APPENDIX 7.7 - FLOW COUNTRY WORLD HERITAGE SITE ASSESSMENT

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Contents

1 INTRODUCTION

1.1 Purpose of Document

This Appendix has been prepared to present the results of an impact assessment of the Proposed Development on the Flow Country World Heritage Site (WHS), which was inscribed as a WHS in July 2024. The approach taken to the assessment is in accordance with The Highland Council's Flow Country Candidate World Heritage Site Impact Assessment Toolkit[1] as published on The Highland Council's website.

The Proposed Development is required to transport electricity generated from the consented Strathy Wood Wind Farm to the existing transmission network. This would initially be via a 'T' onto the existing Strathy North 132 kV trident 'H' wood pole OHL to the existing Connagill 275/132 kV substation for onward transmission. Strathy Wood Wind Farm was consented by Scottish Ministers in December 2021, prior to the Flow Country WHS being nominated or subsequently inscribed by UNESCO.

The baseline conditions for the WHS and the assessment of potential construction and operational impacts are not described in detail in this document as detailed information is provided in the relevant chapters of the EIA Report, which this forms an appendix to. This document should therefore be read in conjunction with, and is supported by, the following technical reports and assessments, which are signposted as necessary throughout this Appendix:

- **Volume 1, Chapter 3: The Proposed Development** – which sets out a description of the construction and operational activities.
- **Volume 1, Chapter 7: Ecology** and relevant Appendices (in **Volume 4**):
    - Appendix 7.2: Ecological Impact Assessment Methodology
    - Appendix 7.3: Habitat Technical Report
    - Appendix 7.4: Protected Species Technical Report [Confidential]
    - Appendix 7.5: Bat Technical Report
    - Appendix 7.6: Shadow Habitats Regulations Assessment for the Caithness and Sutherland Peatlands SAC / Ramsar (Non-avian features)
    - Appendix 7.8 Connagill Cluster Outline Habitat Management Plan (HMP)
- **Volume 1, Chapter 8: Ornithology** and relevant Appendices (in **Volume 4**):
    - Appendix 8.1: Ornithology Technical Report
    - Appendix 8.2: Ornithology Confidential Annex [Confidential]
    - Appendix 8.3: Strathy North Wind Farm Ornithology Summary Report [Confidential]
    - Appendix 8.4: Shadow Habitats Regulations Assessment for Caithness and Sutherland Peatlands SPA / Ramsar (Avian features)

The Flow Country WHS nomination was submitted to the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in February 2023 and the site was formally inscribed as a WHS by UNESCO in July 2024. Subsequent to the WHS nomination, The Highland Council adopted a Planning Position Statement (PPS) for the WHS in April 2023 which states that:

"*Any planning application/application for consent under s36/s37 of the Electricity Act with the potential to effect* [sic] *the Site and its OUV being determined from the date of this planning position statement until the*

[1] It is noted that the Flow Country WHS has been formally inscribed as a WHS since the toolkit was published, and therefore is no longer a 'candidate' WHS. However, the toolkit has yet to be updated and therefore the 'candidate' WHS toolkit remains applicable until such time an updated version is published by The Highland Council.

date of inscription or rejection will be considered in terms of its potential impact on the attributes of the Site and its integrity, and because the Site is now a candidate World Heritage Site, also in the context of Policy 7l in NPF4. Given the full support expressed from all tiers of government for the Site's World Heritage nomination, it is clear that the nomination should not be undermined by proposed development."

This Appendix therefore aims to signpost to the relevant sections of the EIA Report that consider the potential impact on the Outstanding Universal Value (OUV) attributes of the WHS and its integrity, as well as to provide sufficient information to support the assessment using The Highland Council's Flow Country Candidate World Heritage Site Impact Assessment Toolkit.

1.2 Background

The Flow Country WHS straddles Caithness and Sutherland and supports one of the largest areas of blanket bog in the world; a globally rare habitat that is recognised for its international nature conservation importance through its overlapping designations as the Caithness and Sutherland Peatlands Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar. The extensive areas of peatland, bogs and lochs support a diverse ecosystem of invertebrates, mammals and breeding and wintering birds.

The following WHS criteria are considered to be met by the Flow Country WHS in recognition of their OUV:

- Criterion (ix) – The Flow Country is the most extensive and diverse example of an actively accumulating blanket bog landscape found globally.
- Criterion (x) – The Flow Country contains an exceptional example of the biodiversity found within a blanket bog landscape. The geographical position of the Flow Country and the diversity of habitats result in biological associates unlikely any other found globally. Furthermore, the scale and connectivity of the property afford resilience to the ecosystem and the species it contains.

Further details on the features and attributes of the Flow Country WHS and the criteria for their OUVs is provided in **Annex A** of this document.

2 IMPACT ASSESSMENT

2.1 Method

The approach to impact assessment on the OUV attributes of the WHS is the same as that undertaken in the Ecological Impact Assessment (EcIA) presented in **Chapter 7 - Ecology** and **Chapter 8 - Ornithology** within Volume 1 of the EIA Report and was undertaken in accordance with standard CIEEM methodology (CIEEM, 2018).

