SSEN Transmission

Bingally 400 kV Overhead Line Tie-In

Environmental Appraisal

April 2025

Scottish & Southern Electricity Networks
TRANSMISSION

CONTENTS

10. CLIMATE CHANGE

10.1 Introduction

10.1.1 This chapter sets out the EA methodology, baseline environment and mitigation considerations for the Proposed Development in relation to climate change.

10.1.2 The climate assessment has been carried out in accordance with the Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guides to: Assessing Greenhouse Gas Emissions[1] and Evaluating Resilience and Adaptation[2]. Consideration was given to three aspects of climate assessment detailed below in **Table 10-1**.

Table 10-1 Definition of climate assessment elements

Assessment Type	Definition
Life Cycle Greenhouse Gas (GHG) Assessment	Impact of GHG emissions arising from the Proposed Development on the climate, including how it would affect the UK and Scotland meeting their national carbon budgets.
Climate Change Resilience Assessment (CCRA)	The resilience of the Proposed Development to climate change impacts, including how the design would consider projected impacts of climate change.
In-combination climate change impact (ICCI) Assessment	The combined impact of the Proposed Development and potential climate change on receptors in the receiving environment.

10.2 Scoped Out

10.2.1 A separate ICCI assessment has been excluded from the Climate Change assessment on the basis that this is a proportionate approach for an EA. In addition, following an initial scoping workshop with the EA disciplines listed below a full ICCI assessment was excluded from the climate assessment, as impacts on receptors in the surrounding environment were not deemed to be significant by the relevant EA disciplines. The following EA disciplines identified non-significant ICCIs:

- **Chapter 5 Ecology and Nature Conservation and Nature Conservation**;
- **Chapter 6 Ornithology**; and
- **Chapter 8 Hydrogeology, Hydrogeology, Geology and Soils**.

10.2.2 **Table 10-2** summarises the identified ICCIs. No significant ICCIs were identified, and mitigation measures to manage their impacts and consequences are detailed in the respective chapters.

Table 10-2 Identified ICCI Impacts

Discipline	Receptor	Likely ICCI identified	Significance
Ecology and Nature Conservation	Water Vole	Increased winter rainfall and flooding could pose risks to water voles, including mortality during flood events.	Not Significant

[1] IEMA, 2022. *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – second Edition* [Online]. [Accessed 19 August 2024]. Available at: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance

[2] IEMA, 2020. *Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation* [Online]. [Accessed 19 August 2024]. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020

Discipline	Receptor	Likely ICCI identified	Significance
	Notable habitats	An increased risk of wildfire events could harm notable habitats such as grasslands, heathlands, wetlands, and woodlands.	Not Significant
Ornithology	Black Grouse	Drier summers and wildfire risks may cause habitat loss, putting pressure on black grouse by affecting breeding success, nesting conditions, and food availability.	Not Significant
Hydrogeology, Hydrogeology, Geology and Soils – Contamination	Ground Conditions	Increased precipitation and heightened flood risk may result in increased risk of ground contamination.	Not Significant
	Ground Conditions	An increased risk of forest fire events caused by climate change could lead to an increased risk of ground contamination due to fire-fighting methods.	Not Significant

10.2.3 Sea-level rise and coastal flooding as environmental risks have been scoped out of the climate assessment as the Site is at an inland location that is approximately 220 m above sea level. The Intergovernmental Panel on Climate Change (IPCC) Sea Level Projection Tool[3] estimates a 0.6 m increase relative to a 1995 – 2014 baseline at the closest region of Ullapool for 2100 under Representative Concentration Pathway (RCP) 8.5. Flood risk information[4] from the Scottish Environment Protection Agency (SEPA) indicates that the area where the Site is located is not at risk of coastal flooding.

10.2.4 As outlined in **Section 2.15.1** the Proposed Development is expected to operate indefinitely, and thus decommissioning was not included in the scope of the climate assessment.

10.2.5 Currently, globally there is no robust methodology for calculating A0 emissions. However, they are expected to be minimal, contributing less than 1% to the total GHG emissions of the Proposed Development. According to the IEMA GHG Guidance[1], GHG emissions anticipated to be below 1% of the total project emissions can be excluded from the assessment. Therefore, emissions from A0 have been scoped out on this basis.

10.2.6 GHG emissions and their assessment are inherently cumulative for the following reasons:

- The environmental impact arising from GHGs is the aggregation and increased concentration of GHGs within the atmosphere;
- The location of the emissions source is not relevant to the impact arising from it; any development leading to GHG emissions has the same impact whether it is located near to the Proposed Development or in another region / country; and
- Impacts on a given location arise from the aggregated GHG levels in the atmosphere, not from the magnitude of GHG emissions in the local area.

10.2.7 Any attempt to compile a cumulative assessment of GHG emissions would have to include all development projects in the UK (as the impact of GHG is not related to their emission location) and for this reason the approach for managing the cumulative GHG emissions across the UK is through the adoption of national carbon budgets.

10.2.8 The inappropriateness of undertaking a cumulative appraisal (other than by contextualising against Carbon Budgets) is reflected in the IEMA GHG assessment guidance. This

[3] IPCC, 2021. *Sea Level Projection Tool* [Online]. [Accessed 19 August 2024] Available at: https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool.
[4] SEPA, 2024. *Scottish Flood Hazard and Risk Information* [Online]. [Accessed 10 August 2024]. Available at: https://map.sepa.org.uk/floodmaps/FloodRisk/Risk

guidance notes that '*effects from specific cumulative projects…should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other'*.

10.2.9 Therefore, the life cycle GHG assessment has considered whether the carbon emissions from the Proposed Development would have a material impact on the UK's ability to meet its carbon reduction target, including its carbon budgets, and this is presented in **Section 10.7**.

10.2.10 The CCRA considers the impact of climate change on the Proposed Development itself. Therefore, a cumulative assessment is not applicable.

10.3 Information Sources

10.3.1 The following sources of information have been reviewed and form the basis of this EA chapter:

- **Chapter 2 Description of the Proposed Development**;
- **Chapter 5 Ecology and Nature Conservation and Nature Conservation**;
- **Chapter 6 Ornithology**;
- **Chapter 7 Traffic and Transport;** and
- **Chapter 8 Hydrology, Hydrogeology, Geology and Soils**.

Legislation, Policy and Guidance

Legislation

10.3.2 Legislation which is relevant to the climate assessment is presented in **Table 10-3**.

Table 10-3 Relevant Climate Change Legislation

Legislation	Legislation details
United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement[5]	The Paris Agreement is a legally binding agreement within the UNFCCC dealing with GHG emissions mitigation, adaptation, and finance, which started in 2020. It requires all signatories to strengthen their climate change mitigation efforts to keep global warming to well below 2°C this century and to pursue efforts to limit global warming to 1.5°C.
Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[6] and Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017	The EIA Regulations state that an EIA (where relevant) must include: *"a description of the likely significant effects of the development on the environment resulting from… the impact of the project on climate (for example, the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change".*
Climate Change Act 2008 and Climate Change Act 2008 (2050 Target Amendment) Order 2019[7]	In June 2019, the Climate Change Act was amended, requiring the UK Government to reduce the UK's net emissions of GHGs by 100% (net-zero) relative to 1990 levels by 2050.

