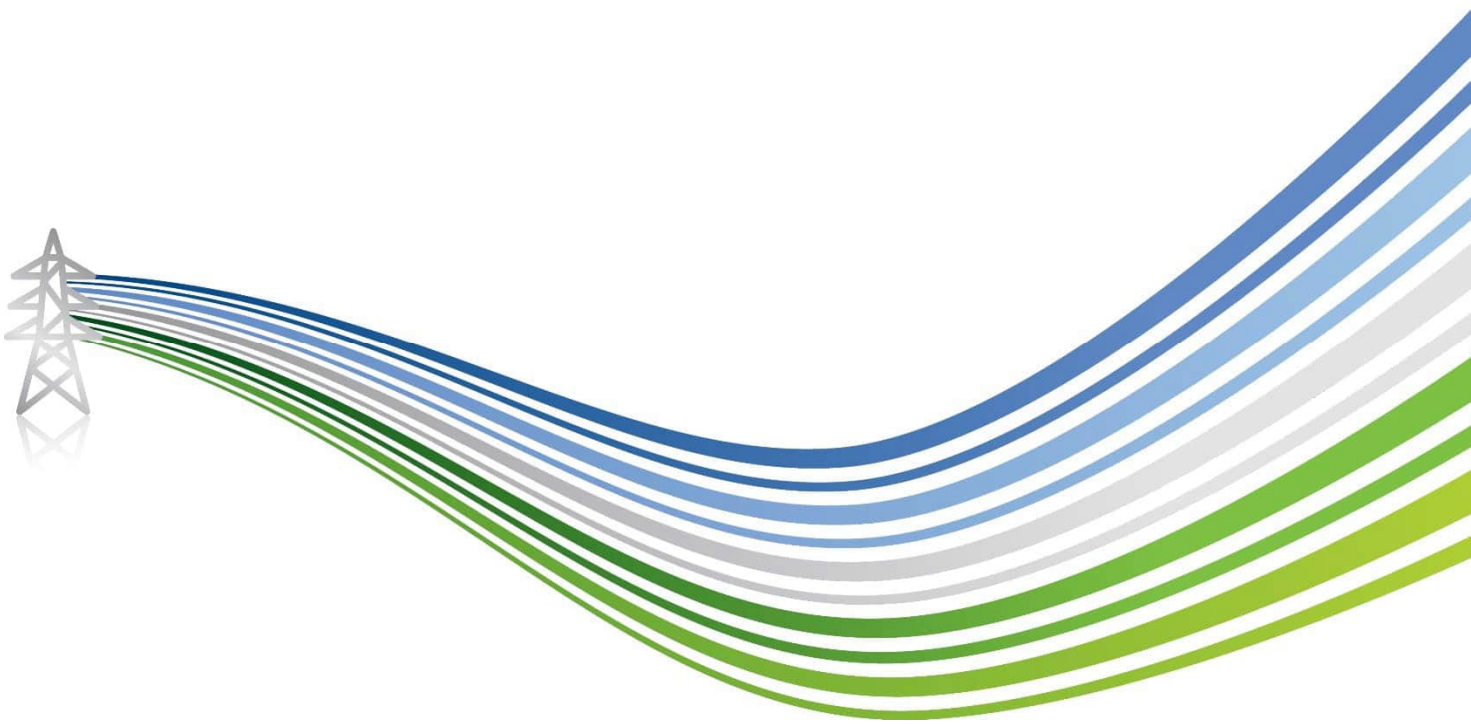
SSEN Transmission

Cambushinnie 400 kV Substation

Haul Track

Environmental Appraisal

June 2025



Scottish & Southern Electricity Networks
TRANSMISSION

CONTENTS

LIST OF ABBREVIATIONS

AAWT	Annual Average Weekday Traffic
ACM	Asbestos Containing Materials
AD	Anno Domini
AIA	Arboricultural Impact Assessment
AIL	Abnormal Indivisible Loads
AIS	Air Insulated Switchgear
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
ASNW	Ancient semi-natural woodland
ASTI	Accelerated Strategic Transmission Investment
ATU	Allyl thiourea
AWI	Ancient Woodland Inventory
BAP	Biodiversity Action Plan
BBPP	Breeding Birds Protection Plan
BCT	Bat Conservation Trust
BESS	Battery Energy Storage System
BGL	Below Ground Level
BGS	British Geological Survey
BMP	Biosecurity Management Plan
BNG	Biodiversity Net Gain
BoCC	Birds of Conservation Concern
BPM	Best Practicable Means
BS	British Standard
BSI	British Standards Institution
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CA	Coal Authority
$CaCO^3$	Calcium Carbonate
CAR	Controlled Activity Regulation
CAT	Carbon Asset Database
CCRA	Climate Change Risk Assessment
CH_4	Methane
CIEEM	Chartered Institute of Ecology and Environmental Management

CIfA	Chartered Institute for Archaeologists
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CoPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
DESNZ	Department for Energy Security and Net Zero Standards
DfT	Department for Transport
DTM	Digital Terrain Model
EA	Environmental Appraisal
EcIA	Ecological Impact Assessment
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EQS	Environmental Quality Standards
ESO	Electricity System Operator
EU	European Union
FRA	Flood Risk Assessment
GBR2	General Binding Rule 2
GCR	Geological Conservation Review
GDL	Gardens and Designed Landscapes
GHG	Greenhouse Gas
GI	Ground Investigation
GIS	Geographic Information System
GLTA	Ground Level Tree Assessment
GPP	Guidance on Pollution Prevention
GT	Grid Transformer
GVLIA	Guidelines for Landscape and Visual Impact Assessment
GWDTE	Groundwater Dependent Terrestrial Ecosystems
H_2S	Hydrogen Sulphide
HEPS	Historic Environment Policy for Scotland
HER	Historic Environment Record
HES	Historic Environment Scotland
HFC	Hydroflurocarbons
HGV	Heavy Goods Vehicle

HMWB	Heavily Modified Water Body
HND	Holistic Network Design
HRA	Habitat Regulations Assessment
HV	High voltage
ICC	In-Combination Climate Change Impact Assessment
ICE	Inventory of Carbon and Energy
IEMA	Institute of Environmental Management and Assessment
INNS	Invasive and Non-Native Species
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
JNCC	Joint Nature Conservation Committee
kV	Kilovolt
LB	Listed Building
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Area
LCRM	Land Contamination Risk Management
LCT	Landscape Character Type
LDP	Local Development Plan
LEP	Long Established Plantation
LGV	Light Goods Vehicle
LHMP	Landscape and Habitat Management Plan
LLA	Local Landscape Area
LNCS	Local Nature Conservation Site
LVA	Landscape and Visual Appraisal
MP	Measurement Position
MIC	Maximum Instantaneous Charge
MTBE	Methyl-tert-butyl-ether
MW	Megawatt
NESO	National Energy System Operator
NGESO	National Grid Energy System Operator
NS	NatureScot
NSR	Noise Sensitive Receptor
NBN	National Biodiversity Network
ND	National Developments

ND3	National Development 3
NF_3	Nitrogen Trifluoride
NFI	National Forest Inventory
NGR	National Grid Reference
NPF4	National Planning Framework 4
NPS	National Policy Statement
NRFA	National River Flow Archive
NVC	National Vegetation Classification
NWSS	Native Woodland Survey of Scotland
O2	Oxygen
OEMP	Operational Environmental Management Plan
OHL	Overhead Line
OS	Ordnance Survey
PAC	Pre-Application Consultation
PAH	Polycyclic Aromatic Hydrocarbons
PAN	Planning Advice Note
PAS	Publicly Available Standard
PDSA	Pre-Desk Study Assessment
PFC	Perfluorocarbon
PKC	Perth and Kinross Council
PLHRA	Peat Landslide Hazard and Risk Assessment
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidelines
PPV	Peak Particle Velocity
PRF	Potential Roost Feature
PWS	Private Water Supply
RBD	River Basin District
RBMP	River Basin Management Plans
RCP	Representative Concentration Pathway
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SBL	Scottish Biodiversity List
SBTi	Science-based Target initiatives
SEPA	Scottish Environment Protection Agency

SF6	Sulphur Hexafluoride
SGT	Super Grid Transformer
SHE	Scottish Hydro Electric
SM	Scheduled Monument
SPA	Special Protection Area
SPP	Species Protection Plan
SSEN	Scottish and Southern Electricity Networks
SSSI	Sites of Special Scientific Interest
STGO	Special Types General Order
SUDS	Sustainable Urban Drainage Systems
SVOC	Semi Volatile Organic Compound
SWMP	Site Waste Management Plan
SWT	Scottish Wildlife Trust
TA	Technical Assessment
TPH	Total Petroleum Hydrocarbons
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
UGC	Underground Cable
UK	United Kingdom
UKCP18	UK Climate Projection 2018
UKHab	UK Habitat Classification
UNDRR	United Nations Office for Disaster Risk Reduction
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
VP	Vantage Point
VPCWG	Volatile Petroleum Criteria Working Group
WAC	Waste Acceptance Criteria
WCA	Wildlife and Country Act
WF	Water Feature
WFD	Water Framework Directive
WHS	World Heritage Site
WPP	Water Protection Plan
WWII	World War II
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1. INTRODUCTION AND PROJECT NEED

1.1 Overview of the Proposed Development

1.1.1 This Environmental Appraisal (EA) has been prepared by AECOM (hereinafter referred to as "the Consultant") on behalf of Scottish Hydro Electric Transmission plc ("the Applicant"). The Applicant, operating and known as Scottish and Southern Electricity Networks Transmission (SSEN Transmission), own, operate and develop the high voltage electricity transmission system in the north of Scotland and remote islands. In this EA, 'the Applicant' and 'SSEN Transmission' are used interchangeably unless the context requires otherwise. This EA has been prepared to accompany an application for planning permission under the Town and Country Planning (Scotland) Act 1997 (as amended) (the "1997 Act")[1].

1.1.2 The Applicant seeks planning permission under the 1997 Act to construct and operate the Cambushinnie haul track. This is hereafter referred to as the 'Proposed Development'.

1.1.3 The purpose of the Proposed Development is primarily for the delivery of two transformers required for the proposed Cambushinnie 400 kV substation site. These transformers would be Abnormal Indivisible Loads (AIL) for which it is currently considered would not be able to pass through Braco village due to their size. In addition, the Proposed Development would enable the construction of the proposed Cambushinnie 400 kV substation and associated development (the proposed Cambushinnie overhead line (OHL) and underground cable (UGC)), avoiding routing construction traffic through Braco village.

1.1.4 SSEN Transmission is voluntarily submitting this EA as a matter of good practice to support its application for planning permission. The EA evaluates whether any specific environmental risks are likely to occur resulting from the Proposed Development and identifies any mitigation recommended to avoid or minimise any associated environmental risks.

1.1.5 The construction of the Proposed Development is expected to commence mid-April 2026, ahead of the construction work period for the proposed Cambushinnie 400 kV substation and associated developments. It is anticipated that the construction of the Proposed Development would take approximately 11 months.

1.1.6 The operational phase of the Proposed Development will facilitate construction of the proposed Cambushinnie 400 kV substation and associated development. Following the construction of the proposed Cambushinnie 400 kV substation and associated development, the haul track would remain in situ (with the exception of the bridge deck) though would not be made available for public or non-SSEN Transmission vehicles, and the entrances to the haul track would be gated.

1.1.7 It is anticipated that the Proposed Development (apart from the bridge deck) would be operational in perpetuity, however the bridge deck would be required to be reinstated if there were a need for the bridge crossing. The design life would require to be the same or greater than the associated Cambushinnie 400 kV substation development. The

[1] Scottish Government, 1997. The Town and County Planning (Scotland) Act 1997, Edinburgh: Scottish Government.

Proposed Development would be maintained as part of a regular maintenance and monitoring regime. Due to the nature of the Proposed Development, it is treated as permanent and as such environmental effects arising from decommissioning are not considered in this EA.

1.2 National Significance

1.2.1 In July 2022, National Grid Energy System Operator, the (NGESO[2]), published the Pathway to 2030 Holistic Network Design (HND), setting out the blueprint for the onshore and offshore electricity transmission network infrastructure required to enable the forecasted growth in renewable electricity across Great Britain, including the UK and Scottish Government's 2030 offshore wind targets of 50GW and 11GW, respectively. This confirms the need for significant and strategic increase in the capacity of the onshore electricity transmission infrastructure to deliver 2030 targets and a pathway to net zero. The need for these reinforcements is underlined within the British Energy Security Strategy (April 2022), which recognised the significant impact on the cost of living from rising gas prices and sets out a plan to increase the supply of electricity from zero-carbon British sources to deliver affordable, clean and secure power in the long term.

1.2.2 The need for the Proposed Development is driven by the need for the wider electricity transmission upgrade and development of the proposed Cambushinnie 400 kV substation and associated development.

1.2.3 SSEN Transmission holds a licence under the Electricity Act 1989 (the "1989 Act") for the transmission of electricity in the north of Scotland and has a statutory duty under section 9 of the 1989 Act to develop and maintain an efficient, co-ordinated, and economical electrical transmission system in its licence area. Where there is a requirement to extend, upgrade or reinforce its transmission network, SSEN Transmission's aim is to provide an environmentally aware, technically feasible and economically viable solution which would cause the least disturbance to the environment and to people who use it.

1.3 National Developments

1.3.1 The Proposed Development is considered as a 'major' development under the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009. The Proposed Development is required for the development of the proposed Cambushinnie 400 kV substation which will be a 'National Development' in accordance with the terms of National Planning Framework 4 (NPF4).

1.4 Designation and Classification

1.4.1 The location for ND3 is set out as being "All of Scotland" and the description of need is that *"[a]dditional electricity generation from renewables and electricity transmission capacity of scale is fundamental to achieving a net zero economy and supports improved network resilience in rural and island areas*."

1.4.2 The designation and classes of development which would qualify as ND3, are *"(a) on and off shore electricity generation, including electricity storage, from renewables exceeding*

[2] The National Grid Energy System Operator (NGESO) roles and responsibilities for system planning were transferred to National Energy System Operator (NESO) in October 2024 following acquisition by the UK Government, and hereafter, will be referred to as NESO.

50 megawatts capacity; (b) new and/or replacement upgraded on and offshore high voltage electricity transmission lines, cables and interconnectors of 132kV or more; and (c) new and/or upgraded Infrastructure directly supporting on and offshore high voltage electricity lines, cables and interconnectors including converter stations, switching stations and substations."

1.5 Statement of Need

1.5.1 The Proposed Development is considered as a 'major' development under the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009 and would facilitate the development of the proposed Cambushinnie 400 kV substation.

1.5.2 The NESO's Pathway to 2030 HND identified the requirement to reinforce the onshore corridors between Beauly and Peterhead, Beauly and Spittal in Caithness, and an offshore subsea cable between Spittal and Peterhead as well as the need to upgrade the 275kV Beauly-Denny circuit. It outlined that these reinforcements would provide the capacity required to take power from large-scale onshore and offshore renewable generation (mainly wind farms) to the northeast mainland of Scotland. From there, it could be transported to demand centres in England via a subsea cable

1.5.3 In December 2022, the independent energy regulator for Great Britain, the Office of Gas and Electricity Markets (Ofgem), approved the need for the upgrade of the existing Beauly-Denny 275 kV circuit as part of the ASTI framework as a Great Britain wide programme of investments. Ofgem's decision approved all of SSEN Transmission's Pathway to 2030 projects, which included the proposed Cambushinnie 400 kV substation. It also set out the regulatory framework under which these projects will be taken forward.

1.5.4 The proposed Cambushinnie 400 kV substation alongside several other major network upgrades planned in the north of Scotland, is therefore part of a Great Britain wide programme of works that are required to meet UK and Scottish Government energy targets. There is a clear expectation from Government and the energy regulator, Ofgem, that these projects will be delivered by 2030. More specifically, these projects are needed to deliver Government 2030 renewable energy targets set out in the British Energy Security Strategy.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

2.1.1 This chapter provides a description of the Proposed Development, including details of the key components and information regarding the construction, operation and maintenance of the Proposed Development. This description is also used as the basis for the technical assessments as reported in **Chapters 4 – 12.**

2.2 The Proposed Development Site

2.2.1 As illustrated in the Site Location Plan (**Figure 2-1, Appendix A Figures**), the Proposed Development site (hereafter referred to as 'the Site') is located approximately 3 km east of the existing Braco West Substation and approximately 50 m south of Braco village.

2.2.2 The Proposed Development would route between the A822 (approximately NN 83661 09053) and the existing access track to Braco West Substation (approximately NN 82451 09246), to the south of Braco. From the A822, the Proposed Development crosses agricultural fields, and Keir Burn before crossing the B8033 adjacent to where the road routes west (approximately NN 83260 09138). Thereafter the Proposed Development would route from the B8033 across agricultural fields and a coniferous tree plantation, where it would adjoin the existing access track to the existing Braco West Substation approximately 60 m north of Gamekeepers Cottage.

2.3 Proposed Development Components

2.3.1 The Proposed Development is required to facilitate the construction of the proposed Cambushinnie 400 kV substation and associated development, which would form part of the wider UK transmission network reinforcement project to upgrade the existing Beauly-Denny 275 kV circuit to a 400 kV circuit. The Proposed Development would be largely permanent in nature and would remain in situ for future maintenance requirements.

Temporary Works

2.3.2 The temporary Proposed Development components are illustrated in **Figure 2-2, Appendix A Figures**.

Bridge Deck

2.3.3 The bridge over Keir Burn would be temporary and at the end of the construction of the proposed Cambushinnie 400 kV substation and associated developments, the bridge deck would be removed and likely placed in storage. This would enable SSEN Transmission to reinstate the bridge at a later date, should this be required for emergency maintenance of the proposed Cambushinnie 400 kV substation. As stated above, the abutments supporting the bridge deck would remain in place; these would be regularly maintained by SSEN Transmission gating would be installed on both sides of the crossing, preventing any access from the haul track into the watercourse.

2.3.4 The bridge would be approximately 48 metres (m) in length and 4.1 m in height from the existing ground level to the parapet.

Areas for Bridge Fabrication

2.3.5 Three potential areas have been identified for bridge fabrication, should it be required that the bridge be fabricated on site. Two areas to the south of the haul track, east and west of Keir Burn, and one to the north of the haul track, east of Keir Burn have been identified.

Crane Pad Areas

2.3.6 Crane pad areas would be required for the installation of the bridge over Keir Burn and would be located within the identified areas for potential bridge fabrication. These would be formed from type 1 stone and geogrid construction material which would be brought to the Site. The crane pad areas would be removed following the construction of the proposed Cambushinnie 400 kV substation and associated development.

Temporary Compounds

2.3.7 Two temporary compounds would be required during the construction phase of the Proposed Development. One would be located adjacent to the A822 directly to the south of the haul track and would be required to enable haul track construction works. This would be decommissioned at the end of the construction phase.