Further details on the EcIA methodology are presented in **Appendix 7.2** (Ecological Impact Assessment Method) for terrestrial ecology features, and **Chapter 8; Section 8.7** (Methodology) for ornithology features.

This document presents a summary of the impact assessment undertaken with reference to the requirements for assessment of impacts on the WHS OUVs in The Highland Council's Flow Country Candidate World Heritage Site Impact Assessment Toolkit. The toolkit has been published by The Highland Council as a modified version of the guidance and toolkit for Impact Assessments in a World Heritage Context Resource Manual (UNESCO and Advisory Bodies to the World Heritage Committee, 2022). The UNESCO guidance has been designed to assist the decision-making process for development proposals that have the potential to damage the OUVs of a WHS and "…*aims to highlight that impact assessments can help to identify better projects that yield more benefits in the long term, satisfying both conservation and development needs*".

The following tables included in the Flow Country WHS Impact Assessment Toolkit have been completed and have assisted with the impact assessment presented in **Table 1**:

- Identifying Potential Risks – **Table B1** in **Annex B**; and
- Description and Evaluation Tool – **Table C1** in **Annex C**.

2.2 Embedded Mitigation

Embedded mitigation is described in detail in **Chapter 7; Section 7.9** (Embedded Mitigation / Mitigation by Design) for terrestrial ecology features and **Chapter 8; Section 8.9** (Mitigation by Design and Embedded Mitigation) for ornithology features.

The routeing and alignment selection process for the Proposed Development has taken into consideration the potential for significant effects on ecological features, and for such effects to be avoided or minimised where possible (see **Chapter 2 - The Routeing Process and Alternatives**). This has continued through the EIA process, with survey data informing the siting of infrastructure and access routes to further minimise effects on habitats and species where practicable, following the mitigation hierarchy as described in CIEEM guidance (CIEEM, 2018).

An Outline Construction Environmental Management Plan (CEMP) is provided as **Appendix 3.7** and sets out the best practice pollution control measures, storage of materials, waste management and other standard construction requirements for the construction phase. An Ecological Management Plan (EMP) will be included as part of the CEMP, which will include relevant information on habitats and protected species local to the Proposed Development, requirements for pre-construction surveys and toolbox talks (TBTs), reference to relevant species protection plans (SPPs) and information on licencing requirements and procedures (as necessary), and best practice pollution control measures with reference to Guidance for Pollution Prevention (GPPs).

An Outline Habitat Management Plan (HMP) for the Proposed Development is provided as **Appendix 7.8**, which sets out habitat enhancements in the wider local area to offset the impacts of construction and operational habitat losses within the Caithness and Sutherland Peatlands SAC / SPA / Ramsar and West Halladale Site of Special Scientific Interest (SSSI), as well as the wider peatland habitats. Grid Connections for four wind farm projects (either constructed, under construction or consented) (including Strathy South, Strathy Wood, Melvich and Kirkton) are present within the wider area; and these are collectively referred to

as the ‘Connagill Cluster Grid Connections’. To address the potential for adverse effects on the Caithness and Sutherland Peatlands SAC / Ramsar and its component SSSIs as a result of cumulative habitat loss / damage, an overarching Outline HMP for the Connagill Cluster Grid Connections is being prepared in consultation with NatureScot (see **Appendix 7.8**).

2.3 Summary of Impact Assessment

Each of the attributes for Criteria (ix) and (x) have been assessed and signposting to the relevant EIA Report Chapters and Appendices, where baseline ecological data and impact assessment to support the conclusions, is provided where necessary in **Table 1**. The boundaries of the Caithness and Sutherland Peatlands SAC / SPA / Ramsar and West Halladale SSSI are not entirely contiguous with the Flow Country WHS boundary because the WHS boundary as a whole is larger. However, the assessment of impacts and effects presented in the EIA Report and shadow HRAs (see **Appendix 7.6** and **Appendix 8.4**) is considered similarly appliable to the WHS assessment because it covers the same habitats and species in the same area relevant to the Proposed Development.

The Ecological Impact Assessment (EcIA) presented in **Chapter 7: Ecology** and **Chapter 8: Ornithology** of the EIA has concluded that the Proposed Development would result in no significant residual effects on habitats or protected species, including qualifying species and habitats of the Caithness and Sutherland SAC / SPA/ Ramsar and West Halladale SSSI, which are also attributes of the Flow Country WHS. This assessment is applicable to WHS Criterion (ix) attributes (a) and (f) and Criterion (x) attributes (a) (i) and (a) (ii).

Shadow HRAs undertaken for the terrestrial (see **Appendix 7.6**) and ornithological (see **Appendix 8.4**) qualifying features of the Caithness and Sutherland SAC / SPA / Ramsar has concluded that there will be no adverse effects on the integrity of the designated sites, which is within and overlapping with the Flow Country WHS boundary. This assessment is applicable to WHS Criterion (ix) attributes (a) and (f) and Criterion (x) attributes (a) (i) and (a) (ii).

Where specific assessment of attributes within the Flow Country WHS has not been undertaken as part of the EcIA (for WHS Criterion (ix) attributes (b), (c), (d) and (e) and Criterion (x) attribute (a) (iii)), the additional assessment undertaken and presented in **Table 1** has concluded there would be no effects on them as a result of the construction or operation of the Proposed Development.