[5] United Nations Framework Convention on Climate Change (UNFCCC), 2016. *The Paris Agreement* [Online]. [Accessed 7 August 2024]. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement

[6] Scottish Government, 2017. *Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017* [Online]. [Accessed 7 August 2024]. Available at: https://www.legislation.gov.uk/ssi/2017/102/contents/made

[7] HMSO, 2019. *The Climate Change Act 2008 (2050 Target Amendment) Order 2019* [Online]. [Accessed 7 August 2024] Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111187654

Legislation	Legislation details
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (Scottish Parliament, 2019)	The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[8] amends the original Climate Change (Scotland) Act 2009, introducing key updates to the legislative framework for GHG emissions reductions, with a clear commitment to achieving net-zero GHG emissions by 2045. The legislation changes the target for reducing all "greenhouse gas emissions" to 100% by 2045, as opposed to the previous target of 80%. The proposed 2019 law explained how annual targets were to be set and how meeting targets would be monitored and reported. The Act requires Scottish Ministers to develop climate change plans through public consultations, enhancing transparency and accountability in setting and achieving emissions targets. Additionally, it includes provisions to assess the impact of major capital projects on these targets, ensuring that climate considerations are integrated into infrastructure planning and decision-making.
Climate Change (Emissions Reduction Targets) (Scotland) Act 2024[9]	The Climate Change (Emissions Reduction Targets) (Scotland) Act 2024 amends the original Climate Change (Scotland) Act 2009, introducing key updates to the legislative framework for GHG emissions reductions, with a clear commitment to achieving net-zero GHG emissions by 2045. The updates include the introduction of Scottish carbon budgets, shifting from annual and interim targets to multi-year budget targets, thereby aligning reporting with international best practices in carbon management. The Act requires Scottish Ministers to develop climate change plans through public consultations, enhancing transparency and accountability in setting and achieving emissions targets. Additionally, it includes provisions to assess the impact of major capital projects on these targets, ensuring that climate considerations are integrated into infrastructure planning and decision-making.
Carbon Budget Order 2021[10]	The Sixth Carbon Budget, the first to align with the amended carbon reduction target, was published by the Climate Change Committee (CCC) for consideration by the Government in December 2020. In April 2021, the Government accepted the CCC's 965 metric tonne of carbon dioxide equivalent ($MTCO_2e$) recommendation and laid the Carbon Budget Order 2021 before parliament. The new target was enshrined in law at the end of June 2021 and will be the first budget to incorporate the UK's share of international aviation and shipping emissions. The CCC released their 7th Carbon Budget in February 2025 and advised the UK Carbon Budget to be set at 535 MtCO2e, however this carbon budget total is not expected to be formally accepted by government or ratified by parliament until later in 2025.

Policy

10.3.3 Policy which is relevant to the climate assessment is presented in **Table 10-4**.

[8] The Scottish Government, 2020c. *Reducing Greenhouse Gas Emissions* [Online]. Available from: https://www.gov.scot/policies/climate-change/reducing- [5 March 2025].
emissions/#:~:text=The%20Climate%20Change%20(Emissions%20Reduction,2030%2C%2090%25%20by%202040

[9] Scottish Government (2024) Climate Change (Emissions Reduction Targets (Scotland) Act 2024. Available at: https://www.parliament.scot/bills-and-laws/bills/s6/climate-change-emissions-reduction-targets-scotland-bill [Accessed 11/11/2024]

[10] The Carbon Budget Order, 2021. *S2021/750* [online]. [Accessed 7 August 2024]. Available at: https://www.legislation.gov.uk/ukdsi/2021/9780348222616

Table 10-4 Relevant Climate Change Policy

Policy	Policy Detail
NPS for Electricity Networks Infrastructure (NPS EN-5)[11]	The NPS for Electricity Networks Infrastructure covers the importance of climate change adaptation and resilience, and resilience and details the requirement for developments to be designed to be resilient to extreme weather conditions. There is a critical national priority for the provision of nationally significant low carbon infrastructure including all power lines in scope of EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations.
Our Green Future: Our 25-year Plan to Improve the Environment	Our Green Future: Our 25-year Plan to Improve the Environment 201912 sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats.
Transport Decarbonisation Plan, Decarbonising Transport: a better, greener Britain	Transport Decarbonisation Plan, Decarbonising Transport: a better, greener Britain13. The UK Government has published a Transport Decarbonisation Plan titled "Decarbonising Transport: a better, greener Britain", outlining its plans to reduce transport emissions to achieve its goal of net-zero emissions by 2050.
Update to the Climate Change Plan 2018–2032: Securing a Green Recovery on a Path to Net Zero Securing a green recovery on a path to net zero: climate change plan 2018-2032[14]	This document updates the 2018 Climate Change Plan to reflect the setting of new ambitious targets to end Scotland's contribution to climate change by 2045. It also reflects on how Scotland emerged from COVID-19, recognising that there is a chance to rebuild the economy in a way that delivers a greener, fairer, and more equal society. In line with the 2018 plan, the focus is on the period up to 2032.
The Scottish Climate Change Adaptation Programme (SCCAP) 2019 – 2024[15]	The Scottish National Adaptation Plan addresses the impacts identified for Scotland in the UK Climate Change Risk Assessment. It sets out the Scottish Government's objectives in relation to adaptation to climate change. The findings of the SCCAP were used to identify and inform the climate change risks and subsequent adaptation measures.
Update to the Climate Change Plan 2018 – 2032[16]	This document updates the 2018 Climate Change Plan to reflect the setting of new ambitious targets to end Scotland's contribution to climate change by 2045. It also reflects on how Scotland emerged from COVID-19, recognising that there is a chance to rebuild the economy to deliver a greener, fairer, and more equal society. In line with the previous plan, the focus is on the period up to 2032.
Independent Assessment of the Scottish Climate Change	The CCC's independent assessment of SCCAP2 is essential for consideration in climate assessments as it critically evaluates

[11] DESNZ, 2023. *National Policy Statement for Electricity Networks Infrastructure* [Online]. Available at: https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf. [Accessed 17 May 2024].

[12] UK Government, 2018. *A Green Future: Our 25 Year Plan to Improve the Environment*. [Online] Available at: https://assets.publishing.service.gov.uk/media/65fd713d65ca2f00117da89e/CD1.H_HM_Government_A_Green_Future_Our_25_Year_Plan_to_Improve_the_Environment.pdf [Accessed 19 March 2025]

[13] Department for Transport, 2021. *Decarbonising Transport: A Better, Greener Britain* [Online]. Available at: https://assets.publishing.service.gov.uk/media/610d63ffe90e0706d92fa282/decarbonising-transport-a-better-greener-britain.pdf [Accessed 11 April 2024].

[14] Scottish Government, 2020. *Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update* [Online]. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/12/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/documents/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/govscot%3Adocument/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero.pdf [Accessed 18 April 2024].

[15] Scottish Government, 2019. *Scottish Climate Change Adaptation Programme 2019-2024* [Online]. Accessed 13 August 2024]. Available at: https://www.gov.scot/publications/scottish-climate-change-adaptation-programme-2019-2024/

[16] Scottish Government, 2020. *Update to the Climate Change Plan 2018-2032* [Online]. [Accessed 7 August 2024] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/

Policy	Policy Detail
Adaptation Programme (SCCAP2)[17]	Scotland's preparedness for climate impacts, identifies gaps in current adaptation measures, and offers policy recommendations to enhance resilience. It considers how adaptation strategies align with broader climate goals, such as achieving net-zero emissions, and highlights the importance of monitoring progress and ensuring accountability. This assessment informs decision-making and future adaptation strategies, making it an indispensable reference for effective climate change adaptation planning.
Draft Energy Strategy and Just Transition Plan[18]	Scotland's Draft Energy Strategy and Just Transition Plan aims to achieve a zero-carbon energy system by 2045. The plan includes a goal for the addition of 20 GW of renewable electricity by 2030, accelerated decarbonisation of industry, transport, and heat, and the establishment of a national public energy agency. The plan also focuses on ensuring a just transition by maximising employment, manufacturing, and export opportunities in the energy sector.
National Planning Framework 4 (NPF4)[19]	The Scottish Ministers adopted NPF4 on 13 February 2023. NPF4 sets out how the Scottish Government's planning and development approach will help achieve a net-zero, sustainable Scotland by 2045.
National Policy Statement (NPS) for Energy Infrastructure[20]	The NPS sets out the national policy for energy infrastructure required to ensure the UK can provide a secure, reliable and affordable energy supply. While planning matters are devolved to the Scottish Government, energy policy is reserved to the UK Government. Therefore, NPS may be a relevant consideration in planning decisions in Scotland. NPS EN-1 is the overarching Statement for Energy and covers the UK's goals for net-zero emissions and their relevant to energy infrastructure, climate impacts and adaptation, adverse effects and benefits and climate change projections, flood risk and the importance of relevant mitigation.

