

Scottish and Southern Electricity Networks Transmission

Lairg II Wind Farm Connection

Appendix 6.1 - Outline Soil and Peat Management Plan

September 2023





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1. OUTLINE SOIL AND PEAT MANAGEMENT PLAN

1.1 Introduction

Background

1.1.1 WSP UK Ltd ("WSP") was commissioned by Scottish & Southern Electricity Networks Transmission (SSEN Transmission), hereafter referred to as 'the Applicant', in May 2023 to produce an Outline Soil and Peat Management Plan (SPMP). The Outline SPMP will form part of a suite of documents which will support an application for consent, under Section 37 (s37) of the Electricity Act 1989.

The Proposed Development

- 1.1.2 SSEN Transmission is proposing to construct a new 132 kV underground cable (UGC) between the consented Lairg II Wind Farm substation and the existing Dalchork-Loch Buidhe 132 kV overhead line (OHL). A cable sealing end compound (CSEC) and a short section of new OHL (i.e., the 'downleads') will also be installed to connect the installed plant to an existing steel lattice transmission tower on the existing Dalchork-Loch Buidhe 132 kV OHL (Tower 31).
- 1.1.3 The Applicant will progress the following project elements, through two separate consenting routes:
 - Downleads comprising approximately 30 m in length and approximately 10 m in horizontal distance from the existing tower to three 132 kV cable sealing end and surge arrestor combined structures, hereafter known as 'the Downleads', under Section 37 of The Electricity Act 1989. The Downleads also includes ancillary works comprising a cable sealing end compound, permanent bellmouth access, and temporary construction compound. Deemed planning permission under Section 57 (2) of the Town and Country Planning (Scotland) Act 1997, as amended, is being sought for these ancillary works as part of the Section 37 (s37) application.
 - A temporary stone track approximately 541 m in length required to facilitate the installation of the UGC. The Highland Council have confirmed that temporary access track will require temporary planning permission under the Town and Country Planning (Scotland) Act 1997 (as amended).
- 1.1.4 The above two items are hereafter referred to collectively as the 'Proposed Development'.
- 1.1.5 The proposed UGC required is considered by the Applicant to benefit from permitted development rights under Class 40 1(a) of The Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (TCP GDPO).
- 1.1.6 This report forms an appendix to Chapter 6: Hydrology, Hydrogeology, Geology and Peat of the Environmental Appraisal (EA) Report, which has been prepared in support of the Proposed Development. This Outline SPMP should be read with reference to this chapter and its associated figures. The findings of this Outline SPMP will be used by the appointed Principal Contractor as a basis for preparing the detailed construction SPMP, as part of a Construction Environmental Management Plan (CEMP) prior to construction. The Principal Contractor will also be responsible for the preparation of the CEMP.
- 1.1.7 The Proposed Development will be permanently accessed during operation via the A836 and the existing access track for Lairg II Wind Farm. Vehicle access will be required along the length of the UGC, which will be undertaken using temporary track solutions and reinstated upon completion of the Proposed Development.
- 1.1.8 The Proposed Development is located approximately 2 km to the south-east of the village of Lairg, to the west of Lairg Wind Farm and to the north of the consented Lairg II Wind Farm. The location of the Site is shown on Figure 1.2: Site Layout of the EA.



- 1.1.9 The soil and peat assessment is based upon the land within the Site Boundary and professional judgement and experience of assessing similar developments in similar environments. The following terms are used across this Report.
 - Site the location of the Proposed Development, as shown on Figure 1.1 Site Location Plan of the EA.
 - Study Area includes the Site and extends 250 m beyond the Proposed Development, which enables consideration of features outwith the Site, such as watercourses or assets.

Baseline

- 1.1.10 The Site's current land use is temperate shrub heathland.
- 1.1.11 During peat probing surveys undertaken by Energyline, between February and March 2023, it was established that peat was present within the Site. As a result, this work was commissioned to establish peat characteristics, depths and extent.
- 1.1.12 Excavated soil and peat management during the construction process falls into four main categories as follows:
 - Excavation at the location of all site infrastructure, including UGC, CSEC and bellmouth;
 - Re-use including re-use as part of the engineering fill around the CSEC and UGC trenches, plus reinstating, backfilling and landscaping adjacent to the excavations. There may be options for further re-use of excavated material onsite;
 - Storage limited to the short-term storage of excavated material before re-use; and
 - Disposal where there is an excess of excavated material following reasonable opportunities for re-use in line with good practice, there may be a need for disposal of that material to a licensed waste facility.
- 1.1.13 In its Regulatory Position Statement Developments on Peat¹, the Scottish Environment Protection Agency (SEPA) state that *"developments on peat should seek to minimise peat excavation and disturbance to prevent the unnecessary production of waste soils and peat"*. On the basis that peat excavation to some extent will be likely, this Outline SPMP examines the volume of soil and peat likely to be excavated during the construction process, and the potential for minimising excavation and identifying volumes for re-use. It is recognised that while re-use of any peat and soil during the construction process represents the preferred option, any such use should be carefully considered regarding risks to the environment or human health.

1.2 Scope of Work

- 1.2.1 During the construction phase of the Proposed Development there will be a need to excavate soil (which may include peat) for infrastructure such as the UGC trench. Where there is not a defined use for this material during the construction process, excess material will be considered as waste and will need to be disposed of in accordance with regulatory requirements.
- 1.2.2 This Outline SPMP defines the likely excavation volume based on the Proposed Development's layout and dimensions and underlying peat conditions and evaluates options to minimise/re-use excavated volumes. This strategy ensures that appropriate plans for excavation, storage, re-use, and (if necessary) disposal of soil and peat have been considered in advance of the construction phase. The findings of this SPMP will be used by the appointed Principal Contractor as a basis for preparing the detailed construction SPMP, as part of a CEMP prior to construction.

¹ Scottish Environment Protection Agency (2010a). Regulatory Position Statement – Developments on Peat. [online] Available at: https://www.sepa.org.uk/media/143822/peat_position_statement.pdf [Accessed: May 2023].



1.2.3 This Outline SPMP has followed the criteria laid out in the following guidance documents: Promoting the sustainable re-use of greenfield soils in construction (NatureScot (formerly known as Scottish Natural Heritage (SNH)))²; Regulatory Position Statement – Developments on Peat¹; and Developments on Peatland Guidance – Waste³.

1.3 Methodology

- 1.3.1 Soil mapping⁴ indicates the Site is predominantly underlain by peaty gleys, which are derived from schists, gneisses, granulites and quartzites principally of the Moine Series. Based on NatureScot mapping⁵ the Site is classified as Class 2 '*nationally important carbon-rich soils, deep peat and priority peatland habitat*'.
- 1.3.2 An extensive peat depth survey was undertaken between February and March 2023, which supersedes the higher-level characterisation from NatureScot Carbon and Peatland Map dataset⁵. The peat depth survey shows isolated pockets of deeper peat but consistent peat soil depths of less than 0.50 m were recorded across the Site. The methodology for the peat depth surveys is explained further in Lairg II Wind Farm Connection Ground Investigation Report (GIR)⁶.

1.4 Results

Peat Depth Surveys

- 1.4.1 The Soil Survey of Scotland⁴ and Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments⁷, both indicate a minimum depth for soil to be defined as peat of 0.50 m. This threshold has been used to distinguish between peat and other soils throughout this report.
- 1.4.2 Peat depth surveys were undertaken between February and March 2023 focussing on the Site. Nine trial pits (TP01S to TP09S) were undertaken within the Site.
- 1.4.3 The collected data from the surveys within the Study Area are summarised in Table 1. Of the 128 records within the Study Area, the average peat depth was 0.50 m. 61.7 % of the points probed had a peat depth result of less than 0.50 m (i.e. less than threshold depth to be classified as peat), with 90.6 % of the results less than 1.00 m and 96.1 % less than 1.50 m. The peat depth results are mapped and presented as Figure 6.1 Peat Depths of the EA.

² SNH (NatureScot) and Forestry Civil Engineering (2010). Floating Roads on Peat. [online] Available at: http://www.roadex.org/wp-content/uploads/2014/01/FCE-SNH-Floating-Roads-on-Peat-report.pdf [Accessed: May 2023].

³ Scottish Environment Protection Agency (2010b). Development on Peatland Guidance – Waste. [online] Available at: http://www.sepa.org.uk/media/144152/development_on_peatland_guidance_final_august_2010.pdf or via http://www.sepa.org.uk/environment/energy/renewable/ [Accessed: May 2023].

⁴ James Hutton Institute (1982). Soil and Land Capability for Agriculture Maps and Handbook. [online]. Available at: https://www.hutton.ac.uk/learning/naturalresource-datasets/soilshutton/soils-maps-scotland [Accessed: May 2023].

⁵ NatureScot (2016). Carbon and Peatland Map. NatureScot. [online] Available at: https://www.nature.scot/professional-advice/planning-and-development/planningand-development-advice/soils/carbon-and-peatland-2016-map [Accessed: May 2023].

⁶ Energyline (2023) Lairg 2 Wind Farm Connection. Ground Investigation Report (GIR) For Scottish and Southern Energy Networks (SSEN), EL REF: 90SS1214-REP-002, Issue: 01, April 2023.

⁷ Scottish Government (2017). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition). [online] Available at: http://www.gov.scot/Publications/2017/04/8868 [Accessed: May 2023].



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Peat/Soil Depth Range (m)	Number of locations surveyed	Percentage of locations surveyed	Average depth in range (m)
0.00 to <0.50	79	61.7%	0.30
≥0.50 to <1.00	37	28.9%	0.60
≥1.00 to <1.50	7	5.5%	1.10
≥1.50 to <2.00	4	3.1%	1.50
≥2.00 to <2.50	1	0.8%	2.00
≥2.50 to <4.00	0	0.0%	N/A
≥4.00	0	0.0%	N/A
Total / Aggregate	128	100.0%	0.50

Table 1: Results of the Peat Probing Surveys within the Study Area

Estimates for Excavation and Re-use of All Material

Excavation

- 1.4.4 Excavation dimensions are based on the design information within Chapter 2: Proposed Development of the EA and shown on Figure 1.1 Site Location and Figure 1.2 Site Layout Plan which accompany the EA.
- 1.4.5 The CSEC will comprise three 132kV cable sealing end and surge arrestor combined structures, as well as three 132kV post insulator structures located on a stone platform which will measure approximately 50 m in length by 20 m in width. These structures and plant combined will measure approximately 5 m in height. A new permanent bellmouth will be constructed to provide access to the CSEC from the existing access track. A short section of new OHL will be installed to connect the installed plant to the existing steel lattice transmission tower on the Dalchork-Loch Buidhe 132 kV OHL (i.e. downleads within the CSEC).
- 1.4.6 The excavated material for the CSEC, according to Table 2, equates to approximately 500 m³ of excavated material. No records of peat were gathered within the CSEC footprint, therefore, the average peat depth (0.50 m) within the wider Study Area has been used to calculate the excavated material. The CSEC footprint was excavated as part of the Lairg Wind Farm, however, recent site visits showed the area covered by soil and vegetation; as such, it has been assumed the entire area will require to be excavated and the material is expected to be non-peat soils.
- 1.4.7 In areas of soft ground and / or very deep peat where firm ground cannot be found, foundations for H-pole structures with two windstays may be added to the foundations to maximise stability of the structure by supporting the structure with wider foundations. It is recognised that this will be a supplementary measure and will involve additional shallow excavations, depending on ground investigation results.
- 1.4.8 Lairg II Wind Farm Connection GIR trial pits along the UGC, TP01S to TP09S, indicate peat extending from 0.00 to 0.50 m depth, underlain by till and morainic deposits. As a result, it is assumed that beyond 0.50 m depth, any material excavated along the UGC is unlikely to be peat.
- 1.4.9 The dimensions for the underground cable are 0.50 1.00 m wide, 570 m in length, and 1.00 1.50 m deep. Based on the average peat depth within 25 m of the proposed UGC (0.55 m), and the upper range value for width (1.00 m), the total excavated material is 285 m³ of peat and 570 m³ of non-peat soils.
- 1.4.10 The approximate area of the permanent bellmouth equates to approximately 85 m³ of excavated material. This calculation accounts for the fact that the majority of the bellmouth footprint overlies existing hard standing (associated with the existing wind farm access track) and the proposed UGC also falls within the footprint of the bellmouth. As such, these areas have been excluded from the anticipated bellmouth



excavation volumes, which only include the areas outwith the existing hard standing and UGC alignment. No records of peat were gathered within the bellmouth footprint, therefore, the average peat depth (0.50 m) within the wider Study Area has been used to calculate the excavated material. Similarly to the CSEC, part of the bellmouth footprint was excavated as part of the Lairg Wind Farm; however, recent site visits showed the area to be covered by soil and vegetation and it has therefore been assumed the entire area will require to be excavated (except for where existing hard standing is present) and the material is expected to be non-peat soils.

- 1.4.11 A temporary access track and construction compound will be required to facilitate the construction works alongside the UGC. The final position of these infrastructure items will be determined by the Principal Contractor following detailed design and further ground investigation. The temporary access track and construction compound will be removed and reinstated as part of the construction reinstatement works and have therefore not been considered as part of the assessment.
- 1.4.12 Temporary and permanent loss of irreplaceable habitats associated with peat, blanket bog, has been quantified as part of the Biodiversity Net Gain Assessment Report which accompanies the EA.

Infrastructure	Width	Length	Depth	Non-peat soils	Peat
CSEC	20 m	50 m	0.50 m	500 m ³	0 m ³
Underground Cable	0.50 – 1.00 m	570 m	1.00 – 1.50 m	570 m ³	285 m ³
Bellmouth	Approximate area = 170 m ² 0.5m			85 m ³	0 m ³
Total		1,155 m ³	285 m ³		

Table 2: Estimated earthwork volumes

Re-use

- 1.4.13 All excavated material (including peat and non-peat soils) from the installation of the CSEC (500 m³), underground cable (855 m³) and bellmouth (85 m³) will be re-used for reinstatement surrounding the CSEC and UGC trench. As a result, the balance between excavation and re-use will be zero.
- 1.4.14 There is also potential for excavated peat to be used for habitat restoration on or locally to the Site. Soil mapping suggests that the majority of the Site is underlain by peaty gleys. This potential re-use option has not been quantified but will provide an additional method to retain and beneficially re-use material.

Storage

- 1.4.15 It is expected that prior to construction commencing, in accordance with the CEMP, the contractor will provide a plan detailing potential locations for temporary storage and an outline programme indicating the duration and quantity of stored peat and measures to mitigate and/or capture sediment runoff from stored material. At all times the primary objectives will be to minimise both the time and volume of temporary storage and to prevent sedimentation of any watercourse or waterbody. Where practical, excavated peat will immediately be used locally for reinstatement and/or landscaping.
- 1.4.16 Good practice methods include careful removal of vegetated turves, short timescales between lifting and replacement of turves (with a four week reinstatement objective) and ensuring stored turves are kept in good condition (including watering when weather conditions could lead to desiccation). Revegetation of bare soil with native vegetation will be undertaken as soon as practicable. Excavated material will be re-used as close to excavation location as practicable and as soon as possible.



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- 1.4.17 The contractor will follow standard good practice with regards to soil/peat storage⁸ as stated in the CEMP. This will include temporary storage of materials at a minimum distance of 10 m from any watercourses and 50 m from any watercourse identified on Ordnance Survey 50,000 scale mapping, with soil mounds and restoration depths no higher than 2 m and with stable banking.
- 1.4.18 Elements of the management and re-use of excavated material will require approval from statutory stakeholders, including SEPA, taking account of reducing erosion/compaction, protecting the soils from pollution and retaining/enhancing soil functionality as a resource.
- 1.4.19 This report does not include long term material storage, e.g. for decommissioning purposes, as none is proposed or required.

1.5 Summary and Conclusions

- 1.5.1 A number of areas of excavation, reinstatement and re-use around infrastructure that could be carried out during construction are listed below. It is recognised that there is a degree of professional judgement involved in quantifying assumptions.
- 1.5.2 Subject to gradients and ground conditions, preference will be given to lower impact access solutions including the use of low pressure tracked personnel vehicles and temporary track solutions in boggy / soft ground areas to reduce any damage to, and compaction of the ground. These journeys would be kept to a minimum to minimise disruption to habitats along the Proposed Development.
- 1.5.3 There are a number of opportunities to reduce the extent of excavation and/or increase the extent of re-use opportunities as good practice measures. These include:
 - reducing excavation depth required for Site infrastructure;
 - avoiding excavation of the new CSEC by using less intrusive methods to achieve a sufficient degree of levelling;
 - re-use of all excavated material for engineering fill and landscaping; and
 - appropriate re-use of excavated material for reinstatement on disturbed ground.
- 1.5.4 Applying the reasonable assumptions discussed above, it is expected there will be sufficient re-use opportunities to balance excavation values.
- 1.5.5 It is considered that all excavated material could be re-used (i.e. balance) with no material needing to be brought onto Site for restoration. All excavated material will be re-used nearby and in as short a timeframe as is feasible during the construction phase. Additionally, locally excavated peat could be used to aid habitat management of the Site.
- 1.5.6 In the event that there is an excess of excavated material, application of additional options at the detailed design and construction phases will be required, as outlined above, in order to avoid off-Site disposal. Furthermore, if no Site use is available, off-Site re-use options should be explored, with appropriate disposal as waste considered only as the final option, in line with the "waste hierarchy"³ and discussion with SEPA.

⁸ CIRIA (2006). Control of water pollution from linear construction projects: technical guidance. Publication C648; Construction Industry Research and Information Association, London.