Table 1: Summary of WHS Assessment and Signposting to the EIA Report

Attribute	Description	Comment	Signposting to Relevant Baseline Data & Impact Assessment in EIA Report	Assessment of Effects
Criterion (ix) outstanding example representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.				
a) most extensive near continuous example of natural, actively accumulating, blanket bog ecosystem found globally	Persistent rain fed wetness and low rates of evaporation across The Flow Country lead to widespread, year round waterlogged ground conditions which are ideal for the growth and preservation of peat forming plants. This ongoing process (paludification) began around 9,000 years ago and is key in the formation of blanket bog. Unlike other bog types, which are confined by topography, this allows blanket bog to mantle entire landscapes. The Flow Country is one of only a few locations globally where conditions exist that are conducive to blanket bog formation, and combines a quality, extent and connectivity of this habitat exceeding that of any other known blanket bog.	The Proposed Development would result in very minor losses of habitat relative to that within the whole Flow Country WHS, which covers c. 200,000 ha. Total direct and indirect losses of habitat are calculated at 8.19 ha, which represents 0.0044% of the total area of land within the WHS. The EcIA concluded that the Proposed Development would result in a minor adverse effect (not significant) on the important peatland habitats, including those within the Caithness and Sutherland Peatlands SAC / Ramsar and West Halladale SSSI (which are also within the WHS boundary). The HRA for the Proposed Development concluded that there would be no adverse effects on the integrity of the Caithness and Sutherland Peatlands SAC / Ramsar, as a result of direct and indirect impacts on blanket bog (an Annex I habitat of international importance and primary reason for the selection of the site as an SAC). This assessment is similarly applicable to the assessment of impacts on the blanket bog ecosystem OUV.	Assessment of Likely Significant Effects (see **Chapter 7**; Ecology, **Section 7.10**) Shadow HRA for Caithness and Sutherland Peatlands SAC / Ramsar (see **Appendix 7.6**)	Minor adverse effect (not significant)
b) climatic, topographic gradients and geological diversity: bog macroform diversity	The scale of the nominated property, alongside the gradients in climate and topography, and the diversity of the underlying geology, provide the setting for subtle variations in processes which result in a huge diversity in the character of the blanket bog. These factors control the development of complex systems of hummocks, moss	There are no pathways by which the Proposed Development could affect the climatic, topographic gradients or geological diversity that support bog macroform diversity.	N/A	No effect

	lawns, hollows and pools, and the associated plant species, which produce surface patterning that has been classified into 15 site-types. No other blanket bog in the world contains such a diverse collection of surface patterning within a single area.			
c) archive it stores (4th dimension)	Delving deeper, the peat, which has been forming for over 9,000 years, reaches thicknesses of over 8 m, providing an exceptional archive and providing a 4th dimension to The Flow Country blanket bog. The processes responsible for the development of the blanket bog system and the ecosystems it supported can be scrutinised back through time across the vast area it covers using pollen records; plant sub-fossils (e.g. hazelnuts, pine cones, pine stumps); lake sediment records (midge and diatom (alga) remains); tephra (ash) layers blown south from Icelandic volcanoes; charcoal (indicating in situ burning).	There are no pathways by which the Proposed Development could affect the historic archive stored in the peat; any excavations for the foundations of the towers and poles, and the new (permanent and temporary) access tracks, would be of minimal depth and affect only a very small proportion of the habitats present.	N/A	No effect
d) natural laboratory – ongoing scientific and educational use	The exceptional nature of The Flow Country makes it the 'type site' for blanket bog study and it continues to be used as a 'test bed' for peatland research globally. The diversity of features related to altitudinal and climatic gradients across the region and the depth of archive provides a huge scope for research. Furthermore, the breadth of existing	There are no pathways by which the Proposed Development could affect the ongoing scientific and educational use of the WHS.	N/A	No effect

	studies provides a fantastic foundation for future research.			
e) carbon sequestration and storage	Globally peatlands are the largest natural terrestrial carbon store. Covering only 3% of the world's land area, they hold nearly 30% of all the carbon stored on land. In blanket bog, year-round waterlogged conditions slow the process of plant decomposition such that the dead plants accumulate to form peat, and thereby sequester carbon from the atmosphere. Over thousands of years this plant material builds up and becomes several metres thick producing a valuable carbon store. The Flow Country provides a superb example of ongoing sequestration, alongside carbon storage demonstrated by peat thicknesses which reach over 8 meters.	Given the minimal permanent impact of the Proposed Development on blanket bog, it is reasonable to assume that there would be no impacts on the ability of the Flow Country to continue to sequestrate and store carbon.	N/A	No effect
f) water filtration and the impact on the water quality of associated riverine habitats	The catchments draining The Flow Country sustain exceptional water quality, resulting from the natural filtration of rainwater as it slowly seeps through these vast peatlands. The superb water quality is critically important in sustaining globally important populations of the freshwater pearl mussel in rivers which drain from The Flow Country. European eel (classed by the IUCN as Critically Endangered) are also recorded from these catchments. Furthermore, the rivers of The Flow Country are	All tower locations have been designed to accommodate a 20 m offset from the nearest watercourse, and although construction works will be undertaken in closer proximity, a minimum buffer of 10 m to watercourses will be implemented during the construction phase. Therefore, there will be no construction works within 10 m of the River Strathy, and there is no potential for impacts on any riparian or aquatic habitats; all aquatic freshwater habitats and species (including European eel, Atlantic salmon and freshwater pearl mussel) were consequently scoped out of the impact assessment. There is embedded mitigation as part of the CEMP to ensure there is no potential for accidental pollution to the River Strathy (or any other watercourse) during the construction phase.	See **Chapter 3: The Proposed Development** See **Chapter 7: Ecology**; Section 7.3: Scope of Assessment) See **Appendix 3.7:** Outline CEMP	No effect