Guidance and Tools

10.3.4 Guidance and tools which are relevant to the climate assessment are presented in **Table 10-5**.

[17] Climate Change Committee, 2021. *Independent Assessment of the Scottish Climate Change Adaptation Programme (SCCAP2)* [Online]. [Accessed 13 August 2024]. Available at: https://www.theccc.org.uk/publication/scottish-climate-change-adaptation-programme-progress-report-2021/

[18] Scottish Government, 2023. *Draft Energy Strategy and Just Transition Plan* [Online]. [Accessed 7 August 2024]. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/01/draft-energy-strategy-transition-plan/documents/draft-energy-strategy-transition-plan/draft-energy-strategy-transition-plan/govscot%3Adocument/draft-energy-strategy-transition-plan.pdf

[19] Scottish Government, 2023. *National Planning Framework 4* [Online]. [Accessed 7 August 2024]. Available at: https://www.gov.scot/publications/national-planning-framework-4/

[20] Department for Energy Security and Net-Zero, 2023. *National Policy Statements for energy infrastructure* [Online]. [Accessed 7 August 2024]. Available at: https://www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure

Table 10-5 Relevant Climate Change Guidance and Tools

Guidance	Guidance Detail
The GHG Protocol[21]	The GHG Protocol is a widely used standard for measuring and managing GHG emissions. It provides guidance on identifying, measuring, reporting, and verifying GHG emissions from various sources, such as energy use, transportation, and waste. The GHG Protocol has informed the assessment methodology used in evaluating GHG emissions for the Proposed Development.
British Standards	The British Standards Institution (BSI) BS EN ISO 14064-1:2019[22] and 14064-2:2019[23] (2019a and b, respectively) The BSI BS EN ISO 14064-1:2019 and 14064-2:2019 provide specifications for organisational-level and project-level guidance on the quantification and reporting of GHG emissions and removals. These standards have been applied in the assessment to ensure accurate and consistent measurement and reporting of GHG emissions for the Proposed Development. The guidance would be used to define the approach to quantifying emissions, ensuring that all relevant sources and removals are considered and reported in line with best practices.
IEMA: Environment Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance[24] (hereby referred to as IEMA GHG Guidance)	The approach for assessing the significance of GHG emissions from the Proposed Development has been undertaken in accordance with the guidance.
Publicly Available Standard (PAS) 2080:2023 Carbon Management in Buildings and Infrastructure[25]	PAS 2080:2023 provides guidance on managing GHG emissions and promoting sustainability in infrastructure projects and buildings. The standard outlines a framework for managing GHG emissions throughout the project life cycle, from planning and design to construction and operation. The life cycle GHG assessment has applied key principles from PAS 2080 and which has been used to inform the life cycle GHG Assessment methodology.
Royal Institute of Chartered Surveyors (RICS) Professional Statement Whole Life Carbon Assessment[26]	RICS Professional Statement Whole Life Carbon Assessment was used in the GHG emissions calculation methodology. The professional statement provides a consistent life cycle GHG assessment implementation plan and reporting structure for built projects in accordance with BS EN 15978: 2011: (Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method). The 2nd edition was published in September 2023 and became effective in July 2024.
IEMA: Environmental Impact Assessment Guide to: Climate Change Resilience and	The IEMA guidance on climate resilience was followed to assess the significance of climate change risks to the Proposed Development.

[21] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD), 2004. *The GHG Protocol, A Corporate Accounting and Reporting Standard* [Online]. [Accessed 7 August 2024]. Available at: https://ghgprotocol.org/corporate-standard

[22] International Organisation for Standardisation (ISO), 2019. *ISO 14064-1:2018* [Online]. [Accessed 7 August 2024]. Available at: https://www.iso.org/standard/66453.html

[23] ISO, 2019. *ISO 14064-2:2019* [Online]. [Accessed 7 August 2024]. Available at: https://www.iso.org/standard/66454.html

[24] Institute of Environmental Management and Assessment (IEMA), 2022. *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance*.

[25] British Standards Institution (BSI), 2023. *PAS 2080 - Carbon management in infrastructure and built environment* [online]. [Accessed 7 August 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/

[26] RICS, 2023. *Whole life carbon assessment for the built environment, 2nd edition* [online]. [Accessed 7 August 2024]. Available at https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment

Guidance	Guidance Detail
Adaptation[27] (hereby referred to as IEMA CCRA Guidance)	
SSEN Assessment Methodology: Emissions from peatland disturbance[28]	The SSEN Transmission Peat Carbon Assessment Methodology provides a framework for evaluating GHG emissions resulting from peatland disturbances during infrastructure projects. This methodology guided the qualitative assessment of GHG impacts associated with peat excavation and relocation linked to the Proposed Development.
Technical Guidance on Climate Proofing of Infrastructure in the Period 2021-2027[29]	The "Technical Guidance on Climate Proofing of Infrastructure in the Period 2021-2027," developed by the European Commission, aims to integrate climate resilience into EU-funded infrastructure projects across sectors like transport, energy, and water management. It outlines steps for climate risk assessment, adaptation measures, and implementation, with a focus on resilient designs, materials, and nature-based solutions. This guidance was used to inform the methodology for the CCRA, particularly in evaluating climate risks and selecting appropriate adaptation measures.
Think Hazard[30]	Think Hazard is an online tool developed by the United Nations Office for Disaster Risk Reduction (UNDRR) that provides information on natural hazards such as floods, wildfires, and heatwaves. In the assessment, Think Hazard was used as part of the CCRA to evaluate the likelihood and potential impact of natural hazards like wildfires on the Proposed Development.

10.4 Methodology

10.4.1 This section provides a summary of the assessment methodology. As this is a voluntary EA, a proportionate and qualitative approach has been adopted in accordance with IEMA guidelines. This includes a high-level qualitative GHG assessment and a Climate Change Risk Assessment (CCRA).

Life Cycle GHG Assessment

10.4.2 The Study Area for the life cycle GHG assessment includes:

- Direct GHG emissions arising from site clearance, construction, maintenance, and operational activities within the boundary of the Proposed Development; and
- Indirect GHG emissions occurring off-site include embodied carbon in materials, transportation, upstream processes (such as well-to-tank and transmission and distribution losses), as well as emissions from waste processing and disposal.

10.4.3 Due to the early design stage of the Proposed Development, granular activity data was not available to inform a quantitative GHG assessment. Therefore, a qualitative approach was used as an alternative for identifying GHG emission sources.