2.3.8 The other would be located west of the B8033 directly to the south of the haul track and would be an access control compound. The access control compound would include car / van parking spaces, a welfare unit for security, heavy goods vehicle (HGV) holding area and room for transport turning. The temporary compounds may be lit during construction working hours during winter periods. This would be decommissioned at the end of the construction and operation phase of the Proposed Development.

Topsoil Storage Areas

2.3.9 Temporary topsoil storage areas would be located adjacent to the two southern areas identified for bridge fabrication, and a third area for topsoil storage would be located to the west of the access control compound.

Vehicle Cleaning Point

2.3.10 A vehicle cleaning point would be located where the surface of the haul track changes from tarmacadam concrete to unbound material. All vehicles traveling down the haul track (towards the B8033 intersection), would be required to use this facility. This would reduce dirt being tracked onto the public road network using facilities for brushing / washing a vehicle. Settled water and silt would be collected and disposed of in line with legislation. The vehicle cleaning point would remain in place during the construction and operation phase of the Proposed Development.

Vehicle Management

2.3.11 Temporary vehicle access control barriers would be in place during the construction and operation phases of the Proposed Development. One would be located where the haul track meets the A822, and the other directly east of the access to the temporary access control compound. Following the construction of the proposed Cambushinnie 400 kV substation and associated development, access to the haul track would be gated from the A822 and B8033.

2.3.12 Temporary traffic management measures where the haul track meets the A822 and where it crosses the B8033 would also be in place during the construction and operation of the Proposed Development. Further temporary traffic management on the Bridge of Keir would be installed. The Bridge of Keir is a narrow bridge on the west side of Braco which is on the route for construction traffic. Two vehicles are unable to safely pass one another on the bridge and therefore it is proposed to introduce temporary traffic management to control traffic flows on it. This would ensure two vehicles do not meet on the narrow bridge.

Acoustic Barriers

2.3.13 Locations for temporary acoustic barriers have been identified to mitigate noise impacts to the properties at Loaning View (approximately NN 83246 09080) and Gamekeepers Cottage (approximately NN 82488 09163). These are proposed to be of wood construction and would remain in place for the construction of the Proposed Development and operational phase (construction of the proposed Cambushinnie 400 kV substation and associated development).

Temporary Culverts

2.3.14 Temporary culverts would be in place during construction, and these would be located adjacent to the eastern temporary construction compound, to the north and south of the haul track, and adjacent to the access control compound where it runs alongside the haul track.

Fencing

2.3.15 Temporary fencing would surround the works area (offset by 5 m) during the construction phase of the Proposed Development, with additional temporary heras fencing around the two temporary compound areas.

2.3.16 Following the construction of the Proposed Development, it is anticipated a combination of post and wire fencing, deer fencing and heras fencing would be in place during the construction of the proposed Cambushinnie 400 kV substation and associated development, subject to landowner agreement. Following the construction of the proposed Cambushinnie 400 kV substation and associated development, the heras fencing would be removed along with some of the post and wire fencing to suit landowner requirements.

Post Construction

2.3.17 Following commissioning of the Proposed Development, all temporary construction areas would be reinstated. Reinstatement would form part of the contract obligations for the Principal Contractor and would include the removal of all temporary site works.

Permanent Works

2.3.18 The permanent Proposed Development components are illustrated in **Figure 2-3, Appendix A Figures**.

Haul Track

2.3.19 The haul track would be approximately 1.2 km in length and 6.5 m wide between the A822 and the existing access track to the Braco West Substation and would cross the B8033 south of Braco. It would include a bell mouth junction at the A822, and for approximately 521 m (to approximately NN 83111 09166), it would comprise of tarmacadam surfacing (see **Figure 2-3, Appendix A Figures**). From approximately NN 83252 09130 to approximately NN 83111 09166 (the wheel wash) there will be approximately 155 m of tarmacadam, which, at the end of the construction phase of the proposed Cambushinnie 400 kV substation and associated development, would be stripped back and returned to unbound type 1 material for the landowner. The remaining area of the haul track, west of this wheel wash, to the point where the haul track meets the existing access track, would comprise of approximately 684 m of unbound type 1 material. Type 1 material would be brought to site.

2.3.20 Between the A822 and the B8033, the haul track would be on an embankment above the existing ground level, increasing in height in proximity to the bridge over Keir Burn. Where the haul track route passes through the coniferous tree plantation in the west of the Site, a section of the haul track would be in a cutting, which would require excavation.

Bridge Abutments

2.3.21 A bridge would span Keir Burn (approximately NN 83401 09083). The bridge deck would be temporary, though the abutments to support the bridge at either side of the burn would be permanent. The abutments would be concrete. There would be no in-channel works or piling associated with installation of the bridge abutments.

Flood Relief Culverts

2.3.22 Flood relief culverts along the haul track would be implemented to provide conveyance of flood waters through the haul track embankment to replicate existing flooding mechanisms. The current design anticipates the need for 56 flood relief culverts in eight clusters positioned along the haul track. These comprise two circular 0.5 m diameter culverts, 12 square 1 x 1 m box culverts and 42 square 0.5 x 0.5 m box culverts.

Riverbank Reinforcements

2.3.23 To mitigate flood risk, riverbank reinforcements in the form of raising an existing flood embankment downstream of the haul track would be implemented. There would be no in-channel works, or piling associated with the installation of riverbank reinforcements. Further details discussing flood risk and the associated mitigation measures are presented in the Flood Risk Assessment (FRA), which accompanies the planning application alongside this EA Report.

2.4 Construction

2.4.1 Once the construction of the proposed Cambushinnie 400kV substation and associated developments has been completed the Proposed Development would not be used for regular ongoing access arrangements. The haul track would remain in-situ with staff attendance on an ad hoc basis for inspection, maintenance and repairs.

Construction Methodology Overview

2.4.2 Prior to construction of the haul track, initial mobilisation works will be required to gain access to the Site from the A822, and to establish a temporary site welfare area.

2.4.3 The construction of the haul track will commence from the A822 west towards Keir Burn and from the B8033 east towards Keir Burn. Construction of the haul track will also commence from Gamekeepers Cottage east towards the B8033 as shown on **Figure 2-2, Appendix A Figures.**

2.4.4 As a result of constraints identified from the noise assessment (**Chapter 11 Noise and Vibration**), significant construction works cannot be ongoing in the proximity of Loaning View (east towards Keir Burn and west towards Gamekeepers Cottage). Therefore on completion of the haul track between the A822 and B8033 roads construction will commence from the B8033 towards Gamekeepers Cottage and the proposed access control compound.

Delivery of Structures and Materials

2.4.5 The Proposed Development would require the import of material for construction including tarmacadam, unbound type 1 material, concrete and wood.

Construction Programme

2.4.6 It is anticipated that construction of the Proposed Development would take approximately 48 weeks (11 months), although detailed programming of the works would be the responsibility of the Principal Contractor in agreement with SSEN Transmission.

Construction Hours of Work

2.4.7 Construction activities would generally be undertaken during daytime periods. Working hours are anticipated between approximately 07:00 – 19:00 Monday to Friday, 08:00 – 13:00 on Saturdays year-round. Working hour assumptions would be agreed with Perth and Kinross Council (PKC).

2.4.8 During the commissioning phase of the associated Cambushinnie 400kV substation, there may be a requirement for 24 hours a day, seven days a week working and potential for out of hours working. In terms of the Proposed Development this would potentially result in the need for a low number of vehicles to use the haul track to gain access to the substation. These working hours are subject to approval from PKC.

Construction Traffic

2.4.9 The A822 would be the route used by construction traffic between the A9 trunk road and the rural roads in the vicinity of the Site access during construction of the Proposed Development.

2.4.10 The B8033 would be used for a short term, temporary period to facilitate the construction of the Proposed Development from multiple points simultaneously. It is anticipated thereafter the B8033 would not be used by construction traffic other than to access local amenities.

2.4.11 A Construction Traffic Management Plan (CTMP) would be prepared by the Principal Contractor prior to any works commencing, in consultation with PKC and Transport Scotland, as required. The CTMP would describe all mitigation and signage measures that are proposed on the public road network. A Framework CTMP is provided in **Appendix K Transport Statement**. Further detail on the anticipated traffic movements associated with construction of the Proposed Development, and an assessment of the likely effects and suggested mitigation measures, is provided in **Chapter 10 Traffic and Transport.**

Reinstatement

2.4.12 Following commissioning of the Proposed Development, all temporary construction areas would be reinstated. Reinstatement would form part of the contract obligations for the Principal Contractor and would include the removal of all temporary site works. Discussions are taking place with landowners on reinstatement and any commitments that may be required.

2.4.13 The Proposed Development would be permanent, except for the proposed bridge over Keir Burn, which would be removed at the end of the associated proposed Cambushinnie 400 kV substation and associated development construction period, and would be reinstated, for example, in the instance of transformer replacement. Though the deck of the bridge over Keir Burn would be removed, the abutments would remain in place.

Landscape Mitigation Measures and Biodiversity Enhancement

2.4.14 Landscape and visual mitigation measures, including woodland tree planting and native hedgerow planting for the purposes of noise / visual screening have been proposed. Such measures would also seek to provide habitat, biodiversity and opportunities for ecological enhancements. Woodland tree planting in proximity to the bridge over Keir Burn would reduce visual impact of the haul track and bridge to Braco residents and residents at Keirallan. Landscape and visual mitigation measures would be developed in conversation with landowners. A landscape and habitat management plan is presented in **Appendix C Landscape and Habitat Management Plan.**

2.5 Operations and Maintenance

2.5.1 The Proposed Development would be utilised for the construction of the proposed Cambushinnie 400 kV substation and associated developments, which is anticipated to have an approximate 4-year duration.

2.6 Mitigation Measures

2.6.1 Mitigation measures are measures which reduce the potential adverse effects of a proposal. There are two types of mitigation which are considered within this EA:

- Embedded Mitigation: This relates to measures that are adopted as part of the design and are an inherent part of the Proposed Development (i.e. do not require additional action, including assessment to be taken). This also includes mitigation measures that would be implemented as a result of following construction practice.
- Additional Mitigation: This relates to measures which have been identified during the assessment of effects in **Chapters 4 – 12** and would be implemented by SSEN Transmission in order to minimise the likely significant effects.

Embedded Mitigation

2.6.2 The layout and design of the Proposed Development has specifically considered the potential impacts on sensitive receptors and features of the surrounding environment. The iterative design process has sought to minimise the potential permanent effects of the Proposed Development on landscape, visual, protected species, habitats, trees, and noise receptors.

2.6.3 Design environmental embedded mitigation measures for the Proposed Development are listed in **Table 2-1** below.

Table 2-1 Embedded Mitigation

Mitigation Reference	Mitigation Title	Description
EM1	Lighting Requirements	The Proposed Development would not be lit during normal operation. Lighting requirements for the Proposed Development may be required during the construction phase. The temporary construction compounds may be lit during working hours during winter periods. As far as possible, works should be carried out in daylight to minimise the risk of disturbing protected or notable nocturnal species. If any temporary artificial lighting is required for construction works, this should be strongly directional and directed only on to the works area, and be turned off when not required, to minimise light spill and adverse effects on nocturnal wildlife. Working hours are anticipated between approximately 07:00 – 19:00 Monday to Friday, 08:00 – 13:00 on Saturdays year-round. Working hour assumptions would be agreed with PKC. There would be no working on Sunday or bank holidays unless in exceptional circumstances and in agreement with PKC.
EM2	Delivery and sourcing of structures and materials	The A822 would be the route used by construction traffic between the A9 trunk road and the rural roads in the vicinity of the Site access during construction of the Proposed Development. The Proposed Development would require the import of materials for construction, including tarmacadam, unbound type 1 material, concrete and wood. Site won materials would be prioritised over imported materials, should they be required, to reduce the impact on local roads and the environment.
EM3	Screening of Proposed Development	All landscape and visual mitigation measures are embedded and covered in detail in **Chapter 4 Landscape Character and Visual Amenity** and **Appendix C Landscape and Habitat Management Plan**. Woodland planting in proximity to the bridge over Keir Burn would reduce visual impact of the haul track and bridge to Braco residents and residents at Keirallan.
EM4	Construction Environmental Management Plan (CEMP) and General	Mitigation measures would be implemented through the use of a full CEMP which will be produced prior to commencement of

Mitigation Reference	Mitigation Title	Description
	Environmental Management Plans (GEMPs)	works. This would also cover all the receptors associated with the Proposed Development. The adoption of the applicable GEMPs would reduce the probability of a pollution incident occurring and reduce the magnitude of any incident due to a combination of good site environmental management procedures, including minimising storage of soil volumes, soil management, staff training, availability of contingency equipment and emergency plans. The relevant GEMPs can be found in **Appendix O GEMPS and SPPs**.
EM5	Construction Traffic Management Plan (CTMP)	A CTMP would operate throughout the duration of the construction programme. **Appendix K Transport Statement** contains a draft CTMP. A detailed CTMP including the following, is expected to be conditioned as part of a planning permission consent and provided once a Principal Contractor is appointed: • Site entry / exit arrangements from public roads; • Traffic routeing plans – defining the routes to be taken by Heavy Good Vehicles (HGVs) to the Site avoiding sensitive locations; • Construction traffic hours and delivery times; • Strategy for traffic management and measures for informing construction traffic of local access routes, road restrictions (statutory limits: width, height, axle loading and gross weight), timing restrictions (if applicable) and where access is prohibited; • Measures to protect the public highway (e.g. wheel wash facilities); • Measures for the monitoring of the CTMP to ensure compliance from construction drivers and appropriate actions in the event of non-compliance; and • Mechanism for responding to traffic management issues arising during the works (including concerns raised from the public) including a joint consultation approach with relevant road authorities.
EM6	Biodiversity Net Gain Landscape and Habitat Management Plan	SSEN Transmission has undertaken a Biodiversity Net Gain assessment for the Proposed Development. A Biodiversity Net Gain Report (**Appendix D Biodiversity Net Gain Report**) and Landscape and Habitat Management Plan (**Appendix C Landscape and Habitat Management Plan**) would be prepared as part of the measures necessary to achieve SSEN Transmission's target BNG figures. The LHMP details specific requirements for enhancement measures (e.g. seeding of embankments, hedgerow and supplementary woodland and specimen tree planting).
EM7	Ecological Features	Embedded mitigation measures in relation to sensitive ecological features are detailed in **Section 5.5.3** in **Chapter 5 Ecology and Nature Conservation.** These include mitigation concerning: • Soil stripping and storage; • Loss of woodland and native trees;

Mitigation Reference	Mitigation Title	Description
		• Otter refuges, bat roots, beaver lodges, water vole burrows, pine martin dens, red squirrel dreys (or other protected breeding / resting sites); • If works carried out directly affect trees that have been identified as having PRFs; and • Trees and woodland in relation to red squirrel dreys. • Specific measures in relation to identified trees and tree groups are included within **Appendix H Arboricultural Impact Assessment.**
EM8	Ornithological Features	Mitigation measures to protect sensitive ornithological features include: • Ideally, undertake all vegetation clearance outside of the breeding bird season, which is generally taken to be between March and August, inclusive; • Where vegetation clearance must take place during the breeding season, the area must first be checked by a suitably experienced ecologist. A works exclusion zone must be implemented around any active bird's nest; and • If breeding birds are present, the ECoW can provide advice on measures to minimise the risk of disturbance being caused.
EM9	Reinstatement	Following commissioning of the Proposed Development, all temporary construction areas would be reinstated. Reinstatement would form part of the contract obligations for the Principal Contractor and would include the removal of all temporary site works. The Proposed Development would be permanent, except for the proposed bridge deck over Keir Burn, which would be removed at the end of the associated proposed Cambushinnie 400 kV substation and associated development construction period, and would be reinstated, for example, in the instance of transformer replacement. Though the deck of the bridge over Keir Burn would be removed, the abutments would remain in place.
EM10	Noise	The Principal Contractor and its sub-contractors would at all times apply the principle of Best Practicable Means (BPM), as defined in Section 72 of the Control of Pollution Act 1974, which is usually the most effective means of controlling noise from construction sites. Temporary noise barriers would be used when activities are being carried out in close proximity to noise sensitive receptor (NSR) 1 and NSR2 (see **Figure 11-1, Appendix A Figures**).
EM11	Science Based Targets initiatives	Science-based Target initiatives (SBTi) define and promote best practice in emissions (including Scope 1, 2 and 3) reductions and net zero targets in line with climate science. SSEN Transmission has committed to the following verified SBTi, which would be applied to the Proposed Development to help mitigate against adverse GHG impacts: Committing to reduce its combined Scope 1 and 2 emissions by 55% by 2033 from a 2020 baseline; and

Mitigation Reference	Mitigation Title	Description
		Committing to working closely with its supply chain so that 35% of its suppliers would have a Science-based target (SBT) set by 2026.
EM12	SSEN Transmission Sustainable Supplier Code[3]	SSEN Transmission Sustainable Supplier Code sets out its Sustainable Procurement Goals, aligned to the UN's Sustainable Development Goals. Implementation of these measures would ensure the project mitigates GHG emissions and contribute towards Scotland's Net Zero targets. The following 2025 targets include (but are not limited to): 50% of its 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 carbon reduction policy and target in place; and 50% of the supply chain by spend will have a biodiversity policy. Regular inspections of equipment will be undertaken to identify deterioration of components and will be replaced where necessary to ensure maximum efficiency.
EM13	Climate Change Risk Assessment	SSEN Transmission's Climate Resilience Strategy[4] provides a holistic overview of SSEN Transmission's actions for ensuring the future resilience of its business and providing benefits to customers. The strategy outlines SSEN Transmission's adaptation action including those relevant to overhead line conductors, underground cable systems, substations, transformers, and switchgears in relation to a number of extreme weather events.
EM14	Design of Watercourse Crossings	A temporary bridge spanning Keir Burn is proposed, which would be approximately 4.1 m in height and 48 m in length (ground elevation in this area around 109 AOD). The bridge would be clear span with permanent bridge abutments to support the bridge either side of the burn. The abutments would be concrete. There would be no in-channel works or piling associated with installation of the bridge abutments. Temporary culverts located adjacent to the eastern temporary construction compound, to the north and south of the Proposed Development, and adjacent to the access control compound where it runs alongside the haul track would be in place during construction. For all other permanent crossings along the Proposed Development it is proposed that bottomless arched culverts or

[3] SSEN, 2023. *Sustainable Supplier Code* [online]. [Accessed on 11 April 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-distribution---scsc-supplier-code-4-pager-v5.pdf

[4] SSEN, 2023. *Climate Resilience Strategy* [online]. [Accessed 20 May 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-climate-resilience-strategy-progress-report-2023.pdf

Mitigation Reference	Mitigation Title	Description
		single spanning bridges would be used for new crossings, to minimise the impact of the Proposed Development. Where there are any requirements to replace or install culverts at any encountered crossings these would need to be designed to current standards and would be designed to accommodate the 1 in 200-year flow plus an allowance for climate change.
EM15	Drainage Design	Surface water from the haul track would be managed and treated by a new surface water drainage system designed by WSP. These would comprise of filter drains along the Proposed Development which would discharge to swales at the end of embankments. The proposed swales would also act as pre-earthworks drainage and would drain to water features (WF2 and WF3), see **Figure 9-1, Appendix A Figures**. The discharge rates would be restricted to the greenfield runoff rate in line with PKC requirements.