	maintaining strong populations of Atlantic salmon which are in global decline.			
Criterion (x) contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation				
a) species associations	The diverse range of habitats that The Flow Country contains supports an exceptional and specialised blanket bog biodiversity, and holds biological associations unlike any other blanket bog found globally. This is a consequence of the overlapping distributions of species typical of both arctic and temperate climatic zones, and is further influenced by altitudinal and climatic gradients and geological diversity found across the nominated property. Furthermore, the scale and connectivity of the nominated property provides resilience to species it contains.	The international importance of the habitats for birds is recognised in its designation as an SPA and Ramsar, and the results of the EcIA (see **Chapter 8: Ornithology**) and shadow HRA (see **Appendix 8.4**) are summarised against the identified ornithology features in (a) (i). The international importance of the habitats is recognised in its designation as an SAC and Ramsar, and the results of the EcIA (see **Chapter 7: Ecology**) and shadow HRA (see **Appendix 7.6**) are summarised against the identified habitat features in (a) (ii).		
a) i. birds	The diversity of environments within the blanket bog of The Flow Country, and the patchwork of connected landscape elements within the wider setting (farmland, coastal, etc.), supports a distinctively special assemblage of birds. The precise combination of species, with arctic-alpine and temperate and continental elements is not found anywhere else in the world and include; red-throated diver, black-throated diver, common scoter, Eurasian wigeon, golden plover, Eurasian greenshank, dunlin, wood sandpiper, golden eagle, merlin, hen harrier and short-eared owl.	The international importance of the habitats for birds is recognised in its designation as an SPA and Ramsar, and all of the bird species listed in the OUV are designated features of the SPA / Ramsar. Potential effects on each of the individual species listed in the OUV are summarised below.		
		<u>Golden plover</u> A small number of breeding territories were recorded in the survey area but none within Limits of Deviation (LoD). Given the limited extent of habitat loss, relatively large core foraging range of this species (3 km) and the presence of extensive suitable undisturbed habitat in the wider local area, effects on this species were assessed as negligible. The risk of mortality resulting from collisions with the Overhead Line (OHL) when the Proposed Development is operational was assessed as negligible for this species, because levels of flight activity were very low and no regular	Assessment of construction effects (see **Chapter 8**; Section 8.8) See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	Negligible effect (not significant)

	commuting routes across the Proposed Development were identified.		
	<u>Greenshank</u> A small number of breeding territories were recorded in the survey area and there is the potential for the loss of one nest site within the OHL LoD. Given the limited extent of habitat loss, relatively large core foraging range of this species (3 km) and the presence of extensive suitable undisturbed habitat in the wider local area, disturbance/ displacement effects on this species were assessed as negligible. The risk of mortality resulting from collisions with the OHL when the Proposed Development is operational was assessed as negligible for this species, because levels of flight activity were very low and no regular commuting routes across the Proposed Development were identified.	Assessment of construction effects (see **Chapter 8; Section 8.8**) See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	Negligible effect (not significant)
	<u>Red-throated diver and black-throated diver</u> No breeding territories were identified within the OHL LoD, and there is no suitable nesting or foraging habitat for this species within the OHL LoD. The nearest breeding sites are >1km from the Proposed Development and therefore there is no potential for noise and visual disturbance during construction or operation. A regularly used flight route used by red-throated diver to commute between their breeding loch and foraging areas at sea was identified crossing the Proposed Development. In contrast, levels of black-throated diver flight activity were low and no regular commuting routes were identified. The risk of mortality resulting from collisions with the OHL when the Proposed Development is operational was assessed as low for these species, because the OHL is >1km from breeding lochs allowing sufficient detection by divers in flight to adjust their flight altitude or flight path to avoid the obstacles.	Assessment of construction effects (see **Chapter 8; Section 8.8**) See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	Negligible effect (not significant)

	The potential displacement of divers due to the barrier effect of the OHL was assessed as low magnitude and not significant.		
	Hen harrier Two breeding territories were previously identified within 2 km of the Proposed Development in 2019, although at least one nest site was considered abandoned following a wildfire in the area in 2019. The potential for disturbance / displacement of breeding hen harrier during construction was assessed as being of medium magnitude and not significant. The collision risk assessment for this species was assessed as low magnitude and not significant.	Assessment of construction effects (see **Chapter 8; Section 8.8**) See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	Medium effect (not significant)
	Merlin Up to four breeding territories were identified within 2 km of the Proposed Development, but none were within the OHL LoD. Given the limited extent of foraging habitat loss, large core foraging range of this species (5 km) and the presence of extensive suitable undisturbed habitat in the wider local area, effects on this species were assessed as negligible. The collision risk assessment for this species was assessed as low magnitude and not significant.	Assessment of construction effects (see **Volume 1, Chapter 8; Section 8.8**) See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	Negligible effect (not significant)
	Wigeon, dunlin, golden eagle and short eared-owl There were no breeding records of wigeon, dunlin, golden eagle or short-eared owl in the survey area, and any other records were infrequent. Two golden eagle flights (outside the breeding season) were recorded during the survey season, at a height of >40m above ground level. Habitats within the survey area were therefore not considered to be of value to these species and they were scoped out of the EcIA and shadow HRA.	Field survey results; see **Appendix 8.2: Section 3.2** See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA / Ramsar**	No effect

		Common scoter and wood sandpiper Common scoter and wood sandpiper were not recorded in the survey area, and therefore these species were scoped out of the EcIA and HRA.	Field survey results; see **Appendix 8.2: Section 3.2** See **Appendix 8.4: Shadow HRA for Caithness and Sutherland Peatlands SPA/ Ramsar**	No effect
a) ii. plants	The floristic composition of The Flow Country blanket bog, and associated wet heath, is not found anywhere else globally, and represents a highly Atlantic influence on plant distribution and development. Key plants of importance are; dwarf birch, alpine bearberry, bogbean, bog hair-grass, water lobelia and bog orchid, marsh saxifrage and 29 species of Sphagnum (over 10% of global Sphagnum flora).	The Proposed Development would not adversely affect the floristic composition of the blanket bog and associated wet heath given the very minor impacts on habitats arising from construction and operation. None of the key plants listed in the OUV were recorded in the study area.	Assessment of Likely Significant Effects (see **Volume 1, Chapter 7**; Section 7.10) See **Appendix 7.6: Shadow HRA for Caithness and Sutherland Peatlands SAC/ Ramsar**	Minor adverse effect (not significant)
a) iii. genetic diversity	The Flow Country occupies a position at the western extreme of the Eurasian landmass. As such it is a haven of locally adapted genetic diversity. Many species here are isolated from their continental relatives, which means that local lineages have developed. Whilst small, isolated populations frequently suffer from inbreeding depression, the large size of The Flow Country means that this not a significant issue here. Furthermore, many species operate as metapopulations: groups of smaller populations between which individuals can move. Not only does this mean that genes can flow between populations, it also means that individuals can recolonise sites in the event of short-term localised extinction, as has been demonstrated with newts. Given models that suggest	Given the very minor and localised impacts of the Proposed Development in context with the thousands of hectares of the WHS, there is no potential for any effects on the genetic diversity of species. The construction and operation of the Proposed Development would not impact the WHS habitats to such an extent that there would be no populations remaining for recolonisation in the event of short-term localised extinctions of species. The Proposed Development will not impact any of the waterbodies that provide valuable refuges.	N/A	No effect

	droughts will increase in both frequency and intensity in the north of Scotland, the large number of waterbodies in The Flow Country will greatly reduce the likelihood of population loss. This makes it a valuable refuge for wildlife of many species at both a population and a genetic level.	

2.4 Potential Cumulative Effects

A cumulative impact assessment on habitats and species impacted by the Proposed Development with other consented and planned projects in the wider local area has been undertaken and is presented in **Chapter 7; Section 7.12** for terrestrial ecology features and in **Chapter 8; Section 8.10** for ornithology features within Volume 1 of the EIA Report.

The EcIA has concluded that the Proposed Development would result in no significant cumulative effects on habitats or protected species, including qualifying species and habitats of the Caithness and Sutherland SAC / SPA / Ramsar and West Halladale SSSI, which are also attributes of the Flow Country WHS. This assessment is applicable to WHS Criterion (ix) attributes (a) and (f) and Criterion (x) attributes (a) (i) and (a) (ii).

A shadow HRA undertaken for the terrestrial and ornithological qualifying features of the Caithness and Sutherland SAC / SPA / Ramsar has concluded that there will be no adverse effects on the integrity of the designated site in combination with any other projects, which is within and overlapping with the Flow Country WHS boundary. This assessment is applicable to WHS Criterion (ix) attributes (a) and (f) and Criterion (x) attributes (a) (i) and (a) (ii).

The projects scoped into the cumulative assessment (and in-combination shadow HRA for the Caithness and Sutherland Peatlands SAC / SPA / Ramsar) are all wind farms and associated electrical infrastructure (e.g. substations and grid connections), of the Connagill Cluster Grid Connections (Strathy South, Strathy Wood, Kirkton and Melvich). The cumulative assessment for ornithology was extended to include proposed and consented (but not yet constructed) wind farms at Bettyhill (Phase 2) and Limekiln due to the mobile nature of bird species. The nature of these developments means that, in common with the assessment for the Proposed Development alone, there is no potential for adverse cumulative effects with the Proposed Development on the following attributes that were not considered in the EcIA:

- Criterion (ix) attribute (b) – climatic and topographic gradients, and geological diversity: bog macroform diversity – the consented and proposed wind farms and associated grid infrastructure would not impact on the climatic and topographic gradients of the blanket bog habitat. There is therefore no potential for cumulative effects on this attribute with the Proposed Development.
- Criterion (ix) attribute (c) – archive it stores (4th dimension) – the consented and proposed wind farms and associated electrical infrastructure would not impact on the historic archive of the blanket bog system. There is therefore no potential for cumulative effects on this attribute with the Proposed Development.
- Criterion (ix) attribute (d) – natural laboratory, ongoing scientific and educational use – the consented and proposed wind farms and associated electrical infrastructure would not impact the ongoing scientific and educational use of the attribute. There is therefore no potential for cumulative effects on this attribute with the Proposed Development.
- Criterion (ix) attribute (e) – carbon sequestration and storage - the consented and proposed wind farms and associated electrical infrastructure would not impact the ability of the peat bog for long-term carbon sequestration and storage, although there may be some releases of carbon in the short-term during construction as peat bog habitat is disturbed, albeit on a very small scale given the magnitude of impact. Cumulative effects on this attribute with the Proposed Development are therefore assessed as negligible (not significant).
- Criterion (x) attribute (a) (iii) – species associations; genetic diversity – the consented and proposed wind farms and associated electrical infrastructure would not impact the genetic diversity of the attribute. There is therefore no potential for cumulative effects on this attribute with the Proposed Development.

3 CONCLUSION

The Flow Country WHS straddles Caithness and Sutherland and supports one of the largest areas of blanket bog in the world; a globally rare habitat that is recognised for its international nature conservation importance through its overlapping designations as the Caithness and Sutherland Peatlands SAC, SPA and Ramsar. Much of the ecological impact assessment presented in **Chapter 7 - Ecology** and **Chapter 8 - Ornithology** is therefore applicable to the assessment of potential impacts on the attributes of the Flow Country WHS.

The assessment, which has been undertaken in accordance with guidance in The Highland Council's Flow Country Candidate World Heritage Site Impact Assessment Toolkit has concluded that there will be no significant adverse effects as a result of the Proposed Development on the attributes of the WHS either alone or in-combination with any other wind farm project or their associated electrical infrastructure in the wider Strathy area, which associated electrical infrastructure includes the Connagill Cluster Grid Connections.

REFERENCES

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ANNEXES

Annex A

Flow Country Statement of Outstanding Universal Value (SOUV)

The following text has been taken from the World Heritage Statement Draft Statement of Outstanding Universal Value (SOUV) Toolkit.

A.1 Brief Synthesis

"*The Flow Country property is the most outstanding example of a blanket bog ecosystem in the world. With its intricate network of pools, hummocks and ridges, the bog stretches across some c. 190,000 hectares of northern mainland Scotland, with the property boundary comprising seven discrete, but adjacent areas. The underlying peat has been accumulating for the past 9,000 years and the bog displays a remarkable range of features resulting from the climatic, altitudinal, geological and geomorphological gradients found across the region. Alongside the extensive record of peat accumulation that The Flow Country contains, and the store of carbon this represents, the ecological processes that result in peat formation continue to sequester carbon on a very large scale.*

The Flow Country blanket bog also provides a globally significant natural habitat for an internationally important assemblage of specialist biodiversity. The area supports a unique and distinctive assemblage of birds, with a combination of arctic-alpine, temperate and continental species not found anywhere else in the world. This is a result of the site's location and the diversity of blanket bog habitats it contains, combined with the patchwork of connected farming and coastal landscape elements within the wider setting.

Protection for The Flow Country is provided through international and national designations, as well as national and local planning policies, and there is scope for future expansion of the site through restoration of adjacent degraded blanket bog. The area is also considered to be the type-locality for the description of blanket bog and so represents a significant research and educational resource."

A.2 Justification of Criteria

A.2.1 Criterion (ix) – The Flow Country is the most extensive and diverse example of an actively accumulating blanket bog landscape found globally.

"Since the glaciers receded from Scotland climatic conditions, in combination with the underlying geology, the resultant topography, and the biogeography have led to the formation of a vast and diverse blanket bog landscape that stretches across the north of Scotland. The persistent precipitation-fed waterlogging of the soil has led to an expanse of peat bog, c. 400,000 hectares, that blankets the landscape, including hills, slopes and hollows, together forming a globally rare and significant peatland ecosystem. Of this, nearly 190,000 hectares is identified as suitable to be included within the property, on the basis of current quality and continuity of habitat.

The Flow Country therefore represents the most extensive, near-continuous, high quality and near-natural blanket bog landscape found globally. The active processes of blanket bog formation have continued uninterrupted for 9,000 years, and the diversity of blanket bog features is not found anywhere else on Earth. Moreover, the processes of blanket bog formation provide an outstanding example of carbon sequestration and long-term storage on a massive scale.

The blanket bog also provides an incredible record of its formation, preserved as pollen and plant fossils, and telling a story of its past flora, fauna, climate, palaeoecology and human influence. This is also important for helping us understand the future functioning of this and other blanket bogs globally."

A.2.2 Criterion (x) – The Flow Country contains an exceptional example of the biodiversity found within a blanket bog landscape. The geographical position of The Flow Country and the diversity of habitats result in biological associations unlike any other found globally. Furthermore, the scale and connectivity of the property afford resilience to the ecosystem and the species it contains.

"*The blanket bog of The Flow Country is a globally significant natural habitat for the conservation of biodiversity, not least because of its unique and specialised assemblage of flora and fauna, but also because of the rarity of the ecosystem and the declining condition and extent of comparable ecosystems globally.*

The diverse range of blanket bog features that The Flow Country contains, such as pools and hummocks, support an exceptional and specialised blanket bog biodiversity and holds biological associations unlike any other blanket bog found globally. This diversity is a consequence of the overlapping distributions of species typical of both arctic and temperate climatic zones and is further influenced by altitudinal and climatic gradients, and geological diversity found across the site.

The property includes some species that are rare, scarce or threatened, but it is the distinct assemblage of specialised flora and fauna within a high-quality blanket bog that make The Flow Country so significant, along with its pivotal position at the crossroads of bird flyways and migration routes. Furthermore, the scale and connectivity of the property afford resilience to the ecosystem and the species it contains."

A.3 Statement of Integrity

"*The Flow Country property comprises seven discrete but adjacent areas totalling around 190,000 hectares, which encompass a large expanse of actively accumulating blanket bog ecosystem. The overwhelming majority of the blanket bog within the property boundary is in near natural condition. The remainder includes areas of blanket bog that are undergoing restoration, and areas that are expected to be restored in the short to medium term.*

The property is of sufficient size to contain all the elements of Outstanding Universal Value (OUV) needed to demonstrate the ecological and biological processes, and the biodiversity that comprise this globally significant ecosystem. These include the blanket bog itself, the wider peatland landscape complex in which it lies and the finer elements, including intricate pool systems, diverse surface patterning, fens, and the range of flora and fauna that all of these systems support. The climatic, altitudinal, geological and geomorphological gradients that occur across The Flow Country all contribute to ensuring that the variety of features that make up blanket bogs are represented. Furthermore, the boundaries of the nominated property are largely defined on the basis of the hydrological elements that comprise the blanket bog, and therefore ensure ecosystem integrity and coherence.

Large areas of the wider Flow Country peatland have suffered from poor historical management decisions in relation to matters such as drainage and woodland creation, but the boundary has been chosen to include only those areas of deep peat which are in good condition or have the ability to return to a near-natural state within the next 10-25 years. It is expected that in time, it will be possible to integrate some of the more degraded bog in the wider Flow Country into the property."

A.4 Requirements for protection and management

"Around 73% of the area within the proposed property boundary has the highest level of statutory protections, with national regulation and policy reflecting their national and international significance, including those originally introduced via the EU Habitats and Birds Directives leading to Special Protection Area (SPA) and Special Area of Conservation (SAC) classification which are now protected through

domestic legislation. The majority of the area is also protected through the Ramsar Convention. These instruments provide specific protection for the elements of OUV as set out in the Site's attributes, notably including the processes for the maintenance and formation of blanket bog, and the associated flora and fauna.

Further to the statutory protection, peatlands – particularly those containing peat greater than 50cm in depth – are protected through planning policies, both at Scottish national and local levels. There are specific planning policies at national level in relation to both World Heritage Sites and areas of peatland that afford them effective protection from development proposals that might impact adversely on OUV. Moreover, where the boundary is not coincident with existing environmental designations, protection will again be ensured by national and local planning policy; the Local Authority will have regard to the Management Plan as a material consideration.

The property has no buffer zone. Areas important for the protection of OUV outside of the boundary are protected through a combination of national and local planning policy, and the wider protection afforded by the existing high-level designations. Buffer zones also have no basis in Scottish law, so would not add more protection than is already in place.

Management of the Site's OUV will be guided by a single clear Management Plan, developed by a stakeholder partnership comprising key landowners and managers, government agencies, local communities and scientific experts, and also through public consultation. The key management opportunity is bog restoration, and potential threats include commercial forestry and unwanted tree regeneration, inappropriate deer management, water management and drainage, intensive agriculture, inappropriately sited and/or designed wind farms, burning and climate change. A key requirement for the management of this property lies in continued strong and adequately resourced coordination and partnership arrangements focused on the World Heritage property."

Annex B

Flow Country WHS Impact Assessment Toolkit: Identifying Potential Risks

Table B1: Identifying Potential Risks to WHS Criteria and Attributes

Criteria	Attribute	Element of a proposed action that has the potential to cause an impact					
		Construction of towers, poles and CSE	Construction of temporary access tracks	Construction of new permanent access tracks	Operation of new permanent access tracks	Operational maintenance and presence of personnel and vehicles/ machinery	Operational presence of towers, poles and CSE
ix: outstanding example representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals	a) most extensive near continuous example of natural, actively accumulating, blanket bog ecosystem found globally	Loss of/ damage to habitat	Loss of/ damage to habitat	Loss of/ damage to habitat	No pathway for impacts (habitats already affected at construction phase)	No pathway for impacts	No pathway for impacts
	b) climatic, topographic gradients and geological diversity: bog macroform diversity	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts
	c) archive it stores (4th dimension)	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts
	d) natural laboratory – ongoing scientific and educational use	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts

Criteria	Attribute	Element of a proposed action that has the potential to cause an impact					
		Construction of towers, poles and CSE	**Construction of temporary access tracks**	**Construction of new permanent access tracks**	**Operation of new permanent access tracks**	**Operational maintenance and presence of personnel and vehicles/ machinery**	**Operational presence of towers, poles and CSE**
	e) carbon sequestration and storage	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts
	f) water filtration and the impact on the water quality of associated riverine habitats	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts
x: contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation	(a) Species associations (i) birds	Loss of/ damage to habitat supporting nesting and foraging birds. Noise and visual disturbance/ displacement.	Loss of/ damage to habitat supporting nesting and foraging birds. Noise and visual disturbance/ displacement.	Loss of/ damage to habitat supporting nesting and foraging birds. Noise and visual disturbance/ displacement.	No pathway for impacts	Noise and visual disturbance/ displacement	Visual disturbance/ displacement Collision risk
	(a) Species associations (ii) plants	Loss of/ damage to habitat	Loss of/ damage to habitat	Loss of/ damage to habitat	No pathway for impacts (habitats already affected at construction phase)	No pathway for impacts	No pathway for impacts

Criteria	Attribute	Element of a proposed action that has the potential to cause an impact					
		Construction of towers, poles and CSE	**Construction of temporary access tracks**	**Construction of new permanent access tracks**	**Operation of new permanent access tracks**	**Operational maintenance and presence of personnel and vehicles/ machinery**	**Operational presence of towers, poles and CSE**
	(a) Species associations (iii) genetic diversity	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts	No pathway for impacts

Annex C
Flow Country WHS Impact Assessment Toolkit: Description and Evaluation Tool

Table C2: Description and Evaluation Tool

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
(ix) (a) most extensive near continuous example of natural, actively accumulating, blanket bog ecosystem found globally	Loss of/ damage to habitat during construction of towers, poles and CSE	Once	Long-term	Irreversible	Irreversible	Permanent	Negligible	Minor impact (negative)
	Loss of/ damage to habitat during construction of temporary access tracks	Once	Short-term	Reversible	Reversible	Temporary	Some	Minor impact (negative)
	Loss of/ damage to habitat during construction of new permanent access tracks	Once	Long-term	Irreversible	Irreversible	Permanent	Some	Minor impact (negative)

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
(x) (a) Species associations **(i) birds**	Loss of/ damage to habitat supporting nesting and foraging birds during construction of towers, poles and CSE.	Once	Long-term	Irreversible	Irreversible	Permanent	Negligible	Neutral impact
	Noise and visual disturbance/ displacement during construction of towers, poles and CSE.	Intermittent	Short-term	Reversible	Reversible	Temporary	Negligible	Minor impact (negative)

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
	Loss of/ damage to habitat supporting nesting and foraging birds during construction of temporary access tracks	Once	Short-term	Reversible	Reversible	Temporary	Negligible	Neutral impact
	Noise and visual disturbance/ displacement during construction of temporary access tracks	Intermittent	Short-term	Reversible	Reversible	Temporary	Negligible	Minor impact (negative)

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
	Loss of/ damage to habitat supporting nesting and foraging birds during construction of new permanent access tracks	Once	Short-term	Reversible	Reversible	Temporary	Negligible	Neutral impact
	Noise and visual disturbance/ displacement during construction of new permanent access tracks	Intermittent	Short-term	Reversible	Reversible	Temporary	Negligible	Minor impact (negative)

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
	Noise and visual disturbance/ displacement during operational maintenance	Intermittent	Short-term	Reversible	Reversible	Temporary	Negligible	Neutral impact
	Visual disturbance/ displacement due to presence of towers, poles and CSE	Continuous	Long-term	Irreversible	Irreversible	Permanent	Negligible	Neutral impact
	Collision risk due to presence of towers, poles and CSE	Continuous	Long-term	Irreversible	Irreversible	Permanent	Some	Minor impact (negative)

Attribute	Description of Potential Impact	Frequency of action Once/ intermittent/ continuous	Duration of action Short-term/ long-term	Reversibility of action Reversible/ irreversible	Reversibility of change to the attribute Reversible/ irreversible	Longevity of change to the attribute Temporary / permanent change	Degree of change to the attribute None/ negligible/ some/ large change	Evaluation of impact Neutral/ minor/ moderate/ major impact (negative or positive)
(x) (a) Species associations **(ii) plants**	Loss of/ damage to habitat during construction of towers, poles and CSE	Once	Long-term	Irreversible	Irreversible	Permanent	Negligible	Minor impact (negative)
	Loss of/ damage to habitat during construction of temporary access tracks	Once	Short-term	Reversible	Reversible	Temporary	Some	Minor impact (negative)
	Loss of/ damage to habitat during construction of new permanent access tracks	Once	Long-term	Irreversible	Irreversible	Permanent	Some	Minor impact (negative)