10.4.4 **Table 10-6** summarises the key anticipated GHG emission sources associated with the Proposed Development by life cycle stage, in accordance with PAS 2080:2023

[27] Institute of Environmental Management and Assessment (IEMA), 2022. *Climate Change Adaption Practitioner Guidance* [Online]. Available from: https://s3.eu-west-2.amazonaws.com/iema.net/documents/IEMA-Climate-Change-Adaptation-Practitioner-Guidance-November-2022-1.pdf [Accessed 18 April 2024].
[28] WSP (2024)
[29] European Commission, 2021. *Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027* [online]. [Accessed 7 August 2024]. Available at: https://ec.europa.eu/clima/sites/default/files/adaptation/what/docs/climate_proofing_infrastructure_en.pdf.
[30] Think Hazard, 2023. *Think Hazard – Scotland* [online]. [Accessed 7 August 2024]. Available at: https://thinkhazard.org/en/report/40172-united-kingdom-scotland-highland

Guidance[20]. Additionally, the RICS Guidance for whole life GHG assessments[21] has been incorporated to inform the scope and reporting framework of the GHG assessment.

Table 10-6 Potential GHG emissions arising from the Proposed Development.

Life cycle stage	PAS2080:2023 Module	Activity	Primary emission sources
Product stage	A1-A3	Raw material extraction and manufacturing of products required to build the Proposed Development.	Embodied GHG emissions of the building of new towers and conductors associated with the Proposed Development.
Construction process stage	A4-A5	On-site construction activity: Establishment of construction compound. Transport of construction materials (where these are not included in embodied GHG emissions). Transport of construction workers. Disposal of any waste generated during the construction processes. Enabling works. Land Clearance. Disposal of any waste generated during the enabling works.	GHG emissions from energy (electricity, fuel, etc.) consumption for plant and vehicles, and generators on site. Fuel consumption from transport of materials to site (where these are not included in embodied GHG emissions). GHG emissions from fuel use for worker commuting. GHG emissions from disposal of waste. GHG emissions from fuel consumption for transportation of waste. Peat excavation during construction.
Operation stage	B1-B8	Peat restoration. Electricity Losses (Transmission Losses). Maintenance.	Carbon sequestration associated with the restored peat. GHG emissions from transmission losses. GHG emissions from fuel use for worker commuting. Fuel use for maintenance activities. General maintenance activities including replacement and repair.

10.4.5 The qualitative GHG assessment has been undertaken by estimating a percentage breakdown of GHG emissions associated with each of the life cycle stages outlined in **Table 10-6.** A semi-quantitative approach based on data from similar projects undertaken by AECOM was used to assess the likely impact of GHG emissions from the Proposed

Development. This approach determined the likely percentage contribution of GHG emissions for each lifecycle stage and identified emission hotspots.

10.4.6 For the purposes of this GHG assessment the global climate is the receptor. The sensitivity of the climate to GHG emissions is 'high'. The rationale is as follows:

- The extreme importance of limiting global warming to below 2 °C above industrial levels, while pursuing efforts to limit such warming to 1.5 °C as set out in the Paris Agreement and a recent report by the IPCC highlighted the importance of limiting global warming below 1.5 °C; and
- Global climate disruption already has diverse and wide-ranging impacts on the environment, society, economy, and natural resources. Known effects of climate change include increased frequency and duration of extreme weather events, temperature changes, rainfall and flooding, and sea level rise and ocean acidification. These effects are largely accepted to be negative, profound, global, likely, long-term to permanent, and are transboundary and cumulative from many global actions.

Determining magnitude of change

10.4.7 As set out in the Methodology (**Section 10.4**) a proportionate and qualitative approach has been adopted in accordance with IEMA guidelines. The UK and Scottish Carbon Budgets were used to provide context on whether the Proposed Development aligns with the UK and Scottish net-zero targets. The budgets are presented **Table 10-7** and **Table 10-8** for contextualisation.

10.4.8 The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a five-year period. The UK is currently in the 4th Carbon Budget period, from 2023 to 2027, as detailed in **Table 10-7**. The 3rd, 4th and 5th Carbon Budgets reflect the previous 80% reduction target by 2050. The 6th Carbon Budget is the first to align with the legislated UK Government 2050 net-zero commitment. The CCC released their 7th Carbon Budget in February 2025 and advised the UK Carbon Budget to be set at 535 $MtCO_2e$, which will later be agreed in Parliament and set into law.

10.4.9 This GHG assessment, therefore, uses the IEMA GHG guidance[31] to assess the significance of effects, with the UK Carbon Budgets and Scottish GHG reduction targets providing context to the GHG emissions as detailed in **Table 10-7** and **Table 10-8**.

[31] Institute of Environmental Management and Assessment (IEMA), 2022. *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance*.

Table 10-7 UK Carbon Budgets and indicative carbon budgets based upon the Climate Change Committee balanced Net-Zero Pathway.

Carbon budget	Electricity Generation Carbon Budget based upon the Carbon Budget Delivery Plan ($MtCO_2e$)	UK Carbon Budget ($MtCO_2e$)	Indicative Carbon Budgets based upon the CCC's balanced Net-Zero Pathway ($MtCO_2e$)
3rd (2018-2022)	-	2,544	-
4th (2023-2027)	143	1,950	-
5th (2028-2032)	63	1,752	-
6th (2033-2037)	42	965	-
7th (2038-2042)	23	-	535
8th (2043-2047)	12.4	-	220
9th (2048-2050)	4	-	19

10.4.10 To illustrate the potential impact of the Proposed Development trajectory towards net-zero by 2050, it is recommended that the CCC's[32] Balanced Net-Zero Pathway is utilised post-2037, in the absence of any nationally legally binding carbon budgets after the 6th carbon budget. Beyond 2050, the UK is expected to remain at net-zero.

10.4.11 The CCC Balanced Net-Zero Pathway is recommended to be divided into 5-year periods post-2037 to align with the existing UK national carbon budgets time periods. The proposed carbon budget periods derived from the Net-Zero pathway encompass the 7th, 8th, and 9th indicative budget periods up to 2050 in line with the UK's 1.5-degree trajectory as detailed in **Table 10-7**.

10.4.12 However, it should be noted that the supplementary carbon budgets beyond 2037 have not been formally adopted by the UK government or ratified by Parliament and can only be used as an indicative measure to contextualise the Proposed Development's progress towards the national net-zero trajectory.

10.4.13 Besides the UK Government's carbon budgets, the Scottish Government previously published annual GHG emission reduction targets that align with Scotland's legislated 2045 net-zero target[9], as detailed in **Table 10-8**. These (now repealed) targets were derived from annual percentage reductions relative to Scotland's 1990 GHG emissions baseline.

[32] CCC (2020); The Sixth Carbon Budget Dataset. Available at: https://www.theccc.org.uk/2021/02/01/the-numbers-behind-the-budget-six-ways-to-explore-the-sixth-carbon-budget-dataset/ [Accessed 18/10/2024]

Table 10-8 Scottish Government Annual Targets

Year	Scotland Annual Target ($MtCO_2e$)	Year	Scotland Annual Target ($MtCO_2e$)
2024	31	2035	14.9
2025	29.4	2036	13.6
2026	27.8	2037	12.3
2027	26.1	2038	11.1
2028	24.5	2039	9.8
2029	22.9	2040	8.5
2030	21.3	2041	6.8
2031	20	2042	5.1
2032	18.7	2043	3.4
2033	17.4	2044	1.7
2034	16.2	2045	0

10.4.14 As outlined in **Section 10.3**, the Scottish Government recently passed legislation abandoning the statutory 2030 GHG emissions reduction target and established a framework for developing specific carbon budgets for Scotland, similar to the approach used by the UK Government. However, at the time the climate assessment was conducted, the Scotland-specific carbon budgets had not yet been published by the CCC for adoption by the Scottish Government. As a result, the previous 2030 GHG emissions target was used to quantitatively assess the magnitude of GHG emissions associated with the Proposed Development.

Significance of Effects

10.4.15 The IEMA GHG guidance[33] states that there are currently no agreed methods to evaluate quantified levels of GHG significance. Instead, professional judgement is required to contextualise the Proposed Development's GHG emission impacts, as the use of standard methods for assessing significance is not deemed appropriate for climate change mitigation assessments.

10.4.16 In addition, the IEMA GHG guidance[1] states that mitigation should be considered from the outset and throughout the project's lifetime whilst also helping to deliver proportionate environmental assessments. Once the magnitude of emissions is determined, mitigation measures should be identified. Any mitigation measures that are committed to within a Proposed Development are included within the assessment.

10.4.17 A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net-zero.

10.4.18 The Proposed Development has been qualitatively assessed against the significance levels described in **Table 10-9**.

[33] Institute of Environmental Management and Assessment (IEMA), 2022. *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance*.

Table 10-9 Definition of Levels of Significance

Significance Level	Effects	Description	Example in the guidance
Significant	Major adverse	A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the UK and Scotland's net-zero trajectory or accepted aligned practice or area-based transition targets. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects.	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net-zero.
	Moderate adverse		The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK and Scotland's trajectory towards net-zero.
Not significant	Minor adverse	A project that is compatible with the budgeted, science based 1.5 °C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net-zero by 2050 with at least a 78% reduction by 2035 and thereby potentially avoiding significant adverse effects.	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK and Scotland's trajectory towards net-zero.
	Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions. This project is playing a part in	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net-zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of

Significance Level	Effects	Description	Example in the guidance
		achieving the rate of transition required by nationally set policy commitments.	the curve' for the trajectory towards net-zero and has minimal residual emissions.
Significant	Beneficial	A project that causes GHG emissions to be avoided or removed from the atmosphere. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net-zero requirements with a positive climate impact.

Climate Change Risk Assessment

10.4.19 The study area for the CCRA includes is the land within the red line boundary, i.e. it covers the construction, operation, and decommissioning of all assets (e.g. employees, contractors, and visitors) and infrastructure which constitutes the Proposed Development.

10.4.20 The methodology for the CCRA has been developed in line with IEMA CCRA Guidance[34] and in accordance with the EU Technical Guidance on Climate Proofing Infrastructure[35].

10.4.21 The CCRA considered the impact of future climate change on the Proposed Development. The assessment uses UKCP18 projections[36] and the Think Hazard tool[23] to identify potential climate hazards impacting the construction and operation of the Proposed Development over an 80-year period from 2020 to 2099.

10.4.22 Climate parameters considered in the CCRA include the following:

- Extreme weather events;
- Temperature change; and
- Precipitation change.

10.4.23 The following key terms and definitions relating to the CCRA were used:

- Climate hazard – a weather or climate-related event which has the potential to do harm to environmental or community receptors or assets, for example, increased winter precipitation;
- Climate change impact – an impact from a climate hazard which affects the ability of the receptor or asset to maintain its function or purpose; and
- Consequence – any effect on the receptor or asset resulting from the climate hazard having an impact.

10.4.24 The CCRA is semi-qualitative and provides commentary on how the Proposed Development would be resilient to climate change within the context of current and predicted future climate conditions.

[34] Institute of Environmental Management and Assessment (IEMA), 2022. *Climate Change Adaption Practitioner Guidance* [Online]. Available from: https://s3.eu-west-2.amazonaws.com/iema.net/documents/IEMA-Climate-Change-Adaptation-Practitioner-Guidance-November-2022-1.pdf [Accessed 18 April 2024].

[35] European Commission, 2021. *Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027* [online]. [Accessed 7 August 2024]. Available at: https://ec.europa.eu/clima/sites/default/files/adaptation/what/docs/climate_proofing_infrastructure_en.pdf.

10.4.25 The CCRA identified potential climate change impacts and considered the likelihood of their occurrence and the potential consequence of their impact, taking account of the measures incorporated into the design of the Proposed Development.

10.4.26 UKCP18 projections[36], historical climate data[26] and other climate data such as the Think Hazard Tool[23] were assessed to understand the likelihood of the climate hazard occurring.

10.4.27 The likelihood of a climate impact occurring is then identified based on the likelihood of the hazard occurring combined with the vulnerability of the Proposed Development, using professional judgment and in discussion with the design team. The criteria in **Table 10-10** are applied to understand the likelihood of a climate impact occurring.

Table 10-10 Likelihood of a Climate Change Impact Occurring

Likelihood category	Qualitative description (frequency of occurrence)	Quantitative description (probability of occurrence)
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

10.4.28 The consequences were assessed according to **Table 10-11** respectively. The categories and descriptions provided are based on the IEMA CCRA guidance[2] and EU Technical Guidance on Climate Proofing Infrastructure[29].

Table 10-11 Level of Consequence of a Climate Change Impact Occurring

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage / Engineering / Operational	Impact can be absorbed through normal activity	An adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity actions	Disaster with the potential to lead to shut down or collapse or loss of the asset / network
Safety and Health	First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury, or disability	Single or multiple fatalities
Environment	No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect. Recovery in one year	Significant harm with local effect. Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Social	No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups (1). National, long-term social impacts	Loss of social licence to operate. Community protests
Financial (for single extreme event or annual average impact) (**)	x % IRR (***) < 2 % of turnover	x % IRR 2 – 10% of turnover	x % IRR 10 – 25% of turnover	X % IRR 25 – 50% of turnover	x % IRR >50% of turnover
Reputation	Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short- term impact on public opinion; negative national media coverage	National, long-term impact with potential to affect the stability of the Government
Cultural heritage and cultural premises	Insignificant impact	Short term impact. Recovery or repair	Serious damage with wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

(1) Including groups that depend on natural resources for their income / livelihoods and cultural heritage (even if not considered poor) and groups considered poor and vulnerable (and often that have less capacity to adapt) as well as persons with disabilities and older persons.

(*) The ratings and values suggested here are illustrative. The project promoter and climate-proofing manager may choose to modify them.

(**) Example indicators – other indicators that may be used including costs of immediate / long-term emergency measures; restoration of assets; environmental restoration; indirect costs on the economy, indirect social costs.

(***) Internal Rate of Return (IRR).

Significance of Effects

10.4.29 The likelihood and consequence of climate change impacts, as determined above, is combined to determine a risk rating. The significance of climate change impacts is determined by this risk rating. **Table 10-12** sets out how the significance was assessed. The assessment has considered confirmed design and adaptation measures.

Table 10-12 Significance of Effect Matrix for CCRA

		Likelihood of climate-related impact occurring				
		Insignificant	Minor	Moderate	Major	Catastrophic
Level of consequence	**Rare**	Low (Not Significant)	Low (Not Significant)	Medium (Not Significant)	Medium (Not Significant)	Medium (Not Significant)

		Likelihood of climate-related impact occurring				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
of a climate risk occurring	**Unlikely**	Low (Not Significant)	Low (Not Significant)	Medium (Not Significant)	High (Significant)	High (Significant)
	Moderate	Low (Not Significant)	Medium (Not Significant)	High (Significant)	High (Significant)	Extreme (Significant)
	Likely	Medium (Not Significant)	High (Significant)	High (Significant)	Extreme (Significant)	Extreme (Significant)
	Almost certain	Medium (Not Significant)	High (Significant)	Extreme (Significant)	Extreme (Significant)	Extreme (Significant)

10.5 Baseline Environment

Life Cycle GHG Assessment

10.5.1 The baseline for the assessment of the impact of the Proposed Development on climate is a projected 'business as usual' scenario where the Proposed Development is not developed. The future baseline provides an estimate of the GHG emissions that would occur at the Site in the future if the Proposed Development does not proceed.

CCRA

10.5.2 The current baseline for the assessment of climate change risks to the Proposed Development are based on historical climate data obtained from the Met Office[36] recorded by the closest meteorological station to the Proposed Development (Fort Augustus, located approximately 20 km southeast of the Site), as summarised in **Table 10-13**.

Table 10-13 Historical Climate Data (Fort Augustus)

Climatic Variable	Baseline data 1981-2010
Mean Annual Max Temp (°C)	11.9
Mean Annual Min Temp (°C)	5.0
Mean summer maximum daily temp (°C)	17.9
Mean winter minimum daily temp (°C)	0.6
Warmest Month on Average (°C)	18.7
Warmest Month on Average (Month)	July
Coldest Month on Average (°C)	0.4
Coldest Month on Average (Month)	December
Frost days per annum	65
Mean Average Rainfall levels (mm)	1336.4
Mean summer rainfall (mm)	70.7
Mean winter rainfall (mm)	158.0

[36] Met Office (2020) UK Climate Averages – Fort Augustus Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfhtjdb28 [Accessed 18/10/2024]

Climatic Variable	Baseline data 1981-2010
Wettest Month on Average (Month)	January
Driest Month on Average (mm)	62.6
Driest Month on Average (Month)	June

10.5.3 The future baseline for the CCRA baseline is based on UKCP18[37] data from the Met Office for the 25 km grid square in which the Proposed Development is located. The future baseline for the Proposed Development and surrounding environment is shown in **Table 10-14**.

[37] Met Office. (2019). UK Climate Projections 2018. Available from https://www.metoffice.gov.uk/research/approach/collaboration/ukcp [Accessed 18/10/2024]

Table 10-14 Climate Change Baseline and Projection Data

Climatic Variable	Baseline data	Projection (change)				Projected Trend	Source
	1981-2010	2020-2049	2040-2069	2070-2099	Beyond 2100		
Mean annual maximum daily temperature (°C)	11.9	+0.8°C (+0.2°C to +1.4°C)	+1.4°C (+0.5°C to +2.3°C)	+2.8°C (+1.3°C to +4.3°C)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Mean summer maximum daily temperature (°C)	17.9	+0.8°C (+0.1°C to +1.6°C)	+1.3°C (+0.4°C to +2.5°C)	+3.5°C (+1.4°C to +5.7°C)		↑	UKCP18
Mean winter minimum daily temperature (°C)	0.6	+0.8°C (-0.1°C to +1.6°C)	+1.3°C (+0.1°C to +2.6°C)	+2.3°C (+0.4°C to +4.4°C)		↑	UKCP18
Number of days of air frost per annum	65	Reports have shown that the number of air frost and ground frost days have decreased since the 1960s. These long-term trends, combined with detailed studies, point to a long-term warming trend of the UK's climate and a reduction in cold events.				↓	Met Office
Highest average monthly temperature for baseline period (°C)	18.7 (July)	+0.8°C (-0.1°C to +1.7°C	+1.8°C (+0.5°C to +3.1°C)	+3.7°C (+1.1°C to +6.3°C)	No projection data is available beyond 2100, trend towards increasing temperatures is expected to continue.	↑	UKCP18
Lowest average monthly temperature for baseline period (°C)	0.4 (December)	+0.8°C (-0.1°C to +1.8°C)	+1.4°C (+0.1°C to +2.8°C)	+2.3°C (+0.4°C to +4.3°C)		↑	UKCP18
Mean annual rainfall (mm)	1336.4	+0.1% (-4.1% to +4.3%)	-0.1% (-4.9% to +4.9%)	-1.4% (-6.7% to +4.1%)	No projection data is available beyond 2100. However, there is potential for a continued slight decrease in rainfall overall.	↓	UKCP18

Climatic Variable	Baseline data	Projection (change)				Projected Trend	Source
	1981-2010	2020-2049	2040-2069	2070-2099	Beyond 2100		
Mean summer rainfall (mm)	62.6	-3.1% (-16.9% to +11.2%)	-10.2% (-29.4% to +11.4%)	-23.7% (-47.1% to +5.3%)	No projection data is available beyond 2100. It is possible for the decrease in summer rainfall trend to continue.	↓	UKCP18
Mean winter rainfall (mm)	158.0	-0.4% (-8.5% to +8.6%)	+2.4% (-6.7% to +13.1%)	+2.8% (-10.6% to +19.6%)	No projection data is available beyond 2100. An increase in winter rainfall is possible.	↑	UKCP18
Wettest month on average (mm)	158.0 (January)	-1.0% (-16.2% to +14.0%)	+4.8% (-13.2% to +23.4%)	+9.9% (-17.3% to +39.4%)	No projection data is available beyond 2100. An increase in winter rainfall is possible.	↑	UKCP18
Driest month on average (mm)	62.8 (June)	+2.6% (-19.8% to +25.3%)	-4.6% (-31.6% to +24.0%)	-15.0% (-45.5% to +23.5%)	No projection data is available beyond 2100. A decrease in summer rainfall is possible.	↓	UKCP18
Droughts	The Met Office has projected a trend towards drier summers on average, with the trend being stronger under a high GHG emission scenario compared to a low one, however, it is the distribution of rainfall throughout the seasons that will determine UK drought risk.					↑	Met Office
Storms	Climate change is expected to lead to more frequent and intense winter storms across the UK. Summer storms are expected to become less frequent due to a northward shift of the jet stream.					↑	Met Office
Wind	The Met Office reports no significant historical trend in maximum wind gusts in the UK, but future projections indicate increasing winter wind speeds in the second half of the 21st century.					↑	Met Office
Wildfires	The wildfire hazard is classified as medium according to the information that is currently available in the Think Hazard tool. This means that there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that may pose some risk of life and property loss in any given year.					↑	Think Hazard

10.6 Embedded Mitigation

10.6.1 Standard mitigation measures would be implemented during construction work, including compliance with both project-wide and site-specific environmental management procedures, including SSEN Transmission's GEMPs and SPPs (see **Appendix M GEMPs and SPPs**).

10.6.2 A CEMP would be developed for the project and adopted by the Principal Contractor during the construction phase. This would provide information on the Proposed Development and aid in avoiding, minimising, and controlling adverse environmental impacts associated with the Proposed Development. The CEMP would be continuously updated throughout the pre-construction phase.

Life Cycle GHG Assessment

10.6.3 Mitigation would focus on measures to reduce GHG emissions from the construction and operation of the Proposed Development, to align with the Scottish Government's target to achieve net-zero emissions by 2045 and remain so thereafter.

10.6.4 SSEN Transmission have committed to meeting a verified Science Based Target (SBT). Mitigation measures to minimise against adverse GHG impacts would therefore be implemented so that the Proposed Development aligns with this target. Through their SBT SSEN Transmission have committed to:

- Reduce its combined Scope 1[38] and 2[39] emissions by 55% from a 2020 baseline; and
- Committing to working closely with its supply chain so that 35% of its suppliers will have a SBT set by 2026.

10.6.5 SSEN Transmission's Sustainable Supplier Code sets out Sustainable Procurement Goals that would also need to be considered during the construction and operational phases of the Proposed Development. The following 2025 targets include (but are not limited to):

- 50% of the supply chain will have a strategy for reducing energy consumption by 2025;
- 56% of the supply chain by spend will have a sustainable sourcing policy;
- 60% of the supply chain by spend will have strategies in place to achieve zero waste to landfill;
- 60% of the supply chain by spend will have strategies in place to reduce water consumption for SSEN Transmission projects;
- 65% of the supply chain by spend must have their own GHG reduction policy and target in place; and
- 50% of the supply chain by spend will have a biodiversity policy.

10.6.6 Regular inspections of equipment would be undertaken to identify deterioration of components and would be replaced where necessary to ensure maximum efficiency.

10.6.7 A CEMP would be used to deliver carbon reduction measures during the construction phase.

Climate Change Risk Assessment

10.6.8 The embedded mitigation measures for the Proposed Development reflects SSEN Transmission's Climate Resilience Strategy[40], which provides a comprehensive overview

[38] Scope 1 emissions are the direct GHG emissions from sources that are owned or controlled by an organisation, such as emissions from fuel combustion in company-owned vehicles or on-site energy generation.
[39] Scope 2 emissions are the indirect GHG emissions from the generation of purchased energy, such as electricity, heat, or steam, consumed by an organisation.
[40] SSEN, 2023. *Resilience Strategy 2023* [online]. [Accessed 19 August 2024]. Available from https://www.ssen.co.uk/resilience-strategy

of actions to ensure future resilience against climate change impacts. This strategy outlines adaptation measures relevant to key infrastructure components, such as OHL conductors, underground cable (UGC) systems, substations, transformers, and switchgear, in response to extreme weather events.

10.6.9 In addition to referencing the SSEN Transmission Climate Resilience Strategy[40], construction and operational phase mitigation measures, as outlined in the risk register and the CEMP, include planned controls to manage and minimise risks. The key construction phase (**Table 10-15**) and operation phase (**Table 10-16**) mitigation measures are detailed below.

Table 10-15 Construction phase mitigation measures

Mitigation measures	Description
Use of Resilient Materials and Equipment	The Principle Contractor should consider the use of construction materials and equipment with enhanced durability and resilience against climate extremes.
Best Practice Guidelines	The CEMP would include best practice guidelines for managing construction activities during adverse weather conditions.
Weather Monitoring and Programme Management	The Principle Contractor would monitor weather forecasts to inform short to medium-term programme management, allowing for the planning of works and timely implementation of mitigation measures to protect workers and resources from extreme weather conditions.
High-Level Risk Assessment	The Principle Contractor would produce a high-level risk assessment of severe weather impacts on the construction process to inform specific mitigations. This assessment will consider any receptors and / or construction-related operations and activities potentially sensitive to severe weather events.
Health and Safety Measures	Health and safety plans would be put in place to include all necessary and appropriate measures to manage severe weather events, ensuring staff safety and minimising risks to construction operations.

Table 10-16 Operation-phase mitigation measures

Mitigation measures	Description
Weather Monitoring and Response	The Operator would monitor weather forecasts and plan operations accordingly to protect workers and resources from any extreme weather conditions.
Asset Inspections	Following hot days or periods of extreme temperature, inspections of vulnerable operational assets should be carried out to assess any impacts and implement necessary maintenance or repairs.
Weather Monitoring and Programme Management	The Operator would monitor weather forecasts to inform short to medium-term programme management, allowing for the planning of works and timely implementation of mitigation measures to protect workers and resources from extreme weather conditions.
Health and Safety Measures	Health and safety plans would be put in place to consider all necessary and appropriate measures to manage severe weather events. These plans would align with the planned controls outlined in the risk register and would include protocols for ensuring the safety of staff and the protection of assets during extreme weather conditions.

10.7 Appraisal

Life Cycle GHG Assessment

10.7.1 **Table 10-17** qualitatively summarises the GHG emissions and estimates the percentage of GHG emissions from each stage of the PAS2080 life cycle stages associated with the Proposed Development.

Table 10-17 Qualitative Life cycle GHG Assessment of the Proposed Development

Life cycle stage	Qualitative Assessment of Significance	Estimated GHG % contribution to the Proposed Development
Product stage (A1 – A3)	The Product Stage considers emissions from raw material extraction, refining, and production phases. Based on previous GHG assessments, embodied GHG emissions from the product stage are predicted to be the largest source of GHG emissions over the life of the proposed works. In line with SSEN Transmission's Net Zero Transition plan[43], NPF4[19], Update to the Climate Change Plan 2018 – 2032[41] and the UK's Net-Zero Strategy[42], GHG emissions associated with this stage are anticipated to reduce over time as lower-carbon materials, energy sources, and transport are utilised. GHG emissions relating to the product stage of the Proposed Development are likely to be controlled and reduced through various control mechanisms through SSEN Transmission's internal climate policies and national policy as discussed below. SSEN Transmission's Net Zero Transition Plan[43] aligns with the UK and Scotland's net-zero targets. It presents targets for reducing emissions in line with the 1.5°C target set out by the Paris Agreement[5]. It also outlines plans to engage with suppliers in setting SBTs by 2026, which will reduce supplier product related emissions in line with a SBT initiative (SBTi) net-zero trajectory. This net-zero trajectory looks at reducing emissions in line with the 1.5 °C target from the Paris Agreement. SSEN are limited to 10% offset emissions as part of the SBTi. Having an SBT demonstrates SSEN Transmission's commitment to achieving net-zero emissions across its supply chain. This will act as one of the main mechanisms to control GHG emissions from the Product Stage, identified as the most carbon-intensive phase. SSEN Transmission has committed	~60%

[41] Scottish Government, 2020. *Update to the Climate Change Plan 2018 – 2032* [Online]. [Accessed 18 August 2024]. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/12/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/documents/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/govscot%3Adocument/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero.pdf

[42] UK Government, 2022. *Net Zero Strategy* [Online]. [Accessed 18 August 2024]. Available at: https://www.gov.uk/government/publications/net-zero-strategy

Life cycle stage	Qualitative Assessment of Significance	Estimated GHG % contribution to the Proposed Development
	to working with its supply chain so that 35% of suppliers have an SBT by 2026 (published in line with the Net Zero Transition Plan[43]). In addition, it's expected that product-stage GHG emissions will be influence by national policy through the broader UK Government and Scotland's legally binding commitment to reduce GHG emissions to net-zero through the Climate Change Act 2008 and Climate Change Act (2050 Target Amendment)[7] and Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[9]. In line with the UK's net-zero target, the UK Government published its Net Zero Strategy[44]. It sets out how it plans to reduce GHG emissions from embodied carbon (including the Product Stage) and drive net-zero across the UK's supply chains. Therefore, the UK Government is managing emissions from this sector at a national level. SSEN Transmission's commitment to the Net Zero Transition Plan, the SBTi, and broader UK and Scotland Government net-zero policies will be crucial in managing and reducing Product Stage GHG emissions.	
Construction process stage (A4 – A5)	For projects of a similar scale, GHG emissions from the construction phase are typically the second-largest contributor to overall emissions. A CEMP would be produced before construction and include mitigation measures to reduce GHG emissions from construction. SSEN Transmission's Net Zero Transition Plan[43] sets targets to replace vehicles up to 3.5 tonnes and where feasible vehicles up to 7.5 tonnes with electric and install charging infrastructure, reducing on site emissions from worker travel. The Transport Decarbonisation Plan (TDP)[45] and the National Transport Strategy 2[46] reflect Scotland's commitment to reducing transport GHG emissions in line with the net-zero emissions goal by 2045. Transport GHG emissions associated with the	~30%

[43] SSE Renewables, 2023. *Net Zero Transition Plan* [Online]. [Accessed 18 August 2024]. Available at: https://www.sse.com/media/32bch32o/net-zero-transition-plan-2023-final.pdf

[44] UK Government, 2022. *Net Zero Strategy* [Online]. [Accessed 18 August 2024]. Available at: https://www.gov.uk/government/publications/net-zero-strategy

[45] Department for Transport, 2021. *Decarbonising Transport: A Better, Greener Britain* [Online]. [Accessed 15 August 2024]. Available at: https://assets.publishing.service.gov.uk/media/610d63ffe90e0706d92fa282/decarbonising-transport-a-better-greener-britain.pdf

[46] Scottish Government, 2020. *National Transport Strategy 2* [Online]. [Accessed 19 August 2024]. Available at: https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf

Life cycle stage	Qualitative Assessment of Significance	Estimated GHG % contribution to the Proposed Development
	construction process stage would likely decrease over time. The in-situ peat at the Site is expected to be adversely affected by the construction of the Proposed Development. A Peat Management Plan (PMP) has been developed, outlining measures to relocate excavated peat to an adjacent restoration site. However, despite the mitigation measures detailed in the PMP, GHG emissions are still expected to be generated from the excavation and relocation of peat. It is anticipated that a small proportion (approximately 5%) of peat would be lost during its transposition to the restoration site, diminishing its carbon sink potential. This estimate reflects a worst-case scenario.	
Operation stage (B1 – B7)	The operation stage of the Proposed Development is likely to be the third largest contributor of GHG emissions. Peat excavation and restoration activities are expected to generate GHG emissions due to a reduction in carbon sequestration potential after restoration. These emissions arise from differences between the peat's pre-restoration and post-restoration conditions. A PMP has been developed to ensure peat excavation and restoration are conducted in accordance with industry best practices. Operational efficiencies would be managed through regular inspections of equipment to identify deterioration of components, which would be replaced where necessary. Energy consumption for the Proposed Development is expected to be minimal, as its primary function is to facilitate electricity distribution rather than consumption. The associated GHG emissions are anticipated to be negligible and are unlikely to have a material impact on the overall emissions of the Proposed Development. Furthermore, these emissions are expected to decrease over time as grid electricity continues to decarbonise in accordance with the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[9]. It is important to note that this Proposed Development plays a crucial role in upgrading the grid infrastructure. It is essential for supporting the UK's transition to net-zero by enabling greater integration of renewable energy sources (The	~10%

Life cycle stage	Qualitative Assessment of Significance	Estimated GHG % contribution to the Proposed Development
	Climate Change Act 2008[47] and Climate Change Act (2050 Target)). GHG emissions associated with transporting maintenance workers to and from the site are expected to progressively decline over the lifespan of the Proposed Development. The TDP[45] and National Transport Strategy 2[46] outline measures to achieve transport sector decarbonisation, aligning with the UK and Scotland's net-zero targets.	

10.7.2 As detailed in **Table 10-17**, it is estimated that the bulk of emissions (estimated around 90%) from the Proposed Development would come from the A0-A5 life cycle stages. Although the Proposed Development would result in increased GHG emissions, it's important to consider the Proposed Development's role in wider UK and Scottish policy to decarbonise the electricity grid. This consideration is crucial when assessing its overall impact on the climate.

10.7.3 The Proposed Development would support the ongoing expansion of renewable energy generation within the UK energy system by providing the necessary infrastructure to support the increased transmission of low-carbon electricity. This would contribute to the decarbonisation of the electricity generation sector as renewables increasingly replace higher-carbon energy sources. This aligns with the UK Government's goal of fully decarbonising the electricity system by 2035, whilst aiming to achieve a clean power system by 2030.

10.7.4 The Proposed Development is in line with the UK and Scotland's policies to decarbonise the electricity grid and transition to net-zero by 2045 and 2050, respectively. In addition, GHG emissions would be managed as a result of commitments made by SSEN Transmission's in their SBTs where they commit the business to achieve net-zero GHG emissions.

10.7.5 Overall, it is anticipated that the impact of the Proposed Development would be **Minor Adverse** and **Not Significant**. The control mechanisms are outlined in **Section 10.6. Section 10.7** highlights the Proposed Development is acting in line with the UK and Scotland's net-zero trajectory and therefore it is deemed not significant.

Climate Change Risk Assessment

10.7.6 This section summarises climate risks identified for the Proposed Development. Further details on each climate risk can be found in **Appendix L Climate Change Risk Assessment.**

10.7.7 It is important to consider extreme weather events which may occur during construction. These include periods of intense rainfall, which may disrupt construction activities, and periods of very hot weather, which could affect worker well-being. The CEMP would incorporate these risks, ensuring appropriate responses and protective measures are in place.

10.7.8 To improve the resilience of the Proposed Development to climate change, the Proposed Development would either be designed for the climatic conditions projected for the end of

[47] HMSO (2019) The Climate Change Act 2008 (2050 Target Amendment) Order 2019: Available at: The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (legislation.gov.uk) [Accessed 18/10/2024]

its design life, using appropriate design guidance where available. Adaptive capacity would be built into the designs in line with the guidance laid out in SSEN Transmission's Climate Resilience Strategy[40].

10.7.9 Project climate change during operation, as indicated by UKCP18 projections in **Table 10-14**, suggest an increased risk of flooding due to increased winter precipitation. This increase in winter rainfall could lead to an increased risk of surface and groundwater flooding, potentially damaging assets and disrupting operations. The Proposed Development's design would account for these potential future conditions, incorporating flood resilience measures as needed.

10.7.10 There is projected to be an increased risk of extreme weather events, such as droughts and storms, which could result in physical and operational damage to OHL structures. The design life of the individual components of the Proposed Development is considered to be approximately 40 years for existing infrastructure and 80 years for new OHL towers. The infrastructure is assessed to function against extreme weather events as expected during this period. Thus, maintaining functionality during adverse weather conditions.

10.7.11 Climate change may lead to higher ambient air temperatures that could cause impacts during operations. This could result in an increase in electricity consumption, raising the energy demand of surrounding transmission and distribution (T&D) infrastructure and leading to higher GHG emissions. Adaptive measures would be considered to mitigate temperature impacts or adjust operational strategies, with the aim of reducing energy consumption where possible.

10.7.12 The site-specific environmental procedures, including the CEMP and the GEMPs (see **Appendix M GEMPs and SPPs**), would provide detailed guidance on avoiding, minimising, and controlling potential adverse environmental impacts associated with the Proposed Development. These procedures would outline best practices and specific actions required to implement effective mitigation measures. They would also integrate adaptation strategies, such as snow clearance and de-icing protocols, flood resilience measures, and design flexibility to address future climate projections. This approach ensures the Proposed Development remains resilient and adaptable throughout its operational lifespan.

10.7.13 In conclusion, the CCRA has identified no significant climate risks. Therefore, it can be concluded that the risk posed by climate change to the Proposed Development is **Not Significant**. The control measures and embedded mitigation outlined in this section are considered sufficient to manage the Proposed Development's exposure to climate risks.

10.8 Recommendations and Additional Mitigation

10.8.1 Overall, the GHG impact of the Proposed Development would be **Minor Adverse** and **Not Significant**. The Proposed Development would bring long-term benefits to the UK by upgrading energy-related infrastructure. This is essential for integrating new sources of renewable power and upgrading the National Grid's capacity to facilitate the electrification of the broader economy. This, in turn, would support the transition away from fossil fuels and help achieve net-zero emissions across Scotland and the UK.

10.8.2 Consequently, no additional mitigation measures are anticipated to be necessary, as no significant impacts have been identified. Therefore, the existing GHG and CCRA mitigation measures incorporated into the design of the Proposed Development are deemed sufficient.