Construction Good Practice

2.6.4 Construction good practice includes standard construction practices, legislative requirements, and published guidance from statutory bodies which is expected to be implemented during construction of the Proposed Development.

2.6.5 A CEMP will be produced prior to commencement of works for the Proposed Development, it would include site-specific and best practice construction management measures including measures to manage risks associated with construction of the Proposed Development to the environment and human health including those associated with the following:

- Noise and vibration;
- Dust and air pollution;
- Surface and groundwater;
- Ecology and ornithology;
- Cultural heritage;
- Traffic and Transport;
- Lighting strategy;
- Waste (construction); and
- Operation and management of the Site (including construction compounds).

2.6.6 The CEMP would incorporate SSEN Transmission's GEMPs and Species Protection Plans (SPPs) (**Appendix O GEMPS and SPPs**) which are applied as standard requirement to all construction sites and practices.

2.6.7 The CEMP would be submitted prior to commencement of works to the Scottish Environment Protection Agency (SEPA) and PKC (and / or to any other person or body that may be specified in the consent for the Proposed Development) for approval and would form part of the contractor documents between the Applicant, and the appointed Principal Contractor.

Operational Residues and Emissions

2.6.8 There is not expected to be a risk of contamination to land and / or water as a result of the operational phase of the Proposed Development. The operational phase of the Proposed Development is not expected to result in any waste.

2.6.9 The operational phase of the Proposed Development overlaps the construction phase of the proposed Cambushinnie 400 kV substation (see **Section 1.1.6**). Therefore, operational noise impacts are not considered within this EA. Appraisal of noise impacts and associated mitigation during operation is detailed in Chapter 12 Noise and Vibration of the 'Cambushinnie 400 kV Substation Environmental Appraisal' (April 2025).

3. METHODOLOGY

3.1 Introduction

3.1.1 This chapter sets out the approach that has been adopted in undertaking the EA of the Proposed Development, including reference to legal requirements, best practice, and assessment parameters.

3.1.2 A detailed overview of the guidance and methodology adopted for each technical study is provided within the respective technical chapters of this EA (**Chapters 4 – 12**).

3.2 Approach to the Environmental Appraisal

3.2.1 SSEN Transmission intends to submit an application for planning permission under the 1997 Act for the construction and operation of the Proposed Development. This EA has been produced as a non-statutory assessment to allow appropriate environmental management and mitigation to be identified and implemented, as identified in **Table 2-1** and **Table 14-1**.

3.2.2 The approach followed in the EA initially identifies topics which require a level of assessment to determine the potential likely direct and indirect environmental effects. This is achieved through a scoping exercise taking into consideration potential sensitive receptors and the nature of the construction and operation of the Proposed Development. 'Scoped out' topics are not considered further in the EA.

3.2.3 For each topic, the potential for environmental effects on these receptors has been considered and is documented in **Table 3-1** which also indicates whether the topic has been 'scoped in' or 'scoped out' of further assessment.

3.2.4 For the 'scoped in' topics this EA provides a concise appraisal of the likely direct and indirect environmental risks that the Proposed Development may pose; and makes recommendations for additional mitigation measures as required. This EA has been undertaken using appropriate methodologies and best practice guidelines. Further details on this are provided in the technical chapters.

3.2.5 **Chapter 14 Summary of Mitigation Measures** collates the additional mitigation measures recommended in each of the appraisal chapters, which would be taken forward for inclusion in the site-specific CEMP produced prior to the commencement of works for the Proposed Development.

3.3 Scope of the Environmental Appraisal

3.3.1 Scoping of potential likely effects with regard to the physical impacts of a project provides a basis for ensuring that the assessment of environmental effects is appropriately limited to issues of genuine potential significance. This section includes a brief description of the environmental receptors of potential significance associated with the Proposed Development which are addressed in detail in the EA Report, and those that are scoped out.

3.3.2 An initial review of environmental baseline conditions and sensitive receptors has been undertaken. **Figure 3-1a to Figure 3-1d, Appendix A Figures.** illustrates the identified environmental constraints located within 5 km of the Proposed Development.

3.3.3 The following key environmental constraints have been identified within the study area, these include:

- The Site is located within the Landscape Character Type (LCT) Broad Valley Lowlands – Tayside;
- The Site is located within a Drinking Water Protected Area for groundwater;
- Braco village is approximately 50 m north of the Site;
- The Site is located across agricultural land classes:
  - Class 3.2: “Land capable of average production through yields of barley, oats and grass can be obtained”; and
  - Class 4.2: “Land capable of producing a narrow range of crops, primarily grassland with short arable breaks of forage crops and cereal”.
- The eastern side of the Site is adjacent to an area of long-established plantation (LEP) listed on the Ancient Woodland Inventory (AWI);
- There are no known private water supplies (PWS) within 1 km of the Site;
- The Site is located on a moderately productive 2B class Aquifer;
- The Keir Burn crosses the Site, a watercourse with a Moderate overall rating;
- Core-paths BRAC/114 and BRAC/106 run adjacent to the Site;
- Scheduled Monument (SM) (SM3088), a Fort at Grinnan Hill, is approximately 100 m north of the Site; and
- Braco Garden and Design Landscape (GDL) is approximately 470 m north of the Site.

Scope of this EA

3.3.4 The scope of this EA has been informed by the Applicant’s knowledge of the Site environmental constraints during:

- Environmental baseline surveys;
- Pre-application consultation feedback;
- Stakeholder consultations; and
- An informal scoping exercise completed by EA topic specialists based on professional judgement.

3.3.5 **Table 3-1** below provides a summary of the key environmental issues scoped in and scoped out of the environmental appraisal.

3.3.6 This summary is not intended to all-encompassing and contains only the main points which are considered to be of relevance to the context of the technical chapters found in **Chapters 4 – 12.**

Table 3-1 Scoping Review

Topic	Issues Scoped in	Issues Scoped out
Landscape Character and Visual Amenity	The following potentially significant environmental risks have been scoped into the Landscape and Visual Appraisal: <u>Construction:</u> • Temporary physical change to the landscape character as a result of construction activity, temporary compounds, tracks and associated lighting. • Temporary change to perceptual aspects of the landscape character and/or landscape designations as a result of nearby construction activity, including lighting at night. • Temporary disruption or change to views experienced from visual receptors (both recreational and residential) and at viewpoints as a result of visibility of construction activity, temporary compounds, tracks and associated lighting. <u>Operation:</u> • Longer term and/or permanent change to physical components of the landscape, including loss of existing features such as trees or woodland, and introduction of the Proposed Development. • Change to perceptual aspects of the landscape character and/or landscape designations as a result of introduction of the Proposed Development into adjacent or nearby landscapes. • Longer term and/or permanent change to the composition and nature of views experienced from visual receptors (both recreational and residential) as a result of introduction of the Proposed Development.	Landscape and visual receptors including landscape designations that are located beyond 5 km or where forestry would screen views of the Proposed Development have been excluded from the scope of the Landscape and Visual Appraisal.
Ecology and Nature Conservation	The following potentially significant environmental risks have been scoped into the Ecology and Nature Conservation Appraisal:	The following designated sites have been scoped out of the EA:

Topic	Issues Scoped in	Issues Scoped out
	• Permanent habitat loss (to e.g., the proposed haul track); • Temporary habitat loss (to e.g. temporary construction compounds); • Habitat degradation as a result of pollution incidents (e.g., fuel or oil spills); • Permanent or temporary changes to hydrological conditions which may affect vegetation and habitats (e.g., indirect impacts on Groundwater Dependent Terrestrial Ecosystems (GWDTE)); • Loss of habitat supporting protected and/or notable species; • Creation of barriers to animal movements (e.g., the construction of watercourse crossings could inhibit the movement of otter or fish); • Temporary disturbance and/or displacement of species during construction; • Disturbance and/or displacement of species during operation (e.g., the use of permanent lighting could impact upon bat foraging); and, • Potential for direct mortality of species during construction (e.g., as a result of increased vehicular traffic, or as a result of pollution incident).	• River Teith Special Area of Conservation (SAC): The Site is over 20 km upstream from this SAC. Given the nature of the Proposed Development and the degree of dilution over this distance and pollution controls embedded in the EA, there is not likely to be pollution risks for this SAC. • None of the other four SACs within the Zone of Influence (ZoI) as defined in **Section 5.3.5** (i.e., Shelforkie Moss SAC, Upper Strathearn Oakwoods SAC, Kippenrait Glen SAC and Glenartney Juniper Wood SAC), have any conceivable pathway for potential impacts on qualifying habitats because there is no hydrological connectivity (via watercourses or otherwise). Given the distances from the Site at which all of these SACs are located it is highly unlikely that these would be adversely affected by the Proposed Development, including via air pollution. Dust and gaseous air pollution can have an adverse impact on habitats over a distance, but such effects diminish rapidly from source and are generally considered negligible at 200 m. There is no conceivable pathway for potential air pollution impacts on the qualifying habitats of the SACs which are located 1.3 km from the Site at closest. • Braco Castle Wood LNCS has no hydrological link with the Site, moreover it is at a distance from the Site (0.7 km at the closest point) at which no possible air pollution impacts are anticipated. • There are woodlands listed on the Ancient Woodland Inventory (AWI) within close proximity to the Site however, these woodlands are in poor condition and do not possess a semi-natural ground flora. It is highly unlikely that there would be any adverse effect on AWI woodlands given the nature of the Proposed Development. The following species have been scoped out of the EA: • Given the sub-optimal quality of habitat and lack of records of beaver, pine marten, and water vole, they are not considered to represent a major ecological constraint to the Proposed Development. • Given the sub-optimal quality of habitat and lack of suitable refugia and resulting likely low frequency of reptile species, they are not considered

Topic	Issues Scoped in	Issues Scoped out
		to represent a major ecological constraint to the Proposed Development and additional survey or mitigation is not warranted. The waterbodies within 500 m of the Site have poor habitat suitability for great crested newt and the desk study did not indicate this species to be present within the search area. It is not anticipated that any optimal habitats that present good opportunities for great crested newt hibernacula would be subject to disturbance from the Proposed Development. Given the above, great crested newt is considered likely to be absent from the Site and no impacts upon potential breeding ponds are considered possible.
Ornithology	The following potentially significant environmental risks are scoped into the Ornithology Appraisal: • Permanent or temporary loss of habitat which supports important species of birds (e.g. felling of woodland habitats); • Temporary disturbance and/or displacement of species of birds during construction (e.g. through noise and vibration disturbance); • Potential for direct mortality of species during construction / operation (e.g. as a result of increased vehicular traffic); and • Disturbance and/or displacement of species during operation (e.g. as a result of increased vehicular traffic).	Given the relative distance from the Site, the following ornithological designated sites identified are scoped out of the Ornithology Appraisal: • South Tayside Goose Roosts Special Protection Area (SPA) and RAMSAR site. Approximately 1.3 km east of the Proposed Development. However, note that this SPA, as a European site, is subject to the HRA process. A Shadow HRA Appropriate Assessment has been produced as a standalone report and will be submitted to PKC, setting out why likely significant effects are not considered possible. PKC will need to confirm agreement or otherwise, as the competent authority for HRA matters. The impacts on the following bird species are not considered significant therefore have been scoped out: • Notable farmland bird species, as listed in the Tayside Farmland LBAP,[5] as they are unlikely to find the Site's habitats to be of great importance for nesting or foraging, as these comprise generally poor-quality habitats, with low ecological value and a dearth of nesting opportunities. The Woodland LBAP and Water & Wetland LBAP[5] are of little relevance to the Site's ornithological interests due to the low degree of naturalness of the woodlands and the limited extent and quality of wetlands on Site. • Common breeding birds which are only of local importance because they are common and widespread species. Loss of breeding sites (e.g. as a result of tree felling) for some species of the general breeding bird

[5] Tayside Biodiversity, 2025. *Tayside Local Biodiversity Plan* [online]. [Accessed February 2025]. Available at: https://www.taysidebiodiversity.co.uk/

Topic	Issues Scoped in	Issues Scoped out
		assemblage would have a minimal effect because the Site development footprint is small compared to surrounding very extensive habitats of the same types.
Cultural Heritage	The following potentially significant environmental risks are scoped into the Cultural Heritage assessment: • Permanent physical impacts on previously unrecorded heritage assets due to construction of the Proposed Development; • Permanent physical impacts on previously recorded heritage assets due to construction of the Proposed Development; • Permanent physical impacts on previously unrecorded heritage assets due to construction of temporary construction compounds or other works areas; and • Impacts on the setting of designated assets due to the introduction of the Proposed Development.	Based on current knowledge of the Site, the following Cultural Heritage risks have been scoped out the EA: • Physical impacts on designated assets.
Forestry	The potential impact on trees resulting from the construction and operation phases of the Proposed Development is more appropriately expressed in terms of arboriculture than effects on forestry. The term forestry covers both commercial and non-commercial woodland (such as farm woodland) but it is not an appropriate term for the potential effects to individual trees, particularly highway trees, or to small groups of trees, including riparian habitat. These potential effects, and recommendations for tree protection measures during the construction period, are addressed in an Arboricultural Impact Assessment (AIA) (**Appendix H Arboricultrual Assessment**). The standalone AIA is presented in **Appendix H Arboricultural Impact Assessment** of this EA. No high sensitivity forestry receptors, such as ancient woodland or mature native woodland, are present within the Site. The AIA identifies individual trees and tree groups within the Site. The information addressed in the AIA includes: • Information Sources;	The Forestry chapter of this EA has been scoped out, however a rationale for scoping out the topic does exist in the place of **Chapter 8 Forestry.** The potential impact on trees resulting from the construction and operation phases of the Proposed Development is more appropriately expressed in terms of arboriculture than effects on forestry. The term forestry covers both commercial and non-commercial woodland (such as farm woodland) but it is not an appropriate term for the potential effects to individual trees, particularly highway trees, or to small groups of trees, including riparian habitat. These potential effects, and recommendations for tree protection measures during the construction period, are addressed in an Arboricultural Impact Assessment (AIA) (**Appendix H Arboricultural Assessment**).

Topic	Issues Scoped in	Issues Scoped out
	• Methodology; • Baseline Environment, including a tree survey schedule and tree constraints plan; • Embedded Mitigation; • Appraisal; and • Recommendations and Mitigation, including a tree protection plan.	
Hydrology, Hydrogeology, Geology and Soils	The following environmental risks have been scoped into the EA: • During the construction and operation phases, excavation, temporary storage, backfilling and compaction of soils during construction and maintenance works represents a potential effect for geology and soils. • Disturbance of potentially contaminated soils and perched groundwater and creation of new pathways allowing migration of such contaminants to reach sensitive receptors (including construction workers, site users and the water environment) during construction phase of the Proposed Development. • Disturbance and damage to peat soils during the construction phase of the Proposed Development. • During the construction and operational phases there are potential adverse effects on the water environment (including, Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and other uses of water). These include: – Contamination of groundwater and surface water bodies from fuels, solvents, oil and other construction chemicals from chemical spillages through runoff to surface water bodies and unnamed watercourses or infiltration to groundwater aquifers; – Contamination from high levels of fine sediment in runoff (including the potential wash out of fine sediment from temporary spoil heaps, embankments, and access tracks); and – The effects of diffuse urban pollutants in surface water runoff (that may contain metals, hydrocarbons, and inert solids etc.) entering the ground and moving towards a receptor.	A detailed flood risk assessment is being undertaken for the Proposed Development in support of the planning application. Flood risk will be dealt with through the planning process based on the separate assessment carried out as part of the planning application. Therefore, flood risk has been scoped out of the EA report. The following water receptors have been scoped out of the EA: • Private Water Supplies (PWS). No PWS were identified within the 1000 m study area. • Water Features (WF) 4, 5,6,8,9 and 10, see **Figure 11-1**, **Appendix A Figures:** • WF4 which is upstream of the works; • WF5 for which there is no direct pathway; • WF6 for which there is direct pathway. WF6 is also upstream of potential sediment laden flow path; • WF8 for which there is no direct pathway. WF8 is also upstream of works; • WF9 for which there is no direct pathway; and • WF10 for which there is no direct pathway.

Topic	Issues Scoped in	Issues Scoped out
	• The potential secondary receptors are GWDTEs (if close to the works, including the access track). Biodiversity specialists would identify sensitive water habitats along the route.	
Traffic and Transport	In accordance with IEMA Guidelines 2023[6] the environmental assessment of road traffic will assess the potential significance of effects for the following categories: • Severance of communities; • Fear and Intimidation; • Road user and pedestrian safety; • Pedestrian and non-motorised amenity; • Pedestrian & non-motorised delay; and • Road vehicle driver and passenger delay.	The following environmental risks from the 2023 IEMA Guidelines6 on Traffic and Transport Environmental assessment will be scoped out of the Appraisal: • Hazardous/ Large Loads as it considered unlikely there would be material construction traffic generated whose loads would fall within the current classifications for carriage of dangerous goods (Class 1-9).
Noise and Vibration	The following environmental risks have been scoped into the EA: • Construction noise arising from the Proposed Development have been assessed at selected Noise Sensitive Receptors (NSRs) within a study area of approximately 300 m from the haul track. • Construction vibration arising from the Proposed Development has been assessed at selected NSRs within a study area of approximately 100 m from the haul track. • Changes in road traffic noise due to the Proposed Development generated by traffic has been assessed for the construction traffic routes in the vicinity of the Proposed Development.	The following environmental risks have been scoped out of the EA: • Operational noise and vibration have been scoped out of this EA and presented in the 'Cambushinnie 400 kV Substation EA' (April 2025).
Climate Change and Carbon	The following assessments will be carried out in-line with Institute of Environmental Management and Assessment (IEMA) Guidelines as part of the Climate Change appraisal:	The following environmental risks have been scoped out of the Climate Change and Carbon EA:

[6] IEMA, 2023. *IEMA Guidelines: Environmental Assessment of Traffic and Movement* [online]. [Accessed 01 March 2025]. Available from: https://www.iema.net/resources/reading-room/2023/07/12/new-iema-guidance-environmental-assessment-of-traffic-and-movement

Topic	Issues Scoped in	Issues Scoped out
	• Lifecycle Greenhouse Gas (GHG) impact assessment; and • Climate Change Risk Assessment (CCRA).	• A separate In-combination Climate Change Impact (ICCI) assessment has been excluded from the Climate Change assessment on the basis that this is a proportionate approach for an EA. • Sea level rise as an environmental risk has been scoped out of the assessment as the Proposed Development has been identified in an upland location. • Decommissioning has been scoped out of the assessment due to the nature of the Proposed Development, which supports the ongoing transmission of electricity in the wider area. It is treated as permanent, so decommissioning is not considered in this EA.
Land Use and Agriculture	N/A	All land within the Proposed Development is within capability Class 3.2 and 4.2, this is not classified as prime agricultural land. Therefore, the environmental effect of withdrawal of this land from agricultural production is scoped out.
Socioeconomics, Recreation and Tourism	N/A	Socioeconomics is scoped out of the appraisal. There are limited recreation and tourism receptors in proximity to the Site and these factors are scoped out of the appraisal, or are otherwise detailed elsewhere as follows: • Detailed appraisal of the visual and noise impacts of the Proposed Development are addressed in more detail in **Chapter 4 Landscape Character and Visual Amenity** and **Chapter 11 Noise and Vibration** respectively. Therefore, impacts on these receptors have been scoped out of this chapter. • Disruption to recreational activities in the area affecting Core paths BRAC/106 and BRAC/114 will be provided in the Construction Traffic Management Plan (CTMP), this would be prepared by the Principal Contractor prior to any works commencing, in consultation with PKC and Transport Scotland, as required. • Impacts on Scheduled Monuments (SMs) are assessed further in **Chapter 7 Cultural Heritage** and visual impacts as a result of the Proposed Development on SMs are assessed in more detail in **Chapter 4 Landscape Character and Visual Amenity**. Therefore, these are scoped out of this chapter.

Topic	Issues Scoped in	Issues Scoped out
Population and Human Health	N/A	The entire Population and Human Health appraisal has been scoped out of the EA. Factors impacting on human health that are scoped into the EA are addressed in the following chapters: • **Chapter 4 Landscape Character and Visual Amenity;** • **Chapter 10 Traffic and Transport;** • **Chapter 11 Noise and Vibration;** and • **Chapter 12 Climate Change.** Effects from light disturbance are to be mitigated through good construction management and light sensors as detailed in **Table 2-1** and **Table 14-1.**
Air Quality	N/A	Air Quality has been scoped out of the EA. The Proposed Development is not located within an Air Quality Management Area (AQMA). There is a potential to give rise to some localised and temporary construction related releases associated with dust and construction traffic exhaust emissions. However, the nature of construction activities means these would be localised, short-term and intermittent. Potential effects would be mitigated further through the implementation of mitigation measures, in particular a CEMP and relevant GEMPs (**Appendix O GEMPs and SPPs**).
Material Assets and Waste	N/A	The entire Material Assets and Waste appraisal has been scoped out of the EA, including the following environmental risks: • The potential effects of land contamination are addressed in detail in **Chapter 9 Hydrology, Hydrogeology, Geology and Soils** of this EA, therefore further analysis is scoped out of this chapter; • It is also assumed that standard mitigation measures and best practice measures will be detailed in the CEMP. This will be produced prior the commencement of works for the Proposed Development and would be implemented throughout the works.
Major Accidents and Disasters	N/A	The entire Major Accidents and Disasters appraisal has been scoped out of the EA, including the following environmental risks:

Topic	Issues Scoped in	Issues Scoped out
		• Crisis management and continuity plans are in place across the SSE Group.; and • Where there are material changes in infrastructure (or the management of it) additional plans are developed. Furthermore, the Principal Designer would need to fully assess risks and mitigate as appropriate during the construction stage as part of the requirements of the Construction (Design and Management) Regulations 2015.

3.4 Consultation Undertaken

3.4.1 This section describes the pre-application consultation and the consultation events that were undertaken to inform the local community of the Proposed Development.

3.4.2 A pre-application advice request was submitted to PKC on 31 January 2025 and a written response was received from PKC on 17 March 2025 (Reference: 15/00016/PREAPL).

3.4.3 Further consultation with PKC determined a CEMP would not be required as part of the planning application due to the outline nature of the CEMP at such a stage and that such information could be included in the EA, with the requirement for a full CEMP prior to commencement of works controlled by way of planning condition. Similarly it was confirmed by PKC that the EA would be sufficient in addressing lighting detail requirements to inform the planning application, with the requirement of any further lighting details to be controlled by way of planning condition.

3.4.4 A Proposal of Application Notice was submitted to PKC on 24 October 2024. Following that, two public consultation events were held.

3.4.5 The first public consultation event was held at Braco Village Hall on 20 November 2024 (15:00-19:00).

3.4.6 A second public consultation event was held at Braco Village Hall on 17 March 2025 (15:00-19:30).

3.4.7 The project team attended an organised Braco and Greenloaning Community Council question and answer session with members of the public at Braco Village Hall on 30 May 2024 (19:30-21:00). This provided an opportunity for interested members of the public to meet and ask the project team questions.

3.5 Cumulative Effects

3.5.1 There are two aspects to Cumulative Effects, defined as follows:

- In-combination effects: The combined effect of the Proposed Development together with other reasonably foreseeable developments (taking into consideration effects at the Site preparation and earthworks, construction, and operational phases); and
- Effects Interactions: The combined or synergistic effects caused by the combination of a number of effects on a particular receptor (taking into consideration effects at the Site preparation and earthworks, construction and operational phases), which may collectively cause a more significant effect than individually. A theoretical example is the combination of disturbance from dust, noise, vibration, artificial light, human presence and visual intrusion on sensitive fauna (e.g. certain bat species) adjacent to a construction site.

3.5.2 The potential for cumulative effects will be considered in relation to other approved or proposed development within the study area relevant to each particular issue. This assessment has been made based on professional judgment as only these developments

have the potential to result in significant cumulative effects in combination with those arising from the Proposed Development. Effects Interactions are scoped out.

3.5.3 The final list of developments to be considered in the cumulative effects assessment will be frozen one month prior to submission of the planning application to PKC to allow sufficient time to compile the EA Report.

3.5.4 A cumulative appraisal has been undertaken considering the developments in-combination with the Proposed Development. This is presented in **Chapter 13 Cumulative Developments**. The development proposals which will be considered in the cumulative appraisal are outlined in **Section 13.1.2** and **Table 13-1**.

3.6 Assumptions and Limitations

3.6.1 The key assumptions and limitations applied to the preparation of this EA are set out in this section. Assumptions and limitations specific to certain topics are identified in the appropriate technical chapter.

3.6.2 A number of design elements still include a level of uncertainty and are indicative for the purpose of the EA. However, these elements will be further defined as the design develops. The EA will define maximum parameters (worst case scenario) when assessing the environmental effects.

3.6.3 Baseline conditions have been established from a variety of sources, including historical data. Due to the dynamic nature of certain aspects of the environment, this information is subject to change as further information becomes available following field surveys, and as the design progresses. Conditions may change during the construction and operation of the Proposed Development.

3.6.4 The design, construction and completed stages of the Proposed Development will satisfy (at least) minimum environmental standards, consistent with contemporary legislation, practice, and knowledge.

4. LANDSCAPE CHARACTER AND VISUAL AMENITY

4.1 Introduction

4.1.1 This chapter considers the potential for effects on landscape character and visual amenity resulting from the Proposed Development.

4.1.2 This section contains:

- Details of the approach and methodology;
- A description of existing baseline conditions of the Site and surrounding context;
- A concise appraisal of the direct and indirect impacts on landscape and visual receptors resulting from the Proposed Development; and
- Recommendations for additional mitigation, where required.

4.1.3 This chapter is supported by the following figures in **Appendix A Figures**:

- **Figure 4-1 Landscape Designations**;
- **Figure 4-2 Landscape Character Types**;
- **Figure 4-3a Zone of Theoretical Visibility (ZTV)**;
- **Figure 4-3b ZTV with Woodland Screening**;
- **Figure 4-4 Representative Viewpoints**; and
- **Figure 4-5 Landscape and Habitat Restoration Plan**.

4.1.4 This chapter is also supported by a series of visualisations contained in **Appendix B Visualisations**. Details of proposed mitigation measures are provided in **Appendix C Landscape and Habitat Management Plan**.

4.1.5 The decommissioning stage of the Proposed Development has been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity, as outlined in **Section 1.1.7**.

4.2 Information Sources

4.2.1 The following information sources have been used to inform this report:

- Online mapping, including Ordnance Survey (OS) maps and aerial photography;
- Scottish Landscape Character Types (LCT) Map and Descriptions[1], and
- Relevant local planning and policy documents.

[1] NatureScot, 2025. *Scottish Landscape Character Types and Description* [online]. [Accessed 01 April 2025]. Available from: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

4.3 Methodology

4.3.1 The scope and approach of the Landscape and Visual Appraisal (LVA) outlined below reflects the nature and scale of the Proposed Development.

4.3.2 The LVA has been carried out in accordance with the following good practice guidance documents:

- The Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition[2];
- Landscape Institute (2019) Technical Guidance Note 06/19, Visual Representation of Development Proposals[3];
- Landscape Institute (2021) Technical Guidance Note 02/21, Assessing landscape value outside national designations[4]; and
- Landscape Institute (2024, August 28). Technical Guidance Note TGN 2024-01 Notes and Clarifications on Guidelines for the Landscape and Visual Impact Assessment Third Addition.

4.3.3 GLVIA places a strong emphasis on the importance of professional judgement in identifying and defining the significance of landscape and visual effects. The LVA has been undertaken by Chartered Landscape Architects with experience in the assessment and appraisal of similar projects. Professional judgement has been used in combination with structured methods and criteria to evaluate landscape and visual value and susceptibility, the resulting sensitivity, magnitude, and significance of effect.

Landscape Sensitivity

4.3.4 Landscape receptors are described as components of the landscape that may be affected by the Proposed Development. These can include overall character and key characteristics, individual elements or features and specific aesthetic or perceptual aspects.

4.3.5 The sensitivity of the landscape receptor has been derived by combining of the value of the landscape (undertaken as part of the baseline study) and the susceptibility to change of the receptor to the specific type of development being considered.

4.3.6 Landscape value is frequently addressed by reference to international, national, regional, and local designations. Absence of such a designation does not necessarily imply a lack

[2] Landscape Institute and Institute of Environmental Management Assessment, 2013. *Guidelines for Landscape and Visual Impact Assessment. Third Edition.*

3 Landscape Institute, 2019. *Technical Guidance Note 06/19, Visual Representation of Development Proposals* [online]. [Accessed 01 July 2024]. Available from: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf

4 Landscape Institute, 2021. *Technical Guidance Note 02/21, Assessing landscape value outside national designations* [online]. [Accessed 01 July 2024]. Available from: https://www.landscapeinstitute.org/publication/tgn-02-21-assessing-landscape-value-outside-national-designations/

of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource.

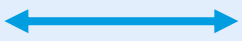
4.3.7 The evaluation of landscape value has been informed by Technical Guidance Note 02/21 and undertaken considering the following factors and classified as very high, high, medium, low or very low with evidence provided as to the basis of the evaluation:

- Natural heritage – Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape;
- Cultural heritage – Landscape with clear evidence of archaeological, historical or cultural interest which contributes positively to the landscape;
- Landscape condition – Landscape which is in a good physical state both in regard to individual elements and overall landscape structure;
- Associations – Landscape which is connected with notable people, events and the arts;
- Distinctiveness – Landscape that has a strong sense of identity;
- Recreational – Landscape offering recreational opportunities where experience of landscape is important;
  - Perceptual (scenic) – Landscape that appeals to the senses, primarily the visual sense;
  - Perceptual (wildness and tranquillity) – Landscape with a strong perceptual value notably wildness, tranquillity and / or dark skies; and
- Functional - Landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape.

4.3.8 Landscape susceptibility relates to the ability of a particular landscape to accommodate the Proposed Development. It is appraised through consideration of the baseline characteristics of the landscape, and in particular, the scale or complexity of a given landscape. The evaluation of landscape susceptibility is defined as very high, high, medium, low or very low and is supported by a clear explanation.

4.3.9 The appraisal of sensitivity of the landscape receptor has been made by applying professional judgement to combine and analyse the factors which contribute to the identified value with those which contribute to susceptibility. Landscape sensitivity has been described based on a scale of very high, high, medium, low, or very low. **Table 4-1** indicators that inform landscape value, susceptibility, and sensitivity.

Table 4-1 Sensitivity of Landscape Receptors

	Higher Sensitivity		Lower Sensitivity
Value	A designated landscape (For example National Scenic Area) or a landscape in very good condition, exceptional scenic quality and high recreational opportunities or a high degree of rarity.		Landscapes containing few if any notable elements / features, of poor condition or containing several detracting features and limited aesthetic qualities. Landscapes which are not formally designated.

	Higher Sensitivity		Lower Sensitivity
Susceptibility	Attributes that make up the character of the landscape which offer very limited opportunities to accommodate change of the type proposed without fundamentally altering key characteristics.		Attributes that make up the character of the landscape which are tolerant of a large degree of the type of change proposed without fundamentally altering the key characteristics.

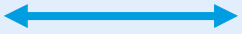
Visual Sensitivity

4.3.10 The sensitivity of visual receptors has been defined through an appraisal of the viewing expectation, or value placed on the view as identified in the baseline study, and its susceptibility to change. The value of the view is an appraisal of the value attached to views and is often informed by the appearance on OS or tourist maps and in guidebooks, literature and art, or identified in policy. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view and its scenic quality is also an indicator. The value of the view has been classified as very high, high, medium, low or very low and is supported by evidenced, professional judgements.

4.3.11 The susceptibility of visual receptors to change has been established as a function of the occupation or activity of people experiencing the view, and the extent to which their attention or interest is focussed on the view and the visual amenity they experience. For example, residents in their home, walkers whose interest may tend to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience, indicate a higher level of susceptibility. Conversely receptors engaged in outdoor sport where views are not important or receptors at their place of work are considered less susceptible to change. As with landscape susceptibility, judgements about the susceptibility of visual receptors have been described as very high, high, medium, low or very low using consistent and reasoned judgements.

4.3.12 The appraisal of sensitivity of the visual receptor has been made by applying professional judgement to combine and analyse the factors which contribute to the identified value with those which contribute to susceptibility. **Table 4-2** below, outlines indicators that inform landscape value, susceptibility, and sensitivity. Landscape sensitivity has been described based on a scale of very high, high, medium, low or very low.

Table 4-2 Sensitivity of Visual Receptors

	Higher Sensitivity		Lower Sensitivity
Value	Views protected by designation, or nationally recognised, or recorded on maps/guidebooks or with cultural associations. Views that have high scenic		Views which are not documented or protected with minimal or no cultural associations and no facilities and/or interpretation. Views that exhibit low scenic qualities relating to the

	Higher Sensitivity		Lower Sensitivity
	qualities relating to the content and composition of the view.		content and composition of the view.
Susceptibility	Viewers whose attention or interest is focused on their surroundings and for which views are highly important to their enjoyment.		People whose attention or interest is not focused on their surroundings and where the view is incidental to their enjoyment.

Landscape Magnitude of impact

4.3.13 The landscape magnitude of impact refers to the extent to which the Proposed Development would alter the existing characteristics of the landscape. It is an expression of the size or scale of change to the landscape, the geographical extent of the area influenced, and its duration and reversibility. The variables involved are:

- The extent of existing landscape elements that would be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape;
- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by the addition of new components;
- Whether the change alters the key characteristics of the landscape that are integral to its distinctive character;
- The geographic area over which the change would be experienced (for example within the application boundary, the immediate setting around that boundary, at the local LCA scale, or on a larger scale influencing broader areas of landscape character);
- The duration of the change (i.e. short term (0-5 years), medium term (5-10 years), or long term (10 years +)), and its reversibility (i.e. whether it is permanent, temporary, or partially reversible); and
- Landscape change can be both direct, through alteration of physical components, or indirect, resulting from changes to perceptual aspects of character and how it is experienced.

4.3.14 An overall appraisal of the magnitude of landscape effect resulting from Proposed Development on landscape receptors has been made by combining the above judgements using evidence and professional judgement. The levels of landscape magnitude of impact are described as very high, high, medium, low, very low and none as defined in **Table 4-3** below.

Table 4-3 Landscape Magnitude of impact

Magnitude	Criteria
Very High	Substantial alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term, permanent or reversible.

Magnitude	Criteria
High	Large alteration to the landscape receptor or may impact an extensive area or unique characteristics at a local level. May be longer term, permanent or reversible.
Medium	Partial alteration to the landscape receptor or may impact a wide area or characteristics at a local level. May be medium term, permanent or reversible.
Low	Slight alteration to the landscape receptor or may impact a restricted area and few key characteristics. May be short to medium term, permanent or reversible.
Very Low	Very little, or no perceptible change to key characteristics or setting.
None	No change to the landscape receptor.

Visual Magnitude of impact

4.3.15 Visual magnitude of impact relates to the extent to which the Proposed Development would alter the existing view and is an expression of the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described below:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development;
- The degree of contrast or integration of any new features or changes in the form, scale, composition and focal points of the view;
- The nature of the view of Proposed Development in relation to the amount of time over which it would be experienced, and whether views of this would be visible fully, partially or glimpsed;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from Proposed Development and the extent of the area over which the changes would be visible; and
- The duration of the change (i.e. short term (0-5 years), medium term (5-10 years), or long term (10 years +), and its reversibility (i.e. whether it is permanent, temporary, or partially reversible).

4.3.16 An overall appraisal of the magnitude of visual effect resulting from Proposed Development on the visual receptor has been made combining the above judgements using evidence and professional judgement. The levels of visual magnitude of impact are described as very high, high, medium, low, very low and none as defined in **Table 4-4** below.

Table 4-4 Visual Magnitude of impact

Magnitude	Criteria
Very High	A substantial change to the composition of the view or change that may be viewed in the foreground or directly. May be longer term, permanent or reversible.
High	A pronounced change to the composition of the view or change that may be viewed in the foreground or directly. May be longer term, permanent or reversible.

Magnitude	Criteria
Medium	A noticeable change to the composition of the view or change that may be viewed in the middle ground or indirectly. May be medium term, permanent or reversible.
Low	An unobtrusive change in the composition of the view or change that may be viewed in the background or obliquely. May be short to medium term, permanent or reversible.
Very Low	Very little, or no perceptible change in visual composition.
None	No change to the view.

Level of Effects

4.3.17 Determination of the level of landscape and visual effects has been undertaken by employing professional judgement and experience to combine and analyse the magnitude of impact against the identified sensitivity of landscape and visual receptors.

4.3.18 The landscape appraisal has taken account of direct and indirect changes to existing landscape elements, features, key characteristics and evaluates the extent to which these would be lost or modified, in the context of their importance in determining the existing baseline character.

4.3.19 The visual appraisal has taken account of the likely changes to the visual composition, including the extent to which new features would distract or screen existing elements in the view or disrupt the scale, structure, or focus of the existing view.

4.3.20 The level of landscape and visual effects are described with reference to the criteria presented in the **Table 4-5** below. It is important to note that the levels of effect represent steps on a sliding scale and as such there is a degree of variation, or tolerance, within each level. Some effects may be towards the lower end of a level and some towards the upper end and so two receptors at the same level may not be directly comparable.

Table 4-5 Level of Effect

Level of Effect	Landscape	Visual
Major Beneficial	Alterations that result in a considerable improvement of the existing landscape resource. Valued characteristic features would be restored or reintroduced.	Alterations that typically result in a pronounced improvement in the existing view.
Moderate Beneficial	Alterations that result in a partial improvement of the existing landscape resource. Valued characteristic features would be largely restored or reintroduced.	Alterations that typically result in a noticeable improvement in the existing view.
Minor Beneficial	Alterations that result in a slight improvement of the existing landscape resource. Characteristic features would be partially restored.	Alterations that typically result in a limited improvement in the existing view.

Level of Effect	Landscape	Visual
Negligible Beneficial	Alterations that result in a very slight improvement to the existing landscape resource, not uncharacteristic within the receiving landscape.	Alterations that typically result in a barely perceptible improvement in the existing view.
Neutral	No alteration to any of the components that contribute to the existing landscape resource.	No change to the existing view.
Negligible Adverse	Alterations that result in a very slight deterioration to the existing landscape resource, not uncharacteristic within the receiving landscape.	Alterations that typically result in a barely perceptible deterioration in the existing view.
Minor Adverse	Alterations that result in a slight deterioration of the existing landscape resource. Characteristic features would be partially lost.	Alterations that typically result in a limited deterioration in the existing view.
Moderate Adverse	Alterations that result in a partial deterioration of the existing landscape resource. Valued characteristic features would be largely lost.	Alterations that typically result in a noticeable deterioration in the existing view.
Major Adverse	Alterations that result in a considerable deterioration of the existing landscape resource. Valued characteristic features would be wholly lost.	Alterations that typically result in a pronounced deterioration in the existing view.

Temporal Scope of Appraisal

4.3.21 Landscape and visual effects can vary depending on the stage or status of use of the Proposed Development. The LVA therefore considers potential effects of the Proposed Development at each of the following stages/ status of use:

- **Construction of the Proposed Development**: including consideration of all temporary structures and works areas, such as temporary construction compounds, movement of plant and machinery etc.;
- **Temporary Operation**: including consideration of the use of the haul track to provide access for construction of the proposed Cambushinnie 400 kV substation and associated OHL and UGC works, and potential occasional maintenance access to the proposed Cambushinnie 400 kV substation. The assessment is undertaken based on greatest anticipated vehicle numbers to represent the worst case; and
- **Post Operation**: including consideration of potential medium to longer term effects associated with the Proposed Development following completion of the construction phase, when not subject to temporary operation, and therefore when the haul track is not in active use.

4.4 Baseline Environment

Study Area

4.4.1 A Study Area of 1 km from the Site has been identified for the LVA. The extent of the Study Area has been informed by desk and site-based review, analysis of the Zone of Theoretical Visibility (ZTV) (see **Figures 4-3a & 4-3b, Appendix A Figures**), aerial photography and mapping and application of professional judgement. The Study Area extent has been reviewed during the appraisal processes to ensure it is appropriate and that the appraisal is focused on the greatest potential landscape and visual effects.

Zone of Theoretical Visibility

4.4.2 ZTV mapping has been undertaken to establish the theoretical extent of visibility of the Proposed Development. The ZTV has been used to inform the extent of the Study Area and the identification of potential landscape and visual receptors. The ZTV indicates areas from where it may be possible to view the Proposed Development. It is considered as a tool to assist in evaluating the theoretical visibility and not a measure of the visual effect. The approach to ZTV modelling and limitations in its use are outlined below:

- **Figure 4-3a, Appendix A Figures** provides a ZTV based on a bare ground topographical model – OS Terrain 5 Digital Terrain Model (DTM) data which does not take account of the screening effects of vegetation, buildings or other structures. This ZTV therefore represents a theoretical worst case scenario, indicating maximum potential visibility of the Proposed Development;
- **Figure 4-3b, Appendix A Figures** provides a ZTV based on the above DTM but with the addition of existing areas of forestry / woodland and buildings and is intended to provide a more realistic impression of the potential visibility of the Proposed Development.
- The ZTV is calculated based on a height of 3.8 m above the haul track level to represent the maximum potential visibility of a vehicle using the haul track. Potential visibility of the track itself is likely to be slightly more limited than is indicated in the ZTV. Potential visibility of the different aspects of the Proposed Development is described in the appraisal of visual effects (**Section 4.10**, below).
- Some areas of theoretical visibility may comprise buildings, forestry and woodland which don't tend to be visited, and the likelihood of views being experienced is consequently low; and
- The ZTV maps do not take account of the likely orientation of a viewer, such as the direction of travel and there is no allowance for reduction of visibility with distance, weather, or light. ZTV analysis was undertaken as part of the LVA in parallel with the iterative design process to identify and refine the Proposed Development.

4.5 Sensitive Landscape Receptors

4.5.1 Braco Garden and Designed Landscape (GDL) and the Ochil Hills Local Landscape Area (LLA) are located within or in close proximity to the Study Area, as shown on **Figure 4-1, Appendix A Figures**.

Braco GDL

4.5.2 This GDL is located north the Proposed Development and is recognised for its architectural and nature conservation merits and is a good example of a small 19th-

century landscape showing different elements with park, walled garden, and woodland walks.

4.5.3 Intervening topography and woodland would result in very little or no visibility of the Proposed Development from the GDL and as such it is not considered further within the LVA.

Ochil Hills LLA

4.5.4 This LLA includes the whole of the Ochil Hills range which lies between Strathearn and the Loch Leven Basin to the Southeast of the Proposed Development. This LLA is comprised of broad, settled lowland agricultural valleys and hull ridges to the south. This is a relatively tranquil area with a strong sense of isolation and extensive areas of heather moorland and bands of broadleaf woodland within glens and lower slopes.

4.5.5 The LLA is outside the Study Area, and although there is potential for visibility of the Proposed Development, particularly from more elevated open slopes, the separation distance and context of settlement and development in the intervening landscape would limit potential change. On the basis that the Proposed Development would have little or no influence on the perceptual qualities of the LLA it has not been considered further in the LVA.

Landscape Character

4.5.6 The landscape appraisal for the Proposed Development is based on the LCTs defined and described by NatureScot[1]. The following LCTs are found within the Study Area and immediate context, as indicated on **Figure 4-2, Appendix A Figures**:

- LCT 380: Lowland Hills – Tayside, to the west of the Proposed Development; and
- LCT 384: Broad Valley Lowlands – Tayside.

4.5.7 The following provides a summary of the character and value of each of the LCTs. A description of the defined key characteristics of each LCT are provided on the NatureScot website.

LCT 380: Lowland Hills – Tayside

4.5.8 This LCT is located in the northeast of the Study Area and covers a series of low ridges and hills between Strathallan and Strath Tay, separating the valleys and adjoining nearby uplands. This is a transitional landscape, with pastures on lower slopes, woodland and coniferous plantation on mid slopes and open moorlands higher up. Modern settlements with scattered farmsteads, prehistoric standing stones and Roman forts provide an indication of the historical and cultural associations. Part of the Braco GDL is located on the fringe of this LCT. Intervening topography and woodland would result in very little or no visibility of the Proposed Development from this LCT and as such it is not considered further within the LVA.

LCT 384: Broad Valley Lowlands – Tayside

4.5.9 This LCT covers the majority of the Study Area and is characterised by a series of broad straths, loosely enclosed by low foothills and hill ridges. Within the Study Area the landscape is defined by gently undulating landform and a mix of agricultural land use, woodland and forestry. There is a variable sense of openness and enclosure, with relatively expansive open views from elevated locations and more restricted views where trees, woodland and topography provide containment. Settlement is focused on the

village of Braco and a number of scattered rural properties and farmsteads. The A822 and B8033 are the main transport routes, although a number of farm tracks and access tracks are also present within the landscape.

4.5.10 Within the Study Area this LCT is not subject to any landscape designations but includes a range of recreational routes and core paths, where scenic quality is mixed. Landscape pattern is varied, and the overall impression of quality is influenced by settlement and land use. Taking this into account, landscape value is considered to be low.

4.6 Sensitive Visual Receptors

4.6.1 This visual appraisal determines the degree of anticipated change to visual amenity experienced by people (visual receptor) that would occur from the construction and operation of the Proposed Development. Potential visual receptors which may experience views of the Proposed Development include:

- Nearby settlement and residential properties, including parts of Braco village and a number of scattered farmsteads;
- Users of recreational routes such as the local Core Paths network within and near Braco village; and
- Road users travelling along the A822 and B8033.

Representative Viewpoints

4.6.2 The visual appraisal is based on representative viewpoints selected to provide a cross section of receptor types, locations and distances from the Proposed Development and focused on receptors with the greatest potential for effects. The locations of each viewpoint are shown on **Figure 4-4, Appendix A Figures.**

4.6.3 **Table 4-6** below, provides details of the viewpoints, including the receptor type they are representative of and a description of the baseline view. All viewpoints are located in publicly accessible locations. The locations of each viewpoint are shown on **Figure 4-4, Appendix A Figures.**

Table 4-6 Representative Viewpoints

ID	Name	Receptor Type	Easting	Northing	Value of the View
1	Silver Birch Lodge / Easter Feddal	Residential	282562	709096	Low
Baseline Description: This viewpoint is representative of nearby residential receptors at Silver Birch Lodge and Easter Feddal. From the viewpoint location views are orientated towards the east over the coniferous tree plantation in the foreground and to the distant Ochil Hills. Views from the adjacent residential properties tend to be more restricted and limited by surrounding trees and woodland. The main views from Silver Birch Lodge are orientated to the east and west, although west facing views are generally short range and limited by trees. There are more open views east, similar to those experienced from the viewpoint location although slightly more restricted by trees and woodland and containing the road / track and a wood pole overhead line in the foreground. Views from properties at Easter Feddal tend to be orientated to the north and south and are generally restricted and limited by surrounding trees and woodland. There is					

ID	Name	Receptor Type	Easting	Northing	Value of the View
potential for heavily filtered views east, with slightly more open views south available from the upper storey. A further residential property (Gamekeeper Cottage) is located to the north of Silver Birch Lodge but is within woodland such that there are no outward views. Overall, views are of mixed quality and composition, are not recognised on mapping and are from private dwellings with no public access and as such are considered to be of low value.					
2	B8033, Glassick Farm	Road users	282922	709010	Low
Baseline Description: This viewpoint is representative of views experienced by road users on the B8033. Views for road users are largely contained within the road corridor by the mature hedgerow and broadleaf tree planting on either side of the carriageway. There are filtered, and occasionally more open views over the roadside hedgerow and between trees to the surrounding agricultural land. A combination of landform and mature tree and hedgerow planting limit most longer distance views from this section of the B8033, although filtered and framed views to the Ochil Hills in the mid-ground and distance to the southeast are possible from select locations. Where outward views are possible, they tend to include a mix of undulating agricultural fields, trees and woodlands and scattered farms and rural properties. This is an undesignated view not recognised on mapping which is of mixed quality and composition considered to be of low value.					
3	Glassick Farm	Residential	282907	708995	Low
Baseline Description: This viewpoint is representative of the views experienced by residential receptors at Glassick farm. The property at Glassick Farm is orientated to the east, with slightly elevated and open views over the adjacent undulating farmland towards a series of linear tree belts which restrict more distant views. There are also slightly elevated and open views across the broad valley and to the Ochil Hills beyond to the south and southeast. Traffic on the A9 introduces movement and activity into these views. Foreground vegetation and farm buildings restrict and limit views to the north and west, although traffic on the adjacent road (B8033) is visible in the foreground to the north. The adjacent Glassick Cottage is orientated to the southeast, with slightly elevated views across the broad valley of Strathallan to the Ochil Hills beyond, similar to those from Glassick Farm. Views in other directions are heavily restricted by rising landform, trees and forestry and adjacent farm buildings. Views are of mixed quality and composition, are not recognised on mapping and are from private dwellings with no public access and as such are considered to be of low value.					
4	Loaning View	Residential	283257	709117	Low
Baseline Description: This viewpoint is representative of the views experienced by residential receptors at Loaning View. Loaning View is located adjacent to the junction of the B8033 with the farm access track connecting to Keirallan Farm. The house is orientated to the southeast, with open views south across agricultural fields to the Ochil Hills on the opposite side of the broad valley.					

ID	Name	Receptor Type	Easting	Northing	Value of the View
Views east are of shorter range, limited by trees and woodland in the midground. There are also filtered and restricted views to the north between the gaps in trees alongside the B8033 in the foreground. The adjacent track and B8033 and the embankments along the Keir Burn represent low level linear features within the view. Occasional traffic on the track and road and agricultural machinery within the surrounding fields introduce movement into the views. This is an undesignated view of mixed quality and composition and as such visual value is considered to be low.					
5	Greenhaugh Way, Braco	Residential	283471	709284	Low
Baseline Description: This viewpoint is representative of the views experienced by residential receptors on the southwest edge of Braco village, and particularly those at the west end of Greenhaugh Way and Commander's Grove. The properties are primarily orientated to the north or south and are largely inward facing towards the adjacent roads. Views in most directions are restricted by foreground vegetation, adjacent woodland, rising topography and other buildings, although the tops of the Ochil Hills are occasionally visible to the south. There are localised filtered and partial views west over an adjacent agricultural field, with mature trees along the Keir Burn and B8033 limiting more distant views. Where visible, occasional traffic on the B8033 and farm tracks introduces movement into the view. Views are not recognised on mapping and are from private dwellings with no public access and as such are considered to be of low value.					
6	Silverton Farm / B8033	Residential / Road users	283275	709444	Low
Baseline Description: This viewpoint is representative of the views experienced by road users on the B8033 west of Braco and nearby residential receptors at Silverton Farm. Silverton Farm is comprised of the main farmhouse dwelling and Silverton Cottage and Silverton Mews within the converted steading. The properties sit at an elevated position upon an undulating ridgeline. Silverton farmhouse is orientated to face southeast, with slightly elevated and expansive views over adjacent fields and to the Ochil Hills on the opposite side of the broad valley of Strathallan. There are also slightly elevated, although more restricted, views to the southwest from the conservatory on the western gable. A mature hedgerow along the garden boundary provides an element of screening of views from lower storeys. Views to the north are generally limited and restricted by the adjacent converted steading buildings. Traffic on the B8033 and agricultural machinery within the surrounding fields introduces movement into parts of the view. Outward views from properties within the converted steading (Silverton Cottage and Silverton Mews) are primarily orientated to the north, although with some views also available in other directions. Views south are largely limited by the adjacent building (Silverton farmhouse) and by the hedgerow and other vegetation along the boundary. From the viewpoint location and adjacent section of the B8033, views tend to be relatively contained and focused along the road corridor, although more open short to medium range views to the adjacent agricultural fields are possible over lower sections of hedgerows or through gaps in roadside vegetation. The B8033 and access to Silverton are notable low level linear feature and associated traffic and agricultural machinery introduces movement into the view. Where outward views are possible, they					

ID	Name	Receptor Type	Easting	Northing	Value of the View
tend to be relatively short range, limited by mature trees and woodland along watercourses, field boundaries and the settlement edge. Views are not recognised on mapping and are from private dwellings with no public access and secondary roads and as such are considered to be of low value.					
7	Core Path BRAC/106/1, Keirallan	Recreational and residential	283242	708847	Low
Baseline Description: This viewpoint is representative of recreational users along the Core Path BRAC/106/1 and nearby residential receptors at Keirallan Farm. There are relatively open views in all directions from the viewpoint location and adjacent sections of the core path. While the focus would change depending on the direction of travel the Ochil Hills to the south represent the main scenic element. Views in other directions tend to be shorter range, limited by trees and woodlands. Views are generally agricultural in nature although include the track and wood pole line in the foreground and occasional traffic on the B8033 and movement of agricultural machinery in the adjacent fields. Views from Keirallan House tend to be orientated to the south across open agricultural fields and the broad valley of Strathallan to the Ochil hills beyond. The A822 and adjacent wood pole line and the more distant A9 are linear features within the view, with associated traffic introducing movement. There are also partial outward views to the east and west from the property, with views north largely screened by the adjacent barns and converted steading. Outward views from properties within the converted steading, including The Bothy, The Byre and Barn House, tend to be focused to the north and west. Trees and vegetation within the garden's limits of filters these views, which are otherwise relatively open across the adjacent agricultural field. Trees and woodland along the Keir Burn, B8033 and settlement edge within the midground limit more distant views. Overall, this is a typical view with no special scenic quality and the visual value is considered to be low.					

4.7 Embedded Mitigation

4.7.1 Landscape and visual considerations have been important in informing the siting and design of the Proposed Development. This process ensures potential adverse effects are designed out as far as possible and mitigation measures are embedded within the scheme design, further reducing potential adverse effects. Key embedded mitigation measures relevant to landscape and visual impacts include:

- Siting of the Proposed Development within a relatively visually contained location, where trees, woodland and topography limit the potential for landscape and visual impacts;
- Removal of the temporary bridge deck when the haul track is not subject to temporary operation;
- Incorporating seeded embankments to aid landscape integration of the linear Proposed Development;
- Inclusion of native woodland planting adjacent to the temporary bridge;

- Incorporating a section of hedgerow alongside the Proposed Development and along an adjacent field boundary to reflect and reinforce the existing landscape pattern and provide an element of screening from nearby receptors; and
- Incorporating specimen tree planting to infill gaps within the tree lined B8033 road corridor.
- The holistic approach adopted for landscape and visual, and ecology mitigation is outlined in more detail in **Chapter 5 Ecology and Nature Conservation** and **Appendix C Landscape and Habitat Management Plan.**

4.8 Sources of Effect

4.8.1 Sources of potential landscape and visual effects include the following:

- Temporary physical change to the landscape due to the removal of vegetation, introduction of temporary works compound, including containers and storage space for machinery and plant along with site car parking, during haul track construction;
- Temporary change to perceptual aspects of landscape character, including the sense of remoteness or tranquillity, due to nearby construction activity, including temporary lighting for use during the construction and temporary operation of haul track and compounds;
- Temporary disruption or change to views experienced from receptors and at viewpoints because of visibility of construction activity, temporary compounds and associated lighting for use during the construction phase and temporary operation;
- Long term and / or permanent change to physical components of the landscape, including loss of existing features such as trees or woodland, and introduction of new elements associated with the Proposed Development;
- Change to perceptual aspects of the landscape character because of introduction of the Proposed Development into adjacent or nearby landscapes; and
- Longer term and / or permanent change to the composition and nature of views because of introduction of the Proposed Development.

4.9 Appraisal of Landscape Effects

4.9.1 Landscape effects relate to physical changes to the fabric of the landscape and / or changes to the way a landscape and its character are perceived as a result of the introduction of the Proposed Development. The landscape appraisal considers the effect of the Proposed Development on LCT 384: Broad Valley Lowlands - Tayside. As highlighted in the baseline section, LCT 380: Lowland Hills – Tayside is also found within the Study Area but has not been considered further due to limited potential for visibility or indirect change from the Proposed Development.

LCT 384 Broad Valleys Lowlands – Tayside

4.9.2 Landscape value is low. This is a relatively large-scale landscape with a variable sense of openness and enclosure. It is influenced by a range of existing settlement, roads and tracks and linear infrastructure which somewhat reduce the susceptibility to change. On

balance, susceptibility to change of the type proposed is medium. Combining low value with medium susceptibility results in low sensitivity.

4.9.3 The Proposed Development would be located within this LCT and as such would result in both direct (physical) and indirect (perceptual) change.

Construction of the Proposed Development

4.9.4 Direct change related to construction would result from the temporary loss of vegetation and temporary earthworks to facilitate access and within temporary compounds, bridge fabrication areas and topsoil and materials storage areas. Indirect change, resulting from introduction of temporary compounds, structures and fencing, temporary earthworks and movement of construction vehicles and machinery and temporary lighting at night would occur over a slightly larger extent but would be limited by the undulating nature of the topography and by surrounding trees, woodland and forestry. Direct and indirect change would be experienced in the context of existing agricultural activity and movement of traffic on the existing road network, although would be more concentrated and intensive.

4.9.5 On balance, although locally intensive, change resulting from construction would be focused on a relatively small part of the wider LCT and would be both temporary in nature and of a short duration. Magnitude of impact from construction is anticipated to be low. The low sensitivity of the receptor combined with the low magnitude of impact would result in a **minor adverse** effect from construction.

Temporary Operation

4.9.6 During temporary operation, all potential effects would be indirect and related to movement of vehicles along the completed haul track to facilitate construction or occasional maintenance of the proposed Cambushinnie 400 kV substation and associated infrastructure.

4.9.7 The level and extent of movement would be slightly reduced from that experienced at construction of the Proposed Development. Topography, trees and woodland would limit the extent of potential indirect change to a relatively small and contained part of this LCT. Movement of vehicles along the haul track would be experienced in the context of traffic on the existing road network and agricultural activity within the surrounding fields. Overall potential change would involve an increase in movement and activity relative to the baseline and would be temporary and of a short duration and limited in extent. On balance, the magnitude of impact from temporary operation would be low. The low sensitivity of the receptor combined with the low magnitude of impact would result in a **minor adverse** effect.

Post Operation

4.9.8 Following completion of construction of the Proposed Development and when not subject to temporary operation, the extent of direct and indirect change would be reduced, with areas temporarily affected by construction of the Proposed Development reinstated, the bridge deck removed and very little or no movement and activity on the haul track anticipated.

4.9.9 Direct change would result from localised loss of vegetation, alteration of landform and introduction of new structures and the haul track. A limited number of mature deciduous trees along the A822 and B8033 roads and alongside the Keir Burn would be lost. There would also be localised loss of commercially planted trees, including the coniferous

plantation, west of the B8033. The eastern section of the haul track would be constructed on raised embankment to facilitate crossing of the Keir Burn, resulting in direct change to the existing topography.

4.9.10 Indirect change to perceptual aspects of the LCT would occur over a slightly wider extent, although would be limited by the undulating nature of the topography and by surrounding trees, woodland and forestry. The haul track would generally be a low-lying linear feature contained within the mosaic of agricultural land, woodland and forestry and this combined with intervening landform would help to limit the impression of change.

4.9.11 Overall, potential change would be relatively localised and the rural and agricultural nature, and the key characteristics and more valued elements would remain intact. Change would be long-term and permanent. On balance, the magnitude of impact post operation would be low. The low sensitivity of the receptor combined with the low magnitude of impact would result in a **minor adverse** effect post operation.

4.10 Appraisal of Visual Effects

Viewpoint 1: Silver Birch Lodge / Easter Feddal

4.10.1 The value of the view is judged to be low. Although adjacent trees and woodland influences the nature of outward views from these properties, views experienced by residential receptors are generally considered to be of high susceptibility to change. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.2 There is potential for partial visibility of construction activity in views to the southeast from the viewpoint location and from Silver Birch Lodge. Intervening topography, trees and woodland would provide an element of screening such that visibility would generally be limited to movement of larger plant and machinery, occupying a relatively small part of the view. This movement and activity would not be dissimilar to occasional agricultural activity, although would be of greater intensity.

4.10.3 Visibility of construction activity from Gamekeeper Cottage and from Easter Feddal would be more restricted as a result of additional screening by trees and other vegetation, further limiting the sense of change.

4.10.4 Overall, change would be relatively limited, temporary in nature and of a short duration. The magnitude of impact from construction would be very low and when combined with the medium sensitivity of the receptor would result in a **negligible adverse** effect.

Temporary Operation

4.10.5 Potential change resulting from temporary operation of the Proposed Development is likely to be limited to partial visibility of vehicles along a section of the haul track. This would not be dissimilar to existing movement of vehicles on the track in the foreground and along the B8033 and agricultural machinery within the surrounding landscape, although would be more concentrated. Potential change would be limited to a relatively small part of the view and would be both temporary and of a short duration. On balance, magnitude of impact resulting from temporary operation would be very low and when

combined with the medium sensitivity of the receptor would result in a **negligible adverse** effect.

Post Operation

4.10.6 Following completion of construction and when not subject to temporary operation, the Proposed Development would predominantly be screened by topography and the existing coniferous tree plantation such that there would be little or no impression of change from the viewpoint location and adjacent receptors. The magnitude of impact would therefore be very low and when combined with the medium sensitivity of the receptor result in a **negligible adverse** effect post operation.

Viewpoint 2: B8033, near Glassick Farm

4.10.7 The value of the view is judged to be low. Views experienced by road users upon the B8033 are generally considered to be incidental or not the primary reason for being at that location. Susceptibility is therefore considered to be low. The combination of the low value and low susceptibility results in a low sensitivity.

Construction of the Proposed Development

4.10.8 During construction, there would be relatively open views north from the viewpoint location of the temporary access control compound, topsoil storage and activity along a short section of the haul track. Visibility from the adjacent sections of the B8033 would be more fragmented and partially screened by roadside hedgerows and trees. There is also potential for filtered and glimpsed views of construction associated with the temporary bridge structure to the east, marginally adding to the impression of change. Construction activity would occupy a small part of the views from a short section (approximately 750 m) of the B8033, with views from the wider route unaffected. Construction would be temporary in nature and short in duration. The magnitude of impact during construction would be low and when combined with the low sensitivity would result in a **minor adverse** effect during construction.

Temporary Operation

4.10.9 Potential change relating to temporary operation of the Proposed Development would result from visibility of the temporary access control compound and vehicles along parts of the haul track. There would be relatively open views of the compound and of traffic on a short section of the haul track to the north from the viewpoint location and more fragmented visibility from adjacent sections of the B8033. Change would be temporary, short in duration and experienced by those using the existing road network. On balance, the magnitude of impact resulting from temporary operation would be low and when combined with the low sensitivity would result in a **minor adverse** effect.

Post Operation

4.10.10 Following completion of construction of the Proposed Development and when not subject to temporary operation, no movement and activity would typically occur and the temporary compound and storage areas would be reinstated, reducing the impression of change. The Proposed Development would be perceptible across a small part of the view from the viewpoint location, adding an additional track into the adjacent fields. The embankments associated with the more elevated section of the haul track east of the B8033 would introduce a new linear element not dissimilar to the existing embankments along the Keir Burn. The Proposed Development would occupy a relatively small part of

the view, often filtered by trees and other roadside vegetation, with visibility limited to a short section of the route. On balance, magnitude of impact at operation would be low and when combined with the low sensitivity of the receptor would result in a **minor adverse** effect.

Viewpoint 3: Glassick Farm (residential properties)

4.10.11 The value of the view is judged to be low. Although existing views in some directions are restricted and or include the B8033 in the foreground, views experienced by residential receptors are generally considered to be of high susceptibility to change. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.12 There is potential for visibility of construction of two short sections of the Proposed Development from Glassick Farm, with the temporary access control compound oblique to the northeast and the section between the B8033 and Keir Burn slightly more distant to the east. The orientation of the building and proximity to the mature tree planting along the B8033 would partially screen and filter views of construction activity and the temporary compound to the northeast, reducing its influence on the view. There would be more open views of construction activity to the east of the B8033, including along a short section of the haul track and within the potential bridge fabrication area. More filtered and limited visibility of works to the east of Keir Burn may also be possible, although it would be largely screened by existing trees along the Keir Burn.

4.10.13 Overall, construction is anticipated to occupy a relatively small part of the view, would be partially screened, and filtered by mature trees and other vegetation and would not influence more distant views towards the Ochil Hills to the southeast and south. Construction would be temporary in nature and short in duration. On balance, magnitude of impact is anticipated to be low and when combined with the medium sensitivity would result in a **minor adverse** effect during construction.

Temporary Operation

4.10.14 Change resulting from temporary operation of the Proposed Development would be limited to visibility of the temporary access control compound and vehicles on relatively short sections of the haul track. Views to the closest section of haul track and the temporary access control compound to the northeast would be partially screened and filtered by trees along the B8033. There is potential for more open views of vehicle movements to the east, although limited to a short section of the haul track and limited part of the wider views. On balance, the magnitude of impact is anticipated to be low and when combined with the medium sensitivity would result in a **minor adverse** effect resulting from temporary operation.

Post Operation

4.10.15 Following completion of construction of the Proposed Development and when not subject to temporary operation, no movement or activity associated with the Proposed Development would typically occur. The temporary compound, bridge fabrication area and storage areas would be reinstated and the bridge deck would be removed, reducing the impression of change. A short section of the haul track would be visible to the northeast, although largely filtered by foreground trees and represent a low-level feature with little influence on the overall impression of the view. Similarly, a short section of the

haul track would be visible to the east, beyond Loaning View, and although raised slightly on embankment would also represent a small element in the wider view. Overall, potential change would be relatively localised and limited and not uncharacteristic with existing features. The magnitude of impact would be low and when combined with the medium sensitivity of the receptor would result in a **minor adverse** effect during operation.

4.10.16 Proposed mitigation planting would result in a small reduction in potential visibility of the Proposed Development in the longer term although the level of effect is anticipated to remain as stated above.

Viewpoint 4: Loaning View

4.10.17 The value of the view is judged to be low. Although existing views in some directions are restricted and / or include the B8033 or farm track in the immediate foreground, views experienced by residential receptors are generally considered to be of high susceptibility to change. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.18 There would be close range views of construction activity to the northwest, north and east from this property. Activity to the east would be slightly oblique to the main view and would include activity within the potential bridge fabrication area, earthworks operations to form embankments and construction of the temporary bridge structure. This increased movement and activity is likely to distract from the existing focus of the view. There is also potential for filtered views of construction activity and the temporary compound to the east of the Keir Burn. Construction activity to the north and northwest would add to the impression of change, although would be partially screened by mature trees and vegetation and the proposed acoustic barriers alongside the B8033. On balance, considering the close proximity with the temporary nature and short duration of construction, the magnitude of impact is anticipated to be medium, resulting in a **moderate adverse** effect during construction.

Temporary Operation

4.10.19 Temporary operation of the Proposed Development would introduce vehicles moving along sections of the haul track into views from this location. Mature trees and the proposed acoustic barrier along the B8033 would partially restrict views of traffic and the temporary access control compound to the north and northwest. However, there would be more open views of traffic along the slightly elevated section of the haul track and bridge in close proximity to the northeast. Although slightly oblique to the main view and partially screened by the acoustic barrier, the close proximity and slightly elevated nature would result in a noticeable change. Potential changes would be temporary and short in duration. On balance, the magnitude of change from temporary operation is anticipated to be medium and when combined with the medium sensitivity would result in a **moderate adverse** effect.

Post Operation

4.10.20 Following completion of construction and when not subject to temporary operation no movement or activity associated with the Proposed Development would typically occur. The temporary compound, bridge fabrication area and storage areas would have been reinstated, and the bridge deck and acoustic barriers removed, reducing the impression

of change. The main visual change would be removal of a small number of trees along the Keir Burn and the introduction of a short section of haul track on embankments within the field to the northeast. Existing views in this direction are relatively short range and although the embankments may restrict this further, they would not fundamentally alter the nature of the view. The main views towards the Ochil Hills to the southeast would be largely unaffected. A short section of the haul track may also be partially visible to the northeast, although would be filtered by foreground vegetation and experienced in the context of existing traffic on the B8033 in the foreground. Overall, the magnitude of impact would be low and when combined with the medium sensitivity of the receptor would result in a **minor adverse** effect during operation.

4.10.21 Proposed mitigation planting, including the hedgerow and woodland planting to the northeast would result in a small reduction in potential visibility of the Proposed Development in the longer term. However, the level of effect is anticipated to remain minor adverse, as stated above.

Viewpoint 5: Greenhaugh Way, Braco

4.10.22 The value of the view is judged to be low. Existing views are often inward facing, with outward views generally restricted. However, views experienced by residential receptors are generally considered to be of high susceptibility to change. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.23 There is potential for partial visibility of construction activity during autumn and winter where leaf fall enables views beyond the immediate field to the temporary construction compound and the temporary bridge to the southwest.

4.10.24 Where visible, this would add movement and activity into the view which would not be dissimilar to periodic agricultural operations but would be of a greater intensity. Potential change would be temporary in nature and of a short duration and would generally be from the rear garden of properties, with no impact on the main views which predominantly face onto the road. On balance, change is anticipated to be relatively limited and as such the magnitude of impact would be low. Combining the medium sensitivity with the low magnitude of impact would result in a **minor adverse** effect at construction.

Temporary Operation

4.10.25 Temporary operation of the Proposed Development would introduce movement of vehicles into views to the southwest. Existing trees and woodland along the settlement boundary and along adjacent field boundaries would limit visibility of traffic to a short section of the haul track and a relatively small part of the view. Mature trees along the Keir Burn and the B8033 would partially restrict and filter views of vehicle movements. Potential change would be experienced in the context of existing traffic on the B8033 and occasional agricultural operations. On balance, considering the relatively small part of the view affected, the temporary nature of change and short duration the magnitude of impact would be low, and when combined with the medium sensitivity would result in a **minor adverse** effect resulting from temporary operation.

Post Operation

4.10.26 Following completion of construction and when not subject to temporary operation, no movement and activity associated with the Proposed Development would typically occur.

The bridge deck would be removed and the temporary compound areas would be reinstated. The Proposed Development would be predominantly screened and although the grassed embankment may be partially visible, it would result in a barely perceptible change to the view. Magnitude of impact would be very low and when combined with the medium sensitivity would result in a **negligible adverse** effect.

Viewpoint 6: Silverton Farm / B8033

4.10.27 The value of the view is judged to be low. Although locally restricted in nature, views experienced by residential receptors are generally considered to be of high susceptibility to change. Views experienced by road users are typically less important and/ or incidental. On balance, based on the residential receptors, susceptibility is considered to be high. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.28 There is likely to be open and relatively close-range views of movement and activity to the west of the B8033 from Silverton Farmhouse. This would include views of construction of a short section of the haul track, the temporary access control compound and adjacent soil storage area. Further to the west, construction activity is likely to be largely screened by intervening trees and landform. There is also potential for filtered views of construction activity to the east of the B8033, and particularly taller plant and machinery associated with the temporary bridge structure. Construction activity would generally occur at lower elevation and as such influence a relatively small part of the wider view south from Silverton Farmhouse and although it may temporarily distract from the existing focus would not obstruct or influence more distant views to the Ochil Hills. On balance, taking account of the noticeable change within the main view south and the temporary nature and short duration, the magnitude of impact during construction is anticipated to be medium. The medium sensitivity combined with the medium magnitude of impact would result in a **moderate adverse** effect during construction.

4.10.29 Views of construction activity from properties within the converted steading (Silverton Cottage and Silverton Mews) would be more limited and largely screened by adjacent buildings and intervening trees and woodland such that there would be a limited sense of change and reduce effect.

Temporary Operation

4.10.30 Potential change from temporary operation of the Proposed Development would result from introduction of traffic along a short section of the haul track. There would be open views to the temporary access control compound and movement of vehicles on the haul track as it crosses the fields west of the B8033, with visibility east of the B8033 more limited due to partial screening by mature roadside trees. Vehicle movements would be experienced in the context of existing traffic on the B8033 and would be at low elevation with little influence on the more distant views to the Ochil Hills. The extent of area affected would be slightly reduced relative to construction of the Proposed Development although change would occur over a slightly longer duration. On balance, considering the open nature of visibility within the main view against the temporary nature of change and

the short duration, magnitude of impact would be medium, resulting in a **moderate adverse** effect.

4.10.31 As with construction, potential impacts on Silverton Cottage and Silverton Mews would be more limited due to screening by buildings, trees and woodland.

Post Operation

4.10.32 Following completion of construction and when not subject to temporary operation, no activity and movement associated with the Proposed Development would typically occur, and areas temporarily occupied during construction would be reinstated, reducing the sense of change. A short section of the haul track would be visible at low elevation to the south, seen within the context of the existing B8033 and other existing tracks. While the Proposed Development would introduce a new linear feature it would have a limited presence or influence on the overall nature or impression of the view and would not distract from the more distant focus of the Ochil Hills to the south. Magnitude of impact would be low and when combined with the medium sensitivity would result in a **minor adverse** effect.

Viewpoint 7: Core Path BRAC/106/1, Keirallan Farm

4.10.33 The value of the view is judged to be low. Although locally restricted and variable in nature, recreation receptors are likely to be at this location in part for the appreciation of views indicating an increased susceptibility. Views experienced by residential receptors are generally considered to be of high susceptibility to change. The combination of the low value and high susceptibility results in a medium sensitivity.

Construction of the Proposed Development

4.10.34 There would be relatively close range and open views of construction activity to the northeast from the viewpoint location and part of the core path. This would primarily include construction works to form the section of the haul track between the B8033 and the Keir Burn and the temporary bridge structure and acoustic barrier. There is also potential for more fragmented or filtered visibility of construction activity further west, to the north of the B8033, and further east, between the Keir Burn and the A822 adding to the impression of change. This is likely to represent a noticeable change from a short section of the core path, experienced by those travelling north, with the more scenic views south towards the Ochil Hills unaffected. Views of construction activity from the properties at Keirallan Farm would be more restricted, reducing the impression of change.

4.10.35 On balance, considering the relatively open and close-range visibility from a short section of the core path, the more restricted visibility from other sections and the temporary nature and short duration, magnitude of impact is considered to be low. The medium sensitivity combined with the low magnitude of impact would result in a **minor adverse** effect during construction.

Temporary Operation

4.10.36 Temporary operation of the Proposed Development would introduce vehicles moving along sections of the haul track into views from the viewpoint location and from part of the core path. This would primarily occur along a short section of the haul track between the B8033 and the Keir Burn, although with potential for partial visibility of traffic along other sections of the track. Vehicle movements would be experienced in the context of existing traffic on the local road network and would represent a local intensification of activity.

There is likely to be a noticeable change locally from the northern end of the core path adjacent to Loaning View with a reduced sense of change from other parts of the route. On balance, considering the route as a whole, the magnitude of impact from temporary operation is anticipated to be low and when combined with the medium sensitivity would result in a **minor adverse** effect.

Post Operation

4.10.37 Following completion of construction and when not subject to temporary operation, no activity would typically occur. The temporary compound, bridge fabrication area and storage areas would be reinstated and the bridge deck removed, reducing the impression of change. The main visual change would be removal of a small number of trees along the Keir Burn and the introduction of a short section of haul track on embankments within the field to the northeast of the viewpoint. Existing views in this direction are relatively short range and as such the Proposed Development would have little influence on the overall impression of the view. The main scenic views south towards the Ochil Hills would remain unaffected. Other sections of the haul track and associated traffic would be largely screened and barely perceptible. On balance, the magnitude of impact would be low and when combined with the medium sensitivity would result in a **minor adverse** effect.

4.10.38 Proposed mitigation planting, including hedgerow and woodland planting along field boundaries and adjacent to the haul track embankments would result in a reduction in potential visibility of the Proposed Development in the longer term. However, the level of effect is anticipated to remain minor adverse, as stated above.

4.11 Cumulative Appraisal

4.11.1 An initial review of the potential cumulative developments is set out in **Chapter 13** and shown on **Figure 13-1, Appendix A Figures**. Two consented developments have been identified to the northwest of the Proposed Development as detailed in **Section 13.1.2** and **Table 13-1** and listed below;

- 21/00756/FLM: 49.9MW battery energy storage system (BESS) facility; and
- 22/02231/FLM: 49.9MW BESS facility compound.

4.11.2 The two BESS developments are primarily located outside the 1 km Study Area and as such are physically separate from the Proposed Development, with very little or no potential for intervisibility or contribution to the impression of a cumulative change. However, both BESS developments intend to take access along the existing track to Braco West Substation located at the western extent of the Site and therefore with potential for localised cumulative change during construction. There is unlikely to be any impression of a cumulative change following completion of construction of the BESS developments.

4.11.3 It is also noted that elements of the proposed Cambushinnie 400 kV substation, principally related to minor track upgrades, would be located within the Study Area. However, as the construction period does not overlap with the Proposed Development it has been scoped out of the LVA.

4.11.4 The following provides an appraisal of potential cumulative effects resulting from construction and temporary operation of the Proposed Development in addition to construction of the BESS developments on the Broad Valley Lowland LCT and visual receptors represented by Viewpoint 1. There would be very little or no potential for

cumulative change on the remaining identified landscape and visual receptors. As highlighted above, cumulative effects are unlikely beyond the construction stage.

4.11.5 It is important to note that there is no certainty that construction of the BESS projects would occur concurrently with the Proposed Development and therefore no certainty that cumulative effects would occur.

LCT 384 Broad Valleys Lowlands – Tayside

4.11.6 Although within this LCT, construction of the BESS developments would make use of an existing track and therefore would result in little or no direct change. The cumulative baseline would include increased movement and activity along the existing track, with a localised and limited influence on the character of the landscape. The extent of potential change is limited by adjacent trees, woodland and forestry along much of the track.

4.11.7 Construction and / or temporary operation of the Proposed Development would add further movement and activity into the landscape, increasing the extent over which construction activity would be apparent. However, construction or vehicle movement would remain focused on a relatively small part of the wider LCT and would be temporary in nature. On balance, magnitude of cumulative impact resulting from the Proposed Development in addition to construction of the BESS developments is anticipated to be low. The low sensitivity of the receptor combined with the low magnitude of impact would result in a **minor adverse** cumulative effect.

Viewpoint 1: Silver Birch Lodge / Easter Feddal

4.11.8 The existing track planned to use to access the BESS development is in the immediate foreground of views to the east of the viewpoint and adjacent receptors and as such the cumulative baseline would include close range views of traffic, plant and machinery.

4.11.9 As outlined in **Section 4.10**, above, there is potential for partial visibility of movement of larger plant and machinery associated with construction of the Proposed Development to the southwest of this location. Where visible, construction activity on the Site would be slightly more distant than construction traffic for the BESS developments and would occupying a relatively small part of the view, representing a limited additional change. Due to the relatively limited and temporary nature of additional change the magnitude of cumulative impact would be very low and when combined with the medium sensitivity would result in a **negligible adverse** cumulative effect during construction or temporary operation.

4.12 Recommendations and Mitigation

4.12.1 All landscape and visual mitigation measures are embedded and shown on **Figure 4-5, Appendix A Figures**. Measures primarily include careful routeing of the Proposed Development, retention of existing trees and woodland, where possible, and incorporation of new tree, woodland and hedgerow planting and grass seeding. These measures would

contribute to a reduction of potential change and help the Proposed Development better fit and integrate into the existing landscape and views.

4.12.2 As these measures are embedded in the design of the Proposed Development they have been taken into consideration within the assessment detailed above, and the summary of findings, below.

4.13 Summary of Findings

4.13.1 **Table 4-7** below, provides a summary of the findings of the LVA.

Table 4-7 Summary of Effects

Receptor	Sensitivtity	Temporary Effects		Permanent Effects
		Construction	Temporary Operation	Post Operation
LCT 384 Broad Valleys Lowlands – Tayside	Low	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse
Viewpoint 1 Silver Birch Lodge / Easter Feddal	Medium	Magnitude of Impact: Very Low Level of Effect: Negligible Adverse	Magnitude of Impact: Very Low Level of Effect: Negligible Adverse	Magnitude of Impact: Very Low Level of Effect: Negligible Adverse
Viewpoint 2 B8033, Glassick Farm	Low	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse
Viewpoint 3 Glassick Farm	Medium	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse
Viewpoint 4 Loaning View	Medium	Magnitude of Impact: Medium Level of Effect: Moderate Adverse	Magnitude of Impact: Medium Level of Effect: Moderate Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse
Viewpoint 5 Greenhaugh Way, Braco	Medium	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse	Magnitude of Impact: Very Low Level of Effect: Negligible Adverse
Viewpoint 6 Silverton Farm / B8033	Medium	Magnitude of Impact: Medium	Magnitude of Impact: Medium	Magnitude of Impact: Low

Receptor	Sensitivtity	Temporary Effects		Permanent Effects
		Construction	Temporary Operation	Post Operation
		Level of Effect: Moderate Adverse	Level of Effect: Moderate Adverse	Level of Effect: Minor Adverse
Viewpoint 7 Core Path BRAC/106/1, Keirallan Farm	Medium	Magnitude of Impact: Medium Level of Effect: Minor Adverse	Magnitude of Impact: Medium Level of Effect: Minor Adverse	Magnitude of Impact: Low Level of Effect: Minor Adverse

Landscape Character

4.13.2 No impacts are anticipated on the landscape designations identified within or in close proximity to the Study Area or on LCT 380: Lowland Hills – Tayside due to screening provided by topography, trees, woodland and forestry and/or the separation distance.

4.13.3 Potential change to landscape character would therefore be focused on the Broad Valley Lowlands – Tayside LCT within which the Proposed Development would be located. Increased movement and activity would result in a local influence on the LCT during construction and temporary operation, and the permanent haul track would result in localised and relatively limited change to the LCT post operation. The appraisal has therefore identified that the Proposed Development would result in a **minor adverse** level of effect on this LCT at construction, temporary operation and post operation. The potential for a **minor adverse** cumulative effect during construction and/or temporary operation has also been identified.

Visual Amenity

4.13.4 The appraisal has identified **negligible adverse** or **minor adverse** effects on the majority of viewpoints and associated visual receptors at construction, temporary operation and post operation. However, slightly greater change and temporary, short term **moderate adverse** effects are anticipated for receptors associated with Viewpoint 4: Loaning View and Viewpoint 6: Silverton Farm during construction and temporary operation. In both cases, following completion of construction and when not subject to temporary operation, the level of change is anticipated to reduce, resulting in **minor adverse** effects post operation and in the longer term. Planting included as part of the Proposed Development would help to locally reduce change in the longer term, although not to the degree that it would alter the level of effects stated above.

5. ECOLOGY AND NATURE CONSERVATION

5.1 Introduction

5.1.1 This chapter considers the potential effects of the Proposed Development on habitats and species within the Site, and within the wider local area. Evaluation of the existing baseline environment has been made through a combination of desk-based study, field surveys, and consultation. This EA chapter was written with cognisance of the methodology set out in CIEEM (2024)[1] guidance.

5.1.2 Birds are considered separately in **Chapter 6 Ornithology**.

5.1.3 This chapter:

- Describes the key ecological issues associated with construction and operation of the Proposed Development;
- Presents the desk study / survey methods that were used to generate ecological baseline information;
- Includes details of consultation undertaken to date to inform the EA;
- Presents the results of the surveys; and
- Provides an outline of embedded mitigation, an appraisal of ecological features and potential significant effects, and details further mitigation measures and recommendations.

5.1.4 Throughout this chapter, species are given their common and scientific names when first referred to and their common names only thereafter (except where a common name does not exist or is not well-known, in which case only the scientific name is used, such as for bryophytes). Nomenclature for vascular plants follows Stace (2019)[2] and for bryophytes, Atherton *et al.* (2010)[3]. All distances from the receptor are cited as the shortest distance from the Site 'as the crow flies', unless otherwise specified.

5.1.5 The decommissioning stage of the Proposed Development has been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity, as outlined **Section 1.1.7.**

5.2 Information Sources

5.2.1 External sources used to inform this chapter are referenced appropriately.

5.2.2 Information to inform this assessment has been drawn from consultation responses, desk study and field survey data. The chapter draws on the following technical figures (see **Appendix A Figures**):

- **Figure 5-1 Designated Sites**;
- **Figure 5-2 Ancient and Native Woodland, and Peatlands**;
- **Figure 5-3 Baseline Habitat Plan**;
- **Figure 5-4 Potential Groundwater Dependant Terrestrial Ecosystems**;
- **Figure 5-5 Mammal Survey Results**;

[1] CIEEM, 2024. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.3, updated September 2024). Chartered Institute of Ecology and Environmental Management, Winchester.

[2] Stace, C E, 2019. *New Flora of the British Isles, 4th edition*. C&M Floristics.

[3] Atherton, I., Bosanquet, S. and Lawley, M., 2010. *Mosses and Liverworts of Britain and Ireland – a Field Guide*. British Bryological Society, London.

- **Figure 5-6 Great Crested Newt Habitat Suitability Index Survey Results**; and
- **Figure 5-7 Bat Ground Level Tree Assessment.**

Consultation

5.2.3 With respect to consultation, at the time of writing this chapter, consultations have been held regarding the potential ecological impacts of the Proposed Development with the following consultees (note that relevant consultation responses are detailed in **Section 5.2.4** and some of the organisations are yet to respond): PKC; Stirling Council; NatureScot; SEPA; Scottish Water; Scottish Forestry; Forth District Salmon Fishery Board; Forth Rivers Trust. A summary of these is provided in **Table 5-1**.

5.2.4 The assessment of impacts on terrestrial ecological features has been informed and influenced by consultation held with several statutory and non-statutory stakeholders.

Table 5-1 Summary of Consultation

Consultee	Summary of Relevant Pre-application Response
NatureScot	We advise that any potential impacts to Carsebreck and Rhynd Lochs Site of Special Scientific Interest (SSSI) are fully addressed. The proposal has the potential to be hydrologically connected, via the Allan Water and other tributaries, to River Teith Special Area of Conservation (SAC) and Kippenrait Glen SAC. We advise that, due to the considerable distance involved, as well as the intention to adhere to an appropriate construction environment management plan and pollution prevention plan, no likely significant effect on these designated sites are expected as a result of the construction and operation of the Proposed Development. Standing advice to be consulted for guidance on protected species surveys, mitigation and licensing. All survey work for protected species should be undertaken in line with the best practice guidance.
Perth and Kinross Council (PKC	The following designated sites were noted: • Shelforkie Moss Special Area of Conservation (SAC) • Carsebreck and Rhynd Lochs Site of Special Scientific Interest (SSSI) Reference was made to "*Protected species in surrounding area*", that could include breeding birds. The National Planning Framework 4 (NPF4) is referenced in regards to Policy 3: Biodiversity. PKC's Local Development Plan[4] is referenced in relation to Policy 38: Environment and Conservation, and Policy 41: Biodiversity. Detailed ecological survey is required. Farm buildings may contain bats and survey should include this species. Actions:

[4] PKC, 2019. *Local Development Plan* [online]. [Accessed 14 February 2025]. Available at: https://www.pkc.gov.uk/ldp2

Consultee	Summary of Relevant Pre-application Response
	Provide a Phase 1 Habitat Survey including Protected Species Survey. There is an area of woodland listed on the Native Woodland Survey of Scotland as upland birchwood which is a UK Biodiversity Action Plan priority habitat and should be protected. Submissions must include a clear impact assessment of the proposed development on trees, woodland and hedgerows, and application of the mitigation hierarchy. Compensatory tree planting is required on a ratio of 1:3 for every tree lost. New planting, particularly native fruit bearing hedgerows to enhance habitat connectivity is strongly encouraged. A landscape and planting plan with details should be submitted as part of a full planning application. The applicant may wish to consult with the Forth Rivers Trust regarding any biodiversity enhancement required as part of this proposal and whether it could link with their Revive the Allan project.

Desk Study

5.2.5 **Table 5-2** details the sources used to inform the EA. The sources were accessed on 14 February 2025.

Table 5-2 Desk study sources

Data Source(s)	Data Obtained
Mammal Society Species Hub[5]	Information on protected and important mammals within 1 km of the Site.
Marine Scotland Maps National Marine Plan interactive[6]	Rivers important for migratory fish within 10 km of the Site.
NatureScot – Peatland Action[7]	Information on peat depth measurements collected across Scotland within 1 km of the Site.
NatureScot SiteLink webpage[8]	SAC and Ramsar sites within 10 km of the Site. Sites of Scientific Special Interest (SSSIs) within 2 km of the Site. National Nature Reserves (NNRs) within 2 km of the Site.
Scottish Government Data Spatial Hub[9]; Royal Society for the Protection of Birds (RSPB)[10];	Information on Local Nature Conservation Sites (LNCS), RSPB Reserves and SWT Reserves within 2 km of the Site.

[5] Mammal Society, 2025. *British Mammal Species* [online]. [Accessed14 February 2025]. Available at: https://mammal.org.uk/british-mammals

[6] Marine Scotland, 2025. *National Marine Plan interactive map* [online]. [Accessed: 14 February 2025]. Available at: https://marinescotland.atkinsgeospatial.com/nmpi/

[7] NatureScot, 2025. *Peatland Action* [online]. [Accessed 14 February 2025]. Available at: https://www.nature.scot/climate-change/nature-based-solutions/peatland-action/peatland-action-data-research-and-monitoring/peatland-action-open-data

[8] NatureScot, 2025. *SiteLink* [online]. [Accessed 14 February 2025]. Available at: https://sitelink.nature.scot/home

[9] Scottish Government, 2025. *Spatial Data Hub* [online]. [Accessed 14 February 2025]. Available at: https://www.spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/home

[10] RSPB, 2025. *RSPB Open Data Portal* [online]. [Accessed 14 February 2025]. Available at: https://opendata-rspb.opendata.arcgis.com/

Data Source(s)	Data Obtained
Scottish Wildlife Trust (SWT)[11] website.	
NatureScot Natural Spaces webpage[12]	Ancient Woodland Inventory (AWI) for Scotland and Native Woodland Survey of Scotland (NWSS) within 1 km of the Site.
National Biodiversity Network (NBN) Atlas Scotland[13]	Commercially available records of protected and/or important species within 1 km of the Site, made since 2004.
OS 1:25,000 maps and aerial photography[14]	Aerial imagery to identify potential habitats and connectivity relevant to interpretation of planning policy and potential protected/notable species constraints.
PKC Local Development Plan (LDP)[4]	Information on local policies regarding the environment.
The PKC follows the Tayside Local Biodiversity Action Plan (LBAP) (2016-2026)[15]	Information on protected or notable species.
Saving Scotland's Red Squirrels[16]	Red squirrel Sciurus vulgaris records within 1 km of the Site.
SEPA Water Classification Hub[17]	Watercourse classification data.

Ecology Survey

5.2.6 A vegetation survey of the Site was conducted broadly following the Phase 1 habitat survey methodology, with habitats classified according to UK Habitat Classification (UKHab), as set out in relevant guidance[18,19]. In addition to the vegetation survey, protected mammal surveys, and an assessment of habitat suitability for notable and protected species were undertaken. All surveys were conducted on 18,19 and 20 March and 3 June 2024. The survey area included the area within the Site. The survey area extended from 50 m to 500 m beyond the Site (dependent on the specific survey). The field survey methodology is detailed further in **Sections 5.3.7** to **5.3.22.**

5.3 Methodology

Sensitive Ecological Receptors

5.3.1 Sensitive ecological receptors (also referred to as 'important' ecological features) have the potential to suffer significant adverse effects as a result of the Proposed Development. This chapter aims to assess the likely effects on sensitive ecological receptors and where necessary recommends mitigation to prevent significant residual effects.

[11] Scottish Wildlife Trust, 2025. *Our Data* [online]. [Accessed 14 February 2025]. Available at: https://scottishwildlifetrust.org.uk/our-work/our-evidence-base/our-data /

[12] NatureScot, 2025. *Natural Spaces* [online]. [Accessed 14 February 2025]. Available at: www.cagmap.snh.gov.uk/natural-spaces/

[13] NBN Atlas Scotland, 2025. *NBN Atlas Scotland* [online]. [Accessed 14 February 2025]. Available at: https://scotland.nbnatlas.org/

[14] Bing Maps, 2025. *Bing Maps* [online]. [Accessed 14 February 2025]. Available at: www.bing.com/maps/

[15] Tayside Biodiversity, 2025. *Tayside LBAP* 2016-2026 [online], [Accessed 14 February 2025]. Available at: https://www.taysidebiodiversity.co.uk/

[16] Saving Scotland's Red Squirrels, 2025. *Saving Scotland's Red Squirrels* [online]. [Accessed 14 February 2025]. Available at: https://scottishsquirrels.org.uk/

[17] SEPA, 2025. *Water Classification Hub* [online]. [Accessed 14 February 2025]. Available at: www.sepa.org.uk/data-visualisation/water-classification-hub/

[18] JNCC, 2010. *Handbook for phase 1 habitat survey – a technique for environmental audit*. Joint Nature Conservation Committee, Peterborough.

[19] UKHab, 2024. *UK Habitat Classification* [online]. [Accessed 14 February 2025]. Available from: https://ukhab.org/

5.3.2 The *Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland* recommend that only those ecological features that are 'important' and that could be significantly impacted by a development require detailed assessment, stating that "*it is not necessary to carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*"[1].

5.3.3 Consequently, for the purposes of the desk study, field survey and assessment of effects, 'important' ecological features will be taken to include:

- Sites designated for nature conservation, including those designated at international, national and local levels;
- The qualifying features of SPA, SAC and Ramsar sites within 10 km of the Site (extending to 20 km for sites designated for non-breeding geese species or where direct connectivity exists, e.g., via watercourses), and the notified features of SSSIs within 2 km of the Site (or further if these are directly connected);
- Woodland listed on the Ancient Woodland Inventory[20] within 2 km of the Site;
- Habitats listed on Annex I of the Habitats Directive (Council Directive 92/43/EEC)[21];
- Species listed on Annexes I and II of the Habitats Directive[21];
- Habitats listed on the Scottish Biodiversity List (SBL)[22], which are thus identified as being of principal importance for biodiversity conservation in Scotland;
- Species listed on Schedules 2 and 4 of The Conservation (Natural Habitats, &c.) Regulations 1994[23];
- Species listed on Schedule 1, 5 and 8 of the Wildlife and Country Act 1981[24] (WCA), and badger *Meles meles*;
- Species listed on the SBL[22], which are thus identified as being of principal importance for biodiversity conservation in Scotland; and
- Invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981[24], those considered to be of European Union (EU) concern under the Invasive Alien Species Regulation (Regulation (EU) 1143/2014)[25], and additional species commonly considered to be invasive as listed in Annex B of the NatureScot Developing with Nature guidance[26].

5.3.4 Other habitats or species that may be rare, scarce, or otherwise notable will be included where deemed appropriate through available information and / or professional judgement.

Desk Study

5.3.5 A desk study to help establish baseline conditions has been completed. The desk study sought to identify ecological features within the likely Zone of Influence (ZoI) of the Proposed Development that may be affected by its construction and operation. The ZoI is

[20] NatureScot, 2025. *A guide to understanding the Scottish Ancient Woodland Inventory (AWI)* [online]. [Accessed 14 February 2025] Available at: https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi

[21] European Commission, 1992. *Habitats Directive (Council Directive 92/43/EEC)*

[22] NatureScot, 2020. *Scottish Biodiversity List* [online]. [Accessed 14 February 2025]. Available at: https://www.nature.scot/doc/scottish-biodiversity-list

[23] UK Government, 2025. *The Conservation (Natural Habitats, &c.) Regulations 1994* [online]. [Accessed 09 June 2025]. Available at: https://www.legislation.gov.uk/uksi/1994/2716/contents

[24] UK Government, 1981. *Wildlife and Countryside Act 1981* [online]. [Accessed 14 February]. Available at: https://www.legislation.gov.uk/ukpga/1981/69

[25] European Commission, 2014. *Invasive Alien Species Regulation (Regulation (EU) 1143/2014)* [online]. [Accessed 20 February 2025]. Available at: https://eur-lex.europa.eu/eli/reg/2014/1143/oj/eng

[26] NatureScot, 2020. *Developing with Nature guidance* [online]. [Accessed 14 February 2025]. Available at: https://www.nature.scot/doc/developing-nature-guidance

the area(s) over which ecological features may be affected by the biophysical changes caused by the Proposed Development and associated activities[1].

5.3.6 The Study Area was defined according to the likely ZoI of the Proposed Development, which covers different distances, depending on the ecological feature (see **Section 5.3.3**). Accordingly, the desk study searched for information within the sources outlined in **Table 5-2** above.

Extended Phase 1 Habitat Survey / UKHab

5.3.7 The preliminary ecological assessment included a walkover survey of the survey area, broadly following the Phase 1 habitat survey methodology as set out in Joint Nature Conservation Committee (JNCC) guidance[18], and defined using the UKHab[19], by which standard habitat types are mapped and ecological notes recorded. The survey extended to 50 m from the Proposed Development. Surveys were conducted on 18,19 and 20 March, and 3 June 2024[27].

5.3.8 Notes were made for each habitat of dominant, typical, and notable (including invasive non-native) plant species, and these reflect conditions at the time of survey. Condition of baseline habitats was recorded in the field by the field surveyor using the condition criteria set out for the Natural England Biodiversity Metric v3.1[28]. Habitat suitability for important ecological features (such as invertebrates, fish, reptiles, and amphibians) was noted.

National Vegetation Classification (NVC) Survey

5.3.9 An NVC survey was carried out following published guidelines[29], in all areas of habitat within the Site with potential to support notable habitats. Surveys were conducted on 3 June 2024. The NVC survey focussed mostly on notable habitats identified through the UKHab survey (e.g. Groundwater Dependent Terrestrial Ecosystems (GWDTE))[30] or habitats listed on the SBL (e.g. priority habitat such as purple moorgrass rush pasture). The survey extended to 250 m from the Proposed Development, in accordance with SEPA guidance[30].

Otter and Water Vole Survey

5.3.10 Survey for otter *Lutra lutra* and water vole *Arvicola amphibius* was carried out along all suitable watercourses within the Site. The otter survey extended to 200 m from the Proposed Development in appropriate habitat, and the water vole survey extended to 50 m from the Proposed Development. The survey generally followed guidance in published literature[31,32], except that only one survey was completed[33]. The guidance was

[27] Surveys were conducted in separate locations in March and June, not the same areas twice.

[28] GOV.UK, 2023. A*rchive Site for Legacy Biodiversity Metrics* [online]. [Accessed 14 February 2025]. Available at: https://publications.naturalengland.org.uk/publication/5850908674228224

[29] Averis *et al.*, 2004. *An Illustrated Guide to British Upland Vegetation*; Averis, B. and Averis A., 2015. *Plant Communities Found In Surveys By Ben And Alison Averis But Not Described In The UK National Vegetation Classification.* Unpublished document; Rodwell, J.S. (ed.)., (1991a) *British Plant Communities Volume 1 Woodlands and Scrub*. Cambridge University Press, Cambridge.; Rodwell, J.S. (ed.), (1991b). *British Plant Communities Volume 2 Mires and Heaths*. Cambridge University Press, Cambridge; Rodwell, J.S. (ed.)., 1992. British Plant Communities Volume 3 Grassland and Montane Communities. Cambridge University Press, Cambridge.

[30] SEPA, 2024. *Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems* [online]. [Accessed 14 February 2025]. Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.sepa.org.uk%2Fmedia%2Fi2cnr03k%2Fguidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx&wdOrigin=BROWSELINK

[31] Chanin, P., 2003. *Monitoring the Otter Lutra lutra.* Conserving Nature 2000 Rivers Monitoring Series No. 10. English Nature, Peterborough.

[32] Dean, M., Strachan, R., Gow, D. and Andrews, R., 2016. *The Water Vole Mitigation Handbook. Mammal Society Mitigation Guidance Series.* The Mammal Society, London.

[33] The desk study returned no records of water vole and the water vole habitat suitability within the Site is low. No water vole sign was noted during the survey. No historic burrows were noted (a sign of presence over a number of years, even if the habitat is not active). Water vole are likely to suffer predation by American mink *Neovison vison*. The Site does not merit a second survey at this stage.

deviated from because the water vole habitat was of low suitability. Surveys were conducted on 18, 19 and 20 March 2024, and 3 June 2024[27]. Evidence of otter searched for included refuges (holts and lay-ups), spraints, footprints, trails, and foraging signs. Spraints were recorded as fresh, recent, or old, according to their apparent age. Evidence of water vole searched for included latrines, droppings, burrows, trails, and foraging evidence.

Bat Roost and Habitat Suitability

5.3.11 In accordance with industry-standard guidelines (Collins, 2023)[34] published by the Bat Conservation Trust (BCT), a ground level tree assessment (GLTA) was carried out to identify trees with potential roost features (PRFs) which could be used by bats within the Site. Surveys were conducted on 18, 19 and 20 March, and 3 June 2024[27]. The survey extended to 250 m from the Proposed Development, to account for potential felling for visual splays. According to the guidance, PRF identified within trees were assessed as either 'PRF-I', i.e. features suitable only for individual or very small numbers of bats, or 'PRF-M', i.e. features suitable for use by multiple bats, including a maternity colony. Trees that require further assessment (e.g. by tree climbing) are defined as further assessment required (FAR).

5.3.12 PRFs searched for included suitable holes, cracks, or splits in trees. Where such features existed, searches were made as far as possible for evidence of bat use such as droppings, staining, foraging remains, auditory evidence and the presence of live or dead bats. Trees that were within 30 m of the Proposed Development that would be felled to accommodate the Proposed Development were assessed with the aid of night-time bat emergence survey techniques.

5.3.13 Note that no buildings were assessed for bat roost potential, because either a) no buildings were present or b) access restrictions prevented surveys to buildings, as detailed in **Sections 5.3.27** to **5.3.30** below.

5.3.14 The general suitability of the habitat within the Site was classified according to the definitions provided in BCT Guidance[34].

Badger

5.3.15 A badger survey was completed within the Site, in accordance with standard guidance[35,36]. Evidence searched for included setts, spoil heaps, bedding, guard hairs, latrines, footprints, trails, scratch marks, and signs of foraging activity. Surveys were conducted 18, 19 and 20 March, and 3 June 2024[27]. The survey extended to 50 m from the Proposed Development.

Great Crested Newt

5.3.16 Field surveys were conducted 18, 19 and 20 March 2024 to assess habitats within the survey area to support great crested newt *Triturus cristatus*, including Habitat Suitability Index calculation for relevant ponds, following English Nature (2001)[37] and Froglife

[34] Collins, J. (ed.), 2024. *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition).* Bat Conservation Trust, London.

[35] Harris, S., Cresswell, P. and Jeffries, D., 1989. *Surveying Badgers – An occasional publication of the Mammal Society No. 9.* The Mammal Society, London.

[36] Scottish Badgers, 2018. *Surveying for Badgers: Good Practice Guidelines.* Version 1 [online]. [Accessed 14 February 2025]. Available at: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf

[37] English Nature, 2001. *The Great Crested Newt Mitigation Guidelines* [online]. [Accessed 14 February 2025]. Available at: https://www2.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/countryside/protectedspecies/greatcrestednewtmitigationguidelines.pdf

(2001)[38] guidance. The survey extended to ponds up to 500 m from the Proposed Development.

Beaver

5.3.17 A beaver *Castor fiber* survey was completed within the Site, in accordance with standard guidance[39]. Evidence searched for included dams, lodges and feeding signs. Surveys were conducted 18, 19 and 20 March, and 3 June 2024[27]. The survey extended to 200 m from the Proposed Development.

Reptiles

5.3.18 Field surveys included recording any incidental sightings of reptiles, in addition to the assessment of habitats within the survey area to support reptiles (adder *Vipera berus*, common lizard *Zootoca vivipara* and slow worm *Anguis fragilis*), following Froglife[40] and JNCC[41] guidance.

Notable / Important Invertebrates

5.3.19 Field surveys included the assessment of habitats within the survey area to support notable species of invertebrates, both terrestrial and aquatic (including white-clawed crayfish *Austropotamobius pallipes*).

Protected or Notable Plants

5.3.20 Field surveys included recording protected or notable plant species and assessing potential for their occurrence.

Other Notable Species

5.3.21 Field surveys included recording any incidental sightings of other notable species such as toad *Bufo bufo*, hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus*. In addition to an assessment of habitats within the survey area to support those notable species mentioned above.

Invasive Non-native Plant Species

5.3.22 The survey recorded any evidence of the presence of invasive and non-native species (INNS), including but not limited to those of UK concern, such as those identified on Schedule 9 of the WCA, (as amended by the Wildlife and Natural Environment (Scotland) Act 2012), and of EU concern under the EU Invasive Alien Species Regulation. Additional species commonly considered to be invasive as listed in Annex B of the NatureScot *Developing with Nature* guidance[26] were also recorded.

Ecological Appraisal

5.3.23 The results of the completed field surveys, in combination with the findings of the desk study and consultation with relevant stakeholders, were used to inform this EA. This was conducted in accordance with the industry-standard guidelines published by the Chartered Institute of Ecological and Environmental Management (CIEEM)[1].

5.3.24 The appraisal used the ecological baseline to identify the sensitive ecological receptors that could be affected by the construction or operation of the Proposed Development.

[38] Froglife, 2001. *The Great Crested Newt Conservation Handbook* [online]. [Accessed 14 February 2025]. Available at: https://www.froglife.org/info-advice/our-publications/great-crested-newt-conservation-handbook/

[39] NatureScot, 2025. *Understanding the Ecosystem Engineer* [online]. [Accessed 14 February 2025]. Available at: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/protected-species-z-guide/beaver/understanding-ecosystem-engineer

[40] Froglife, 1999. *Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.

[41] Joint Nature Conservation Committee, 2003. *Herpetofauna Workers Manual* [online]. [Accessed 14 February 2025]. Available at: https://hub.jncc.gov.uk/assets/9d7da8c4-9d76-4b65-8263-6b925b3433a4

Each receptor was assigned a geographic level of importance based on its national and local conservation status and population / assemblage trends and other relevant criteria (including size, naturalness, rarity, and diversity). Details of the Proposed Development were then used to assess if a significant environmental effect is anticipated for each receptor.

5.3.25 Where appropriate, mitigation measures have been recommended within the EA to remedy any adverse impacts (detailed in **Appendix O GEMPs and SPPs**). Measures to enhance local biodiversity are incorporated within the appraisal (further detailed in the **Appendix D Biodiversity Net Gain Report** and **Appendix C Landscape and Habitat Management Plan**).

5.3.26 Enhancement measures that are proportionate to the scale and impacts of the Proposed Development were identified in pursuance of the objectives of NPF4, and a Biodiversity Net Gain (BNG) assessment has been completed (**Appendix D Biodiversity Net Gain Report**), to ensure that the Proposed Development delivers gains for biodiversity.

Limitations

5.3.27 Desk study information is dependent on records having been submitted for the area in question. As such, a lack of records for particular habitats or species does not necessarily mean they are absent. Likewise, the presence of records for a habitat or species does not automatically mean that they still occur or are relevant in the context of the Proposed Development.

5.3.28 Where habitat edges are sharp and coincide with features on base mapping or aerial photography that are considered correct, their placement is based on the accuracy of that data in Geographic Information System (GIS). Otherwise, habitat edges are best estimates as judged in the field. Note also that habitat transitions can be gradual without sharp boundaries. Consequently, habitat mapping and any stated habitat areas are approximate and should be verified by measurement on Site where required for design or construction.

5.3.29 Baseline conditions are increasingly liable to change with further elapsed time since the field survey. For example, protected species may establish new refuges, or invasive non-native species may spread. Any conclusions or recommendations in this EA are based on the information collected during the described desk study and field surveys. In line with NatureScot guidance[26], re-survey is recommended if construction or enabling works would take place more than two years since the date of field survey.

5.3.30 There was no access to areas of private dwellings (e.g. houses and gardens on the B8033) during the field survey, because of access permission restrictions. However, these areas cover a small fraction of the Site, and it is highly unlikely that notable habitats are within these areas. It was not considered necessary to inspect the private residencies (or any other building) for bat roost potential as all buildings within the survey were at a suitable distance from the Site to be considered at no risk of disturbance to roosting bats (if bats were present at all).

5.3.31 One water vole survey was conducted during one period (in summer), whereas The Water Vole Mitigation Handbook[32] recommends two surveys, conducted in spring and summer. Considering the likely absence of water vole from the Site, see **Section 5.4.46** below, this is considered a minor constraint.

5.4 Baseline Environment

Statutory Designated Sites

5.4.1 There are five statutory designated sites for nature conservation within the possible ZoI of the Proposed Development: River Teith SAC; Shelforkie Moss SAC; Kippenrait Glen SAC; Upper Strathearn Oakwoods SAC; and Carsebreck and Rhynd Lochs SSSI. These are detailed in **Table 5-3** below and shown in **Figure 5-1, Appendix A Figures.** Statutory designated sites relevant to birds are discussed in detail in **Chapter 6 Ornithology**.

Table 5-3 Statutory Locally Designated Nature Conservation Sites

Site Name	Reason for Designation	Relationship to the Proposed Development
European Sites		
Shelforkie Moss SAC	Active raised bog; and, Degraded raised bog	Located at closest point: Approximately 1.3 km east of the Site. No downstream hydrological connectivity of the Site to Shelforkie Moss SAC. Intervening land mainly comprises farmland and forestry.
River Teith SAC	Atlantic salmon *Salmo salar*; Brook lamprey *Lampetra* planeri; River lamprey *Lampetra fluviatilis*; and, Sea lamprey *Petromyzon marinus*	Located at closest point: Approximately 8.6 km southwest of the Site ('as the crow flies'). Approximately 24 km upstream of the Site (following the watercourse) following a hydrological link of Keir Burn, which joins the Allan Water, which connects to the River Teith SAC. There is a theoretical hydrological link between the Site and the SAC, but over a considerable distance. Intervening land is mainly commercial forestry and arable / pastoral farmland.
Upper Strathearn Oakwoods SAC	Western acidic oak woodland	Located at closest point: Approximately 8.6 km north of the Site. There is no downstream hydrological link between the Site and the SAC. Intervening land comprises a mix of arable / pastoral farmland and forestry.
Kippenrait Glen SAC	Mixed woodland on base-rich Soils associated with rocky slopes	Located at closest: Approximately 8.8 km south of the Site ('as the crow flies'). 20 km downstream following Keir Burn, which joins Allan Water, which connects to Kippenrait Glen SAC. There is a theoretical hydrological link between the Site and the SAC, but over a considerable distance.

Site Name	Reason for Designation	Relationship to the Proposed Development
		Intervening land includes the settlement of Dunblane, major roads and a mix of farmland and commercial forestry.
Sites of Special Scientific Interest		
Carsebreck and Rhynd Lochs SSSI	Raised bog; and, Hydromorphological mire range	Located at closest point: Approximately 1.3 km east of the Site. The Allan Water passes through the SSSI, but there is no hydrological connectivity to the Carsebreck Loch and Upper Rhynd Loch, or the raised bog (which is a rain-fed system). Intervening land mