therefore been produced to consider these potential impacts in line with planning policy.

2.2.4 Policy 2 – Climate Mitigation and Adaptation is also relevant as it aims to encourage, promote and facilitate development that minimises emissions and adapts to the current and future impacts of climate change:

"a) Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible.

b) Development proposals will be sited and designed to adapt to current and future risks from climate change.

c) Development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change will be supported."

2.2.5 Part a) of Policy 2 is of particular relevance to this assessment, as although a full lifecycle assessment of greenhouse gas emissions is not being completed for the Proposed Development, potential emissions from peatland disturbance would be included in that assessment and therefore should be minimised as far as possible.

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[3] The Scottish Government (2024) National Planning Framework 4 [Online] Available at: https://www.gov.scot/publications/national-planning-framework-4/ (Accessed: May 2025)

2.3 Guidance

BS 5930:2015 Code of Practice for Ground Investigations[4]

2.3.1 This British Standards Institute (BSI) Standards Publication provides comprehensive guidelines for conducting site investigations, including those involving peat. It lists the following key considerations relevant to soils containing peat:

- Desk Study and Field Reconnaissance;
- Planning Ground Investigations;
- Exploratory Holes;
- Field Tests;
- Laboratory Tests;
- Reporting and Interpretation; and
- Environmental Considerations including carbon impacts.

Advising on Peatland, Carbon-rich Soils and Priority Peatland Habitats in Development Management (NatureScot, 2023)[5]

2.3.2 NatureScot's 2023 guidance on Peatland, Carbon-rich Soils, and Priority Peatland Habitat was published in order to provide developers and decision makers with consistent advice on the assessment of effects of any development proposals on the aforementioned habitats or environments. The guidance was produced to support NPF4, and should be used for proposals affecting land which is not protected for its peatland interest.

2.3.3 To support this assessment, this guidance provides definitions for carbon-rich soils and priority peatland habitat, as well as detailing potential direct and indirect impacts from development on peatland.

2.3.4 This guidance defines direct and indirect impacts to peatland as follows:

- Direct Impacts – comprise a loss of resource and habitat lost or damaged during construction and operation; and
- Indirect Impacts – comprise the loss of function, which may arise from temporary or permanent changes in drainage patterns and the quality or quantity of surface and ground water.

2.4 Consultation

2.4.1 To inform the scope of the assessment for the Proposed Development, consultation was undertaken with statutory and non-statutory bodies through early consultation and a formal EIA Scoping process.

2.4.2 Full details of the consultation process and responses are included in **Volume 2, Chapter 6: Scope and Consultation** and associated **Volume 5, Appendix 6.3: Scoping Matrix**. Specific scoping responses, relevant to the peat carbon assessment are provided in **Table 1**.

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[4] British Standards Institute (2020) BS 5930:2015+A1:2020 Code of Practice for Ground Investigations. [Online] Available at: https://knowledge.bsigroup.com/products/code-of-practice-for-ground-investigations (Accessed: May 2025)

[5] NatureScot (2023) Advising on Peatland, Carbon-Rich Soils and Priority Peatland Habitats in Development Management. [Online] Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management (Accessed: May 2025)

Table 1: Scoping Responses and Consultations

Consultee	Type and Date	Summary of Consultation Response	EIA / Design Response to Consultee	EIA Report Section Addressing Consultation
Energy Consents Unit (ECU)	Scoping Opinion, 5th February 2025	The ECU requests that the EIA includes a full assessment of the impact of the Proposed Development on peat, in line with NPF4 Policy 5.	Peat probing has been completed for the Proposed Development, and a full assessment of the impact of the Proposed Development on peat is provided within **Volume 2, Chapter 11: Geological Environment** and its associated appendices.	Potential impacts of the Proposed Development on peat, and the completed peat probing surveys, are detailed in **Volume 2, Chapter 11: Geological Environment**, and its associated appendices.
Scottish Environment Protection Agency (SEPA)	Scoping Response, 31st October 2024	The consultee states that where proposals are on peatland or carbon-rich soils, specific information should be submitted to address NPF4 Policy 5 to protect carbon-rich soils and the ecosystem services they provide (including water and carbon storage). This information should include the demonstration that adverse impacts have been avoided where possible and mitigated through best practice, especially for deep peat, the provision of peat depth and peatland condition information, and the inclusion of an Outline Peat Management Plan (OPMP).	The Proposed Development has been designed in order to avoid peatlands in the first instance, and then avoid placing infrastructure on deep peat where complete avoidance of peat was not possible. Phase 1 peat probing has been completed along the alignment, and an outline Peat Management Plan is provided in **Volume 5, Appendix 11.2: Outline Peat Management Plan**.	Details of peat surveys are provided in **Volume 2, Chapter 11: Geological Environment**, and the OPMP is provided in **Volume 5, Appendix 11.2: Outline Peat Management Plan**. **Section 5** of this Appendix details the potential impact of the Proposed Development on peat carbon storage.
NatureScot	Scoping Response, 5th December 2024	NatureScot flags the potential direct and indirect impacts on priority peatland habitats in protected sites, including the Caithness and Sutherland Peatlands Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site, and the Flow Country World Heritage Site, and uplands where carbon-rich soils, deep peat and priority peatland habitat are likely to be present.	The Proposed Development has been designed to avoid priority peatland habitat and deep peat where possible. Where avoidance has not been possible, appropriate mitigation is proposed within this EIA Report, and potential adverse impacts have been assessed.	Details of potential impacts to peat are provided in **Volume 2, Chapter 11: Geological Environment**, and consideration of ecologically protected sites is provided in **Volume 2, Chapter 8: Ecology and Nature Conservation.** An assessment of the potential impacts to the WHS is provided in **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact**

Consultee	Type and Date	Summary of Consultation Response	EIA / Design Response to Consultee	EIA Report Section Addressing Consultation
				Assessment Report, which includes consideration of potential impacts to peat carbon storage.

3. ASSESSMENT METHODOLOGY

3.1 Scope of Assessment

3.1.1 The scope of the peat carbon assessment solely includes the potential impact of the Proposed Development on peat carbon storage. This assessment does not constitute a full life cycle or embodied carbon assessment, which has been scoped out of the EIA, as it is assumed that the total carbon emissions embedded into material and components associated with infrastructure are not predicted to be significant in relation to the carbon savings of the Proposed Development as it supports carbon reduction targets at a national level. More detail on this is provided in **Section 6.7** within **Volume 2, Chapter 6: Scope and Consultation**.

3.1.2 A peat carbon assessment has been completed for the EIA due to the sensitivity of the peatland environment which the Proposed Development runs through, and the recent acknowledgement of the importance of peatland carbon stores and the potential impacts developments can have on them. Potential impacts to peat carbon storage are assessed for the full alignment of the Proposed Development. A separate assessment is also provided for the sections of the Proposed Development which run through the Flow Country WHS (further detail provided in **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact Assessment Report**).

3.1.3 As stated in Paragraph 1.2.8, although the methodology used for this peat carbon assessment can assess potential impacts on both peat carbon storage and peat carbon flux rate, the assessment of peat carbon flux rate has been scoped out of the assessment due to insufficient peatland condition information. The two calculations included in the peat carbon assessment are separate calculations, and therefore, the exclusion of the calculation of the peat carbon flux rate does not impact the assessment of the potential impact of the Proposed Development on peat carbon storage. The assessment of solely peat carbon storage is also in line with NPF4, because Policy 5 refers to the loss of carbon as well as climate emissions.

3.1.4 A cumulative assessment of the potential impacts on peat carbon storage due to the Proposed Development in addition to those from other developments (for energy generation and transmission) has been scoped out of this peat carbon assessment. This is due to the difficulty in acquiring the required data to complete the assessment methodology, including areas of proposed infrastructure and peat depths. The assessment will therefore assess the impact of the Proposed Development on peat carbon storage in isolation, without consideration of other nearby schemes.

3.2 Study Area

3.2.1 The baseline peat carbon storage has been assessed using the LoD of the route of the Proposed Development. This constitutes the maximum extent within which the Proposed Development can be built. This covers the key components of the Proposed Development which involve new steel lattice towers and access track routes.

3.2.2 The horizontal LoD, for which consent is sought, is typically as follows:

- OHL (steel lattice) – approximately 200 m total LoD (100 m either side of the centre line); and
- Access tracks – approximately 200 m total LoD (100 m either side of the centre line) for new access tracks. A 20 m total LoD (10 m either side of the centre line) for upgrades to existing tracks.

3.2.3 Further detail on the LoD and the variation related to local constraints, known engineering challenges, and environmental sensitivities are provided in **Volume 2, Chapter 3: Description of the Proposed Development** in **Section 3.5**.

3.2.4 For the assessment of direct impacts, the peat balance data collected on peat as detailed in **Volume 2, Chapter 11: Geological Environment** and **Volume 5, Appendix 11.2: Outline Peat Management Plan** is used to inform the peat carbon assessment. The methods and extent of the field data collected are outlined in that chapter.

3.2.5 The peat carbon assessment only includes areas within the LoD that are designated as Class 1, Class 2, or Class 3 peat on the Carbon and Peatland 2016 Map[6] for the baseline assessment and assessing indirect impacts. It is assumed that of the mapped peat soils, these contain the most peat or carbon-rich soil that has the potential to be impacted by the Proposed Development. The definitions of these classes are provided as follows:

- 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.

3.2.6 Class 4 and 5 peat, and Class 0 soils (mineral soils) have not been included within the assessment, as it is assumed that the peat within these Classes is less sensitive to impacts from the Proposed Development.

3.2.7 The Proposed Development crosses The Flow Country WHS in four places, with 25 steel lattice towers proposed to be constructed and sited permanently within the WHS. In order to assess the potential impact of the Proposed Development on the OUV for which the site was inscribed by UNESCO in 2024, a peat carbon assessment has been completed for the area covered by the LoD of the Proposed Development within the WHS. This is summarised in **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact Assessment Report**, and is detailed further in **Sections 3.3**, **4.2** and **5.2** below.

3.3 Assessment Methodology

3.3.1 The methodology for the peat carbon assessment has been developed by WSP, and is used within the EIAs for SSEN's Transmission ASTI projects where relevant. The methodology is described in more detail in the following sections.

Part 1: Impact Screening

3.3.2 The initial part of the assessment relates to completing a desk study to identify whether the Proposed Development is likely to have 'direct' or 'indirect' impacts on peatlands. This should consider all likely direct and indirect impacts, from both permanent and temporary infrastructure. This part of the methodology should constitute use of site-specific information (for example, results of other field surveys) and mapping, such as the Carbon and Peatland 2016 Map.

Part 2: Peat Surveys & Site Probing

3.3.3 Once it has been determined that there is the potential for the Proposed Development to impact peatland, peatland surveys and peat probing should be conducted in order to collect the required data to quantify and assess the potential impact on peat carbon. These surveys allow the understanding of the baseline peat depths, peat condition, and peat stability, and the results inform the baseline peat carbon values used within the peat carbon assessment. The peat surveys completed for the Proposed Development are detailed in **Section**

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[6] Scotland's Soils and NatureScot (2016) Carbon and Peatland 2016 Map. [Online] Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ (Accessed: May 2025)

11.3 within **Volume 2, Chapter 11: Geological Environment**, and their methodologies and results are not repeated within this Appendix.

Part 3: Peat Carbon Assessment

Peat Carbon Calculator

3.3.4 The peat carbon assessment has been completed using a bespoke ‘Peat Carbon Calculator’ developed by WSP for use in the SSEN Transmission ASTI EIA Framework, in order to support the assessment of carbon emissions from peatland disturbance.

3.3.5 The Peat Carbon Calculator draws on input from the Scottish Government’s Carbon Calculator Tool for Wind Farm Developments on Peatlands[7], in order to estimate carbon stores lost through peatland removal using the tool’s peat-related coefficients.

3.3.6 The Peat Carbon Calculator includes consideration of both direct and indirect impacts to peatland, which are detailed in paragraph 2.3.4.

3.3.7 The Peat Carbon Calculator provides values for two scenarios:

- No Impact Scenario – baseline storage of existing peat and emissions (loss) or sequestration (storage) with no project impact; and
- Project Impact Scenario – storage and emissions (loss) including the impact of the project over four timeframes (pre-construction, during construction, post construction at 2-5 years, and post construction at 50 years).

3.3.8 The ‘No Impact Scenario’ determines the pre-construction baseline of the peatland (as informed by site surveys) and then predicts the future peatland emissions and / or storage over the lifetime of the project under a no intervention scenario.

3.3.9 The ‘Project Impact Scenario’ takes the pre-construction baseline condition of the peatland, and then predicts the impact of the scheme design and temporary construction on the baseline (during construction stage), the impact of the scheme design and post construction enhancement in the short-term (post construction at 2-5 years), and the impact of the scheme design and post construction enhancement in the long-term (post construction at 50 years).

Peat Carbon Storage

3.3.10 The following data is used to quantify the impact of the Proposed Development on peat carbon storage:

- Total area of peat (m^2) not impacted by the Proposed Development;
- Average depth of peat (m) that is not impacted by the Proposed Development;
- Total area of peat (m^2) directly impacted by the Proposed Development;
- Average depth of peat (m) that is directly impacted by the Proposed Development;
- Total area of peat (m^2) indirectly impacted by the Proposed Development;
- Average depth of peat (m) that is indirectly impacted by the Proposed Development;
- Total area of peat (m^2) to be restored following construction of the Proposed Development;

[7] Scottish Government (2022) Carbon Calculator for Wind Farms on Scottish Peatlands: Factsheet. [Online] Available at: https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/. (Accessed: April 2025)

- Average depth of peat (m) to be restored following construction of the Proposed Development;
- Carbon content of dry peat (%) for all not impacted, directly / indirectly impacted, and restored peat; and
- Bulk density (kg/m^3) for all not impacted, directly / indirectly impacted, and restored peat.

3.3.11 This data is used to determine:

- The volume of peat and carbon stored in the 'no impact' scenario or baseline for the Proposed Development for the short, medium and long term.
- The volume of peat directly / indirectly impacted as a result of the Proposed Development. This value is then used to calculate the carbon loss in kilograms associated with this volume of peat being disturbed, which is then converted into tonnes of CO_2 equivalent. This value is subtracted from the 'no impact' scenario baseline to provide a 'During Construction' baseline.
- Restoration is considered by adding the amount of restored peat carbon storage to this 'During Construction' baseline to result in a 'Post Construction' baseline for the short- and long-term.

Peat Carbon Assessment

<u>Baseline Conditions</u>

3.3.12 Given the length of the Proposed Development (approximately 173 km in total), and the range of habitats that are present along the route, it is expected that peat does not underlie every piece of infrastructure to be constructed. In order to determine a worst-case baseline, the Carbon and Peatland 2016 Map has been used to determine the areas within the LoD where peat is likely to be present (as Class 1, 2, and 3 peat), and this total area value has been used in the Peat Carbon Calculator to determine the baseline peat carbon store of the peatland within the LoD of the Proposed Development. The depth of the peat across the LoD has been assumed to be the average peat depth collected through the peat probing surveys.

<u>Direct Impacts</u>

3.3.13 The assessment of direct impacts on peat carbon storage has utilised the peat depth and infrastructure area data used in the peat balance calculations used to assess peatland disturbance, excavation and reuse in **Volume 2, Chapter 11: Geological Environment**. The bulk density and carbon content of dry peat have been set at the Peat Carbon Calculator's suggested default values of 175 kg/m^3 and 42% respectively as this data was not available for the peat within the LoD.

3.3.14 The following infrastructure located on peat has been included in the assessment of direct impacts on peat carbon storage:

- Permanent tower bases;
- Permanent access tracks;
- Temporary tower pads; and
- Temporary access tracks.

3.3.15 It was determined that in using the average peat depths recorded for each of the infrastructure types, the total volume of peat impacted / disturbed in the Peat Carbon Calculator was different to the excavation volumes calculated in **Volume 2, Chapter 11: Geological Environment**. This was likely due to the reduction in the influence of deep peat where it is present below infrastructure due to using an average value rather than calculating the volume impacted by every individual piece of infrastructure using the specific peat depth at that infrastructure location. In order to align the assessments, and improve consistency between them, minor amendments were made to the average peat depth used in the Peat Carbon Calculator for some of the infrastructure types. This allowed the directly impacted volumes in the Peat Carbon Calculator to be more in line with the peat balance calculations. The corrections are detailed in **Table 2**.

Table 2: Peat Depth Corrections for Use in the Peat Carbon Calculator

Infrastructure	Area (m^2)	Average Peat Depth (m)	Impacted Volume Using Average Peat Depth (m^3)	Impacted Volume Using Specific Peat Depth (m^2)	Difference in Volume from using Specific Peat Depth to Average Peat Depth (m^3)	Proposed Peat Depth to be used for Correction (m)	Impacted Volume Using Peat Depth Correction (m^3)	Difference in Volume from using Specific Peat Depth to Corrected Peat Depth (m^3)
Tower Bases	59,488	0.710	42,261	42,261	0	N/A	N/A	N/A
Permanent Access Tracks	147,170	0.430	63,328	76,977	13,649	0.523	76,970	7
Tower Pads	1,684,825	0.710	1,196,926	1,153,474	-43,452	0.685	1,154,105	-631
Temporary Access Tracks	728,888	0.555	404,366	412,445	8,079	0.566	412,551	-106

Indirect Impacts

3.3.16 Indirect impacts have been assumed to occur within 30 m of proposed permanent access tracks and within 10 m of proposed permanent tower bases, through changes to the hydrological environment. These distances have been determined based on NatureScot guidance and professional judgement of the potential for indirect impacts to occur within the vicinity of the Proposed Development. Indirect impacts on peat carbon storage are assumed to not occur for temporary infrastructure, because while the water table depth and habitat may change over the 48-month construction period in these locations, it is assumed that these timescales are short-term with regards to peat formation and decomposition, and therefore limited changes to peat carbon storage would occur during this time. The temporary infrastructure would also be removed following construction, so impacts to peat carbon storage in these locations are assumed to be reversible as the peat would recover following construction.

3.3.17 As peat probing has not been completed to cover 10 m or 30 m around the proposed infrastructure, the area of these indirect impacts has been determined through the use of the Carbon and Peatland 2016 Map, with the assumption that peat is present within the 10 m or 30 m area from every piece of proposed infrastructure located within Class 1, 2, and 3 peat. Peat depth within the 10 m or 30 m area is assumed to be the same as the average peat depth for the particular infrastructure type that the 10 m or 30 m area is measured from.

3.3.18 It is assumed within the Peat Carbon Calculator, that indirect impacts cause a 25% loss in peat carbon storage (i.e. a quarter of the stored carbon in the volume of peat impacted is lost through indirect impacts). This is because the peat in these areas would be impacted by a change in function through hydrological changes, rather than direct excavation, and it is assumed that indirect impacts on peat carbon storage would reduce the further from the infrastructure the peat is located, and that the majority of indirect impacts would be mitigated by best practice measures. Further details on this is provided in Paragraph 5.1.8.

Restoration

3.3.19 Peatland restoration included in the peat carbon assessment constitutes redressing and restoration of peat around permanent and temporary infrastructure locations, as detailed in **Volume 5, Appendix 11.2: Outline Peat Management Plan** and **Volume 2, Chapter 11: Geological Environment**. The volume of peat to be reused, as calculated in the peat balance assessment, has been used in the Peat Carbon Calculator.

3.3.20 Additional peatland restoration or compensation is excluded from the peat carbon assessment as the proposals for this are not currently finalised and are not included in this EIA.

The Flow Country World Heritage Site

3.3.21 As detailed above, the Proposed Development passes through The Flow Country WHS. This WHS is inscribed under UNESCO WHS Criterion ix, representing an "*outstanding example of an actively accumulating blanket bog landscape*". Attribute e) of this Criterion refers to carbon sequestration and storage, and therefore a specific peat carbon assessment of the potential impacts of the Proposed Development on peat carbon storage has been completed for the WHS. The results are summarised in **Section 5.2** below, and the assessment is detailed in **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact Assessment Report**.

3.3.22 The methodology followed for this specific assessment aligns with the methodology detailed in this Appendix for the peat carbon assessment of the full route of the Proposed Development. Direct impacts on peat carbon storage have been calculated using the peat areas and peat depths provided in the peat excavation and reuse calculations within this EIA, and indirect impacts on peat carbon storage have been calculated using the area within 10 m or 30 m of permanent infrastructure on Class 1, 2, and 3 peat within the LoD of the Proposed Development within the WHS.

Part 4: Demonstrating avoidance and minimisation of impacts

3.3.23 The final stage of the assessment methodology dictates that the peat carbon assessment, and associated peat surveys, should be used to influence the design of the Proposed Development, and ensure compliance with the mitigation hierarchy.

3.3.24 Mitigation that has been embedded into the design of the Proposed Development to avoid and minimise potential impacts on peatland are detailed in **Section 3.4** below. Of particular importance is the initial avoidance of peatlands where possible through the routing of the Proposed Development, as detailed in **Volume 2, Chapter 4: The Routing Process and Alternatives**. Further detail on how the Proposed Development has followed the mitigation hierarchy is provided throughout this EIA Report, with particular focus on reducing potential peatland impacts provided in **Volume 2, Chapter 8: Ecology and Nature Conservation**, **Volume 2, Chapter 11: Geological Environment**, and **Volume 5, Appendix 11.2: Outline Peat Management Plan**.

3.4 Embedded Mitigation

3.4.1 Embedded mitigation has been developed as the Proposed Development's design has progressed through the route, alignment and EIA Stages. Standard mitigation measures relating to the geological environment during construction and operation are embedded through the design and adoption of best practice measures in order to ensure that disturbance of peat is avoided or minimised. Further details regarding embedded mitigation are provided in **Volume 2, Chapter 3: Description of the Proposed Development** and **Volume 2, Chapter 19: Schedule of Mitigation**.

3.4.2 The following embedded mitigation measures have been considered:

- Avoiding peatlands where possible for the routing of the Proposed Development, as detailed in **Volume 2, Chapter 4: The Routing Process and Alternatives**;
- Best practice measures for construction, including adhering to General Environmental Management Plans developed by SSEN Transmission, and aligning with the Construction Environmental Management Plan (CEMP) to be prepared for the Proposed Development;
- Measures to ensure well-maintained drainage systems and developing robust drainage systems that would require minimal maintenance and avoid creating areas of concentrated flow;

- Developing methodologies to prevent degradation and erosion of exposed peat deposits to minimise effects on peat morphology and associated hydrology;
- The avoidance of removal and off-site disposal of soils where possible, especially where soils hold environmental or ecological value and agricultural productivity;
- The implementation of best practice methods for soil handling and storage;
- Using existing access tracks as far as practicable, in order to avoid unnecessary disturbance to peat soils that may arise from the construction of new tracks;
- Using floating stone roads where practicable in sensitive areas, such as over deeper areas of peat; and
- Implementation of embedded mitigation and best practice measures detailed in **Volume 5, Appendix 11.2: Outline Peat Management Plan** with regards to peat excavation, reuse, restoration potential, storage, handling, transportation, and waste management.

3.5 Assumptions

3.5.1 The following assumptions have been made in order to complete the peat carbon assessment:

- The peat bulk density and carbon content of dry peat is 175 kg/m^3 and 42% respectively across the full LoD of the Proposed Development;
- Temporary infrastructure (temporary access tracks and tower pads) will cause direct impacts to peat carbon storage permanently in order to assess the worst-case scenario, despite the fact that impacts from temporary infrastructure may be short-term and reversible following construction;
- Peat restoration associated with the Proposed Development solely relates to peat reuse and redressing around infrastructure, with no additional peatland restoration or compensation included in the assessment. It is therefore assumed for this assessment that the surplus of peat excavated in the construction phase of the Proposed Development (beyond the amount to be used for infrastructure redressing and restoration as detailed in **Volume 5, Appendix 11.2: Outline Peat Management Plan**) would not be utilised for on-site or off-site peatland restoration;
- Peat restoration will be successful and restore the peatland to its original, pre-construction quality and depth;
- Indirect impacts are assumed to occur within 30 m of permanent access track locations and 10 m of permanent tower base locations, as detailed in Paragraph 3.3.16;
- Temporary infrastructure would not result in indirect impacts as their effect is short-term, as detailed in Paragraph 3.3.16;
- In the assessment of indirect impacts, the average peat depth within 10 m or 30 m of the infrastructure is equal to the peat depth at the infrastructure location;
- Indirect impacts are assumed to result in a 25% loss of peat carbon storage, in order to demonstrate the potential for indirect impacts while indicating that they are unlikely to result in total carbon loss within the peat and would most likely be mitigated through best practice measures, as detailed in Paragraphs 3.3.18 and 5.1.8;
- Class 1, 2, and 3 peat from the Carbon and Peatland 2016 Map is assumed to be the most vulnerable carbon-rich soils to disturbance causing impacts on carbon sequestration, and therefore these areas have been used for the baseline assessment and assessment of indirect impacts;
- The corrections to the peat depth to be used in the assessment, as detailed in **Table 2**, have minimised any imprecision introduced through the use of averaging peat depths across a 173 km route where peat depths vary considerably, and have maintained consistency with the peat excavation and reuse calculations; and
- A worst-case for all access tracks is assumed, with the track width and construction corridor merged to assume a total upper limit impact width of 10 m.

4. BASELINE CONDITIONS

4.1 Full Route of the Proposed Development

4.1.1 The Proposed Development predominantly crosses undeveloped open moorland, commercial forestry, and agricultural land. The route also crosses multiple public roads and tracks, railways, and watercourses. A large portion of the route is underlain by peaty gleys, peaty podzols, and blanket peat, with peat deposits typically concentrated to the north of the route, and predominantly mineral soil to the south of the route. The Carbon and Peatland 2016 Map indicates that areas of Class 1, 2, and 3 peat are present along the route. Class 4 and Class 5 peat are also present along the route, as well as Class 0 (mineral soil), especially along the southern extents, although these are assumed to be less sensitive to impacts from the Proposed Development and are not considered in the assessment.

4.1.2 A total of 17,371 peat probes were sunk during the peat surveys, with the most common peat depths recorded sitting between 0 – 0.5 m, followed by >0.5 – 1.0 m. Isolated areas of deeper peat (>1.0 - >2.0 m) are present along the full route of the Proposed Development, with the deepest peat recorded at 7.5 m within the northern extents of the route.

4.1.3 Further details on the baseline conditions of the Proposed Development can be found in **Volume 2, Chapter 11: Geological Environment** and **Volume 5, Appendix 11.2: Outline Peat Management Plan**.

4.1.4 The average peat depth across the full route has been calculated as 0.68 m, and there is 14,460,968 m^2 (1,446.1 ha) of Class 1, 2, and 3 peat within the LoD of the Proposed Development. Using the Peat Carbon Calculator, this suggests that approximately 2,645,000 tCO_2e of carbon is stored within the LoD, or 2.65 Megatonnes carbon dioxide equivalent (Mt CO_2e). This constitutes the pre-construction baseline, and also forms the future baseline as the Peat Carbon Calculator does not anticipate this will change in 5 or 50 years due to the peat carbon flux rate not being included in the assessment.

4.2 The Flow Country World Heritage Site

4.2.1 The soils within the LoD of the Proposed Development that passes through The Flow Country WHS are predominantly peat and peaty podzols. Class 1 and 2 peat is present within the LoD in these areas, with large sections of high priority Class 1 and 2 peat. Class 5 peat is also present, but this is assumed to be less sensitive to potential impacts from the Proposed Development and is therefore not included in the assessment. Peat depths range from 0.01 – 5.9 m, and the average peat depth is 1.58 m below the infrastructure locations.

4.2.2 There is 779,492.39 m^2 (77.95 ha) of Class 1, 2 and 3 peat within the LoD in the WHS, which means these areas store approximately 331,000 tCO_2e (0.33 Mt CO_2e).

5. ASSESSMENT OF EFFECTS

5.1 Full Route of the Proposed Development

5.1.1 The potential impacts on peat carbon storage of the Proposed Development are reported in a sequential approach through the following sections, focussing on direct impacts, indirect impacts, the inclusion of restored peat, and then a final overall assessment to summarise the impact of all the proposed infrastructure and restoration. The results are communicated in tables to simplify the results from the Peat Carbon Calculator, although the final overall assessment will also be displayed as shown in the Peat Carbon Calculator for completeness. The results of the Peat Carbon Calculator are displayed to the nearest thousand for ease of communication and understanding. It should be noted that percentage changes are calculated from the precise Peat Carbon Calculator result values, not the rounded values.

Direct Impacts

5.1.2 The Peat Carbon Calculator demonstrates that disturbing and excavating peat for the infrastructure of the Proposed Development would have a direct impact on peat carbon storage by reducing the peat carbon store present in the peatland within the LoD. The results of the direct impacts of the Proposed Development on peat carbon storage are detailed in **Table 3,** and are as follows:

- A 0.41% decrease in peat carbon storage from permanent tower bases (Calculator Run 1);
- A 1.02% decrease in peat carbon storage from permanent access tracks (Calculator Run 2);
- An 11.65% decrease in peat carbon storage from temporary tower pads (Calculator Run 3);
- A 5.04% decrease in peat carbon storage from temporary access tracks (Calculator Run 4);
- A 1.43% decrease in peat carbon storage from permanent infrastructure (tower bases and permanent access tracks) (Calculator Run 5);
- A 16.69% decrease in peat carbon storage from temporary infrastructure (tower pads and temporary access tracks) (Calculator Run 6); and
- An 18.12% decrease in peat carbon storage from all direct impacts (Calculator Run 7).

5.1.3 The direct impact is greatest when considering all the infrastructure together (a calculated 18.12% decrease; Calculator Run 7), but the temporary infrastructure has the largest impact individually as these cover the largest areas. These effects from the temporary infrastructure have the potential to be short-term and reversible, as it is assumed that peat disturbed for the temporary infrastructure will be fully restored post-construction when the infrastructure is removed. It is also likely that peat will not need to be fully excavated for temporary infrastructure, and therefore impacts would be reduced.

5.1.4 The permanent infrastructure has a negligible impact on peat carbon storage (a reduction in 1.43% across the full route; Calculator Run 5), due to the small permanent infrastructure footprint that the Proposed Development has. This direct impact is likely to be the most realistic for the Proposed Development, due to the short-term and reversible nature of the temporary impacts (as detailed in Paragraph 5.1.3).

Table 3: Summary of Direct Impacts on Peat Carbon Storage

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	During Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
1	Tower Bases Only	Tower Bases	59,488	0.710	2,634,000	-11,000	-11,000	0.41% decrease
		Not Impacted Peat	14,401,480	0.68				
2	Permanent Tracks Only	Permanent Tracks	147,169.6	0.523	2,618,000	-21,000	-27,000	1.02% decrease
		Not Impacted Peat	14,313,799	0.68				
3	Tower Pads Only	Tower Pads	1,684,825	0.685	2,337,000	-310,000	-308,000	11.65% decrease
		Not Impacted Peat	12,776,143	0.68				
4	Temporary Tracks Only	Temporary Tracks	728,888	0.566	2,512,000	-111,000	-133,000	5.04% decrease
		Not Impacted Peat	13,732,080	0.68				
5	Permanent Impacts	Tower Bases & Permanent Tracks	206,658	0.617	2,607,000	-34,000	-38,000	1.43% decrease
		Not Impacted Peat	14,254,311	0.68				
6	Temporary Impact	Tower Pads & Temporary Tracks	2,413,713	0.626	2,204,000	-406,000	-442,000	16.69% decrease
		Not Impacted Peat	12,047,255	0.68				
7	All Direct Impacts	All Infrastructure (Tower Bases, Tower Pads, & Permanent and Temporary Tracks)	2,620,371	0.647	2,166,000	-456,000	-479,000	18.12% decrease
		Not Impacted Peat	11,840,598	0.68				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.1** - 2,645,000 tCO_2e.

5.1.5 When also considering peat restoration and reuse, the majority of the potential direct impact on peat carbon storage is mitigated. **Table 4** demonstrates that the proposed peat restoration and reuse for infrastructure redressing reduces the loss of peat carbon storage, resulting in the infrastructure having a negligible impact (0.89% decrease; Calculator Run 8) on the peat carbon storage with the LoD of the full route.

Table 4: Summary of Direct Impacts on Peat Carbon Storage with Restoration Included

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	Post-Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
8	Direct Impacts & Restoration	All Infrastructure (Tower Bases, Tower Pads, & Permanent and Temporary Tracks)	2,620,371	0.647	2,622,000	-232	-23,000	0.89% decrease
		Not Impacted Peat (During Construction)	11,840,598	0.68				
		Restoration	2,646,451	0.647				
		Not Impacted Peat (Post-Construction)	11,814,517	0.68				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.1** - 2,645,000 tCO_2e.

Indirect Impacts

5.1.6 Indirect impacts relate to changes in peat function due to changes in hydrology, and other environmental factors. The results of the indirect impact of the Proposed Development on peat carbon storage are detailed in **Table 5**, and are as follows:

- A 0.33% decrease in peat carbon storage from indirect impacts within 10 m of permanent tower bases (Calculator Run 9);
- A 6.39% decrease in peat carbon storage from indirect impacts within 30 m of permanent access tracks (Calculator Run 10); and
- A 5.31% decrease in peat carbon storage from all indirect impacts (Calculator Run 11).

Table 5: Summary of Indirect Impacts on Peat Carbon Storage

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	During Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
9	10 m from Tower Bases	Tower Bases (10 m)	218,412	0.71	2,637,000	-10,000	-9,000	0.33% decrease
		Not Impacted Peat	14,242,556	0.68				
10	30 m from Permanent Tracks	Permanent Tracks (30 m)	2,183,261	0.523	2,476,000	-77,000	-169,000	6.39% decrease
		Not Impacted Peat	12,277,708	0.68				

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	During Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
11	All Indirect Impacts	All Infrastructure (10 m from Tower Bases and 30 m from Permanent Tracks)	2,401,672	0.617	2,505,000	-100,000	-140,000	5.31% decrease
		Not Impacted Peat	12,059,000	0.68				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.1** - 2,645,000 tCO_2e.

5.1.7 **Table 5** indicates that indirect impacts will have a smaller overall effect on peat carbon storage than the calculated direct impacts, and this is likely due to the assumption that only 25% of peat carbon storage would be lost from peatlands due to indirect impacts (rather than complete loss occurring) despite indirect impacts covering a wider area. Together, indirect impacts correspond to a 5.31% reduction in peat carbon storage (Calculator Run 11).

5.1.8 The assumed 25% loss in peat carbon storage with indirect impacts (as detailed in Paragraph 3.3.18, and **Section 3.5**) has been determined through professional judgement. This assumption means that where an indirect impact occurs, rather than the impacted volume of peat losing the full amount of carbon stored within it (as it does with direct impacts), it is assumed that it would only lose a quarter (or 25%) of the carbon stored within it. To assess a worst-case scenario it was expected that indirect impacts would affect peat carbon storage (the Peat Carbon Calculator originally assumed there would be no carbon loss from indirect impacts), but given the nature of the proposed infrastructure, it was assumed that impacts on peatland function around the permanent infrastructure locations would be minimal. Unless the peat fully dries out or is completely drained / excavated it is unlikely that the full carbon store within it would be lost, and therefore the 25% loss assumption was introduced to account for some loss of carbon without being unrealistic. In addition, there is uncertainty associated with indirect impacts due to the complexity of the peatland system and interacting environmental effects, and therefore it is difficult to quantify the potential peat carbon storage loss associated with indirect impacts and it is unclear whether these calculated impacts would occur in reality. Overall, indirect impacts are also likely to be mitigated by suitable best practice measures and guidelines, ensuring that impacts to peat are kept localised and avoiding significant impacts to the surrounding hydrological environment. The calculations presented in **Table 5** therefore represent a potential worst-case effect that indirect impacts could have on peat carbon storage within the LoD of the Proposed Development, but these are likely to be of a smaller magnitude in reality.

Overall Impact

5.1.9 Giving consideration to direct impacts (from permanent and temporary infrastructure), indirect impacts, and proposed peat restoration and reuse, the overall impact of the Proposed Development would be a negligible adverse impact on peat carbon storage within the Class 1, 2, and 3 peat in the LoD of the full route. As a worst-case, the Peat Carbon Calculator (Calculator Run 12) suggests that a 6.19% decrease in peat carbon storage (a loss of approximately 100,000 tCO_2e) may be caused by the Proposed Development. This is shown in **Table 6** and **Table 7**. Given the results discussed in the sections above, this loss is most likely due to indirect impacts, as no restoration is proposed to mitigate these impacts. Paragraphs 5.1.12 and 5.1.13 below put this result into the context of the total area of Scottish peatlands and the UK Carbon Budgets, demonstrating the negligible impact calculated on peat carbon storage.

5.1.10 In addition, consideration must be given to the uncertainty related to indirect impacts discussed in paragraph 5.1.8 above, and the inclusion of temporary infrastructure in these calculations as it is unclear whether temporary infrastructure would cause a total carbon loss. The calculations provided in **Table 6** and **Table 7** therefore show a worst-case scenario for loss of peat carbon storage, which may not occur in reality. In reality, it is more likely that the 0.89% decrease in peat carbon storage from direct impacts and consideration of restoration (Calculator Run 8) would occur for the peat within the LoD for the full route due to the uncertainties associated with indirect impacts to peat carbon storage.

5.1.11 The calculations also demonstrate the beneficial impact of restoration and reuse of peat, raising the during construction baseline of 2,026,000 tCO_2e to 2,481,000 tCO_2e for the post-construction baseline (an increase in 455,000 tCO_2e).

Table 6: Summary of Overall Impact of the Proposed Development on Peat Carbon Storage

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	Post-Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
12	Overall Impact	Total Direct Impact	2,620,371	0.647	2,481,000	-100,000	-164,000	6.19% decrease
		Total Indirect Impact	2,401,672	0.617				
		Not Impacted	9,438,925	0.68				
		Restoration	2,646,451	0.647				
		Total Indirect Impact	2,401,672	0.617				
		Not Impacted (Post-Construction)	9,412,845	0.68				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.1** - 2,645,000 tCO_2e.

Table 7: Peat Carbon Calculator Output for the Overall Impact of the Proposed Development on Peat Carbon Storage

Scenario	Carbon Values Reported	Pre-Construction	Future Baseline (5 years)	Future Baseline (50 years)	N/A	Overall Change (50 years)
No Impact Scenario	Carbon Storage (tCO_2e)	2,581,334	2,581,334	2,581,334		0.0
Scenario	**Carbon Values Report**	**Pre-Construction Baseline**	**During Construction**	**Post Construction (short term, 2-5 years)**	**Post Construction (long term, 50 years)**	**Overall Change (50 years)**
Project Impact Scenario	Carbon Storage (tCO_2e)	2,581,334	2,025,603	2,481,446	2,481446	-99,888.4

5.1.12 To put this calculated potential worst-case loss of peat carbon storage (approximately 100,000 tCO_2e) into context, it should first be acknowledged that the peatland within the LoD used for the assessment covers an area of 1,446 ha, with direct impacts predicted for 262 ha, and indirect impacts predicted for 240 ha (502 ha of peatland potentially impacted in total by the Proposed Development). Peatlands cover approximately 20% of Scotland's land area[8], corresponding to over 1.5 million hectares of peatland. The peatland within the LoD of the Proposed Development therefore represents approximately 0.1% of Scotland's peatlands, so the potential

[8] NatureScot (2025) Restoring Scotland's Peatlands [Online] Available at: https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/restoring-scotlands-peatlands (Accessed: July 2025)

impact on the peat carbon storage within this area would have a negligible impact on peatland carbon storage nationally.

5.1.13 Similarly, the UK Carbon Budgets[9], which restrict the total amount of greenhouse gases the UK can emit over a 5-year period in order to reach climate change targets and which are secured through legislation, are currently 1,950 $MtCO_2e$ for the 2023 – 2027 period, reducing to 1,725 $MtCO_2e$ for 2028-2032 and to 965 $MtCO_2e$ for 2033-2037. A 100,000 tCO_2e decrease in peat carbon storage, assuming this is released as CO_2 through peatland disturbance and removal, represents a negligible percentage of the current carbon budget, indicating that the impact of the Proposed Development on climate change through impacts to peatland carbon sequestration and storage would be negligible. In addition, the Proposed Development supports carbon reduction targets at the national level by facilitating the transmission of electricity from the north of the UK, particularly from renewable sources. These contribute to carbon savings compared to conventional energy generation and therefore play a part in mitigating climate change, potential impacts on peat carbon storage from the Proposed Development, and potential impacts on peatlands caused by climate change that could impact their carbon sequestration and storage potential in the future.

5.2 The Flow Country World Heritage Site

Direct Impacts

5.2.1 Infrastructure within the WHS consists of tower bases, permanent access tracks, and temporary access tracks. **Table 8** details the peat carbon storage within the WHS associated with direct impacts from this infrastructure. The total carbon storage loss from the direct impacts is a 9.52% decrease in the baseline (Calculator Run 17). This is due to the following:

- A 0.50% decrease in peat carbon storage from permanent tower bases (Calculator Run 13);
- A 2.39% decrease in peat carbon storage from permanent access tracks (Calculator Run 14); and
- A 6.62% decrease in peat carbon storage from temporary access tracks (Calculator Run 15).

5.2.2 The largest impact on peat carbon storage within the LoD within the WHS would be caused by the temporary access tracks (resulting in a 6.62% decrease in peat carbon storage; Calculator Run 15), although this is likely a worst-case scenario as peat is unlikely to need to be fully excavated for temporary infrastructure, and the effects are likely short-term and reversible once the infrastructure has been removed.

5.2.3 The permanent infrastructure would result in a negligible adverse direct impact on peat carbon storage, resulting in a 2.89% decrease in peat carbon storage within Class 1, 2 and 3 peat within the LoD of the Proposed Development that runs through the WHS (Calculator Run 16). This the most likely impact to occur in reality due to the fact that this infrastructure will be introduced into the WHS permanently, and the direct impacts from temporary infrastructure are likely to be reversible and short-term. Compared to the size of the WHS, this is likely to be a negligible impact on the peat carbon storage of the full WHS, and therefore does not impact the OUV for which the WHS is inscribed.

[9] UK Government (2021). Carbon Budgets [Online] Available at: https://www.gov.uk/guidance/carbon-budgets#setting-of-the-fourth-carbon-budget-2023-2027 (Accessed: July 2025)

Table 8: Summary of Direct Impacts on Peat Carbon Storage within the WHS

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	During Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
13	Tower Bases Only	Tower Bases	3,900	1.53	330,000	-2,000	-2,000	0.5% decrease
		Not Impacted Peat	775,592	1.58				
14	Permanent Tracks Only	Permanent Tracks	18,642	1.28	323,000	-6,000	-8,000	2.39% decrease
		Not Impacted Peat	760,850	1.58				
15	Temporary Tracks Only	Temporary Tracks	51,640	1.53	309,000	-21,000	-22,000	6.62% decrease
		Not Impacted Peat	727,853	1.58				
16	Permanent Impacts	Tower Bases & Permanent Tracks	22,542	1.405	322,000	-9,000	-10,000	2.89% decrease
		Not Impacted Peat	756,950	1.58				
17	All Direct Impacts	All Infrastructure (Tower Bases, Permanent Tracks, and Temporary Tracks)	74,182	1.45	300,000	-29,000	-32,000	9.52% decrease
		Not Impacted Peat	705,310	1.58				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.2** – 331,000 tCO_2e.

5.2.4 When considering the proposed 35,000 m^3 of peat to be used for restoration and reuse within the WHS (as detailed within **Volume 5, Appendix 8.10: The Flow Country World Heritage Site (WHS) Impact Assessment Report**), the potential impact on peat carbon storage from the proposed infrastructure is almost completely mitigated. The inclusion of restoration reduces the direct impact of both permanent and temporary infrastructure to a 0.25% decrease in the baseline peat carbon storage (Calculator Run 18; **Table 9**).

Table 9: Summary of Direct Impacts on Peat Carbon Storage within the WHS with Restoration Included

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	Post-Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
18	Direct Impacts & Restoration	All Infrastructure (Tower Bases, Permanent Tracks and Temporary Tracks)	74,182	1.45	330,000	2,000	-800	0.25% decrease
		Not Impacted Peat (During Construction)	705,310	1.58				
		Restoration	23,968	1.45				
		Not Impacted Peat (Post-Construction)	755,525	1.58				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.2** – 331,000 tCO_2e.

Indirect Impacts

5.2.5 **Table 10** provides the calculated indirect impacts of the Proposed Development on peat carbon storage within the LoD within the WHS, and these are as follows:

- A 0.66% decrease in peat carbon storage from indirect impacts within 10 m of permanent tower bases (Calculator Run 19);
- A 5.38% decrease in peat carbon storage from indirect impacts within 30 m of permanent access tracks (Calculator Run 20); and
- An overall 5.37% decrease in peat carbon storage from all indirect impacts (Calculator Run 21.)

5.2.6 **Table 10** indicates that indirect impacts would have a smaller overall effect on peat carbon storage on Class 1, 2, and 3 peat within the LoD within the WHS than direct impacts despite their larger area of effect around permanent infrastructure. A maximum potential 5.37% decrease in peat carbon storage within Class 1, 2, and 3 peat within the LoD of the Proposed Development within the WHS is possible from indirect impacts from the infrastructure proposed to be located within the WHS, assuming a 25% loss in peat carbon storage caused by indirect impacts (as detailed in Paragraph 3.3.18, Paragraph 5.1.8 and **Section 3.5**). However, these calculations do not take restoration into account (see **Table 11** which includes restoration), and as discussed in paragraph 5.1.8 there is uncertainty associated with indirect impacts so these calculations likely represent a worst-case scenario.

Table 10: Summary of Indirect Impacts on Peat Carbon Storage within the WHS

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	During Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
19	10 m from Tower Bases	Tower Bases (10 m)	18,906	1.53	329,000	--2,000	-2,000	0.66% decrease
		Not Impacted Peat	760,586	1.58				
20	30 m from Permanent Tracks	Permanent Tracks (30 m)	106,836	1.28	313,000	-9,000	-18,000	5.38% decrease
		Not Impacted Peat	672,656	1.58				
21	All Indirect Impacts	All Infrastructure (10 m from Tower Bases and 30 m from Permanent Tracks)	125,743	1.405	314,000	-12,000	-18,000	5.37% decrease
		Not Impacted Peat	653,750	1.58				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.2** – 331,000 tCO_2e.

Overall Impact

5.2.7 When taking into account direct impacts (from permanent and temporary infrastructure), indirect impacts, and proposed peatland restoration and reuse, the Peat Carbon Calculator indicates that the Proposed Development would have a negligible adverse impact on peat carbon storage within The Flow Country WHS. The overall impact is calculated to be a 5.63% decrease in peat carbon storage within the LoD within the WHS (Calculator Run 22; **Table 11** and **Table 12**). It should be noted however, that this value includes direct impacts from temporary infrastructure, which may be short-term and reversible, and indirect impacts with the assumption that indirect impacts would result in a 25% in peat carbon storage (as detailed in Paragraph 3.3.18, Paragraph 5.1.8, and **Section 3.5**). This means that the results detailed in **Table 11** and **Table 12** represent a worst-case scenario in terms of impact to peat carbon storage within the LoD within the WHS. In reality, it is more likely that the 0.25% decrease in peat carbon storage from direct impacts and consideration of restoration (Calculator Run

18) would occur for the peat within the LoD within the WHS due to the uncertainties associated with indirect impacts to peat carbon storage.

Table 11: Summary of Overall Impact of the Proposed Development on Peat Carbon Storage within the WHS

Calculator Run	Scenario Details	Infrastructure / Restoration / Peat Included	Area (m^2)	Average Peat Depth (m)	Post-Construction Baseline (tCO_2e)	Overall Change from Calculator Run Baseline[1] (tCO_2e)	Overall Change from Original Baseline (tCO_2e)	Percentage of Baseline Storage (%)
22	Overall Impact	Total Direct Impact	74,182	1.45	313,000	-10,000	-19,000	5.63% decrease
		Total Indirect Impact	125,743	1.405				
		Not Impacted	579,568	1.58				
		Restoration	23,968	1.45				
		Total Indirect Impact	125,743	1.405				
		Not Impacted (Post-Construction)	629,782	1.58				

[1] Each run of the Peat Carbon Calculator has a slightly different pre-construction baseline due to the changed peat depth for the impacted peat. The Original Baseline refers to the pre-construction baseline calculated in **Section 4.2** – 331,000 tCO_2e.

Table 12: Peat Carbon Calculator Output for the Overall Impact of the Proposed Development on Peat Carbon Storage within the WHS

Scenario	Carbon Values Reported	Pre-Construction	Future Baseline (5 years)	Future Baseline (50 years)	N/A	Overall Change (50 years)
No Impact Scenario	Carbon Storage (tCO_2e)	322,798	322,798	322,798		0.0
Scenario	**Carbon Values Report**	**Pre-Construction Baseline**	**During Construction**	**Post Construction (short term, 2-5 years)**	**Post Construction (long term, 50 years)**	**Overall Change (50 years)**
Project Impact Scenario	Carbon Storage (tCO_2e)	322,798	281,981	312,673	312,673	-10,125

6. SUMMARY AND CONCLUSIONS

6.1.1 The Proposed Development has the potential to adversely impact the amount of carbon sequestered in peat through disturbance and excavation required for construction, and through indirect impacts to peatland functioning such as through changing the hydrological environment. Proposed peat restoration and reuse included within the Proposed Development also has the potential to improve peat carbon storage along the route of the Proposed Development. These impacts have implications for future climate change, as a reduction in carbon sequestration in peatlands allows more carbon dioxide to accumulate in the atmosphere, resulting in enhanced climate change, and vice versa, mitigation of climate change can occur if carbon sequestration is increased through peatland restoration.

6.1.2 Due to the adoption of National Planning Framework 4 by the Scottish Government, Policy 5 of which emphasises the importance of peat and carbon-rich soils, including for their carbon sequestration potential, more scrutiny is being placed on developments to ensure impacts on peat and carbon-rich soils are avoided where possible, or minimised. In response to this, SSEN Transmission have developed a bespoke methodology to assess the potential impacts of the Proposed Development on peat carbon storage through the use of the Peat Carbon Calculator. This considers the area and depth of peat impacted by infrastructure (both directly and indirectly) and restored in order to determine the potential impacts on peat carbon storage.

6.1.3 Overall, the Proposed Development is predicted to have negligible adverse impacts on peat carbon storage, both for the full route and within The Flow Country WHS. The largest impacts on peat carbon storage stem from temporary infrastructure (for example, temporary access tracks and tower pads are calculated to cause a 16.69% decrease in peat carbon storage within the LoD of the full route of the Proposed Development) and indirect impacts due to the larger peatland areas that these affect. A worst-case scenario has been assessed where it is assumed that temporary infrastructure would result in a total loss of peat carbon storage, and indirect impacts would cause a 25% loss of peat carbon storage rather than a total loss of peat carbon storage. In reality, it is likely that full peat excavation would not be needed for temporary infrastructure, and the impacts would be short-term and reversible. Similarly, indirect impacts are likely to reduce in magnitude the further the peat is from the infrastructure location, and suitable best practice measures should be put in place to avoid any indirect impacts on peat. This means that the predicted impacts are likely of a higher magnitude than would be expected in reality.

6.1.4 The calculations have also demonstrated that proposed peat restoration and reuse through redressing infrastructure locations has a beneficial effect on peat carbon storage and contributes to mitigating the predicted direct and indirect impacts.

6.1.5 As a worst-case scenario, when taking account of proposed restoration, the Proposed Development is predicted to cause a 6.19% decrease in peat carbon storage within the LoD for the full route, and a 5.63% decrease in peat carbon storage within the LoD within the WHS. When taking account of proposed restoration and solely direct impacts (the calculated impacts most likely to occur in reality due to the uncertainties associated with indirect impacts), it is predicted that peat carbon storage would likely reduce by 0.89% within the LoD for the full route, and by 0.25% within the LoD within the WHS, due to the Proposed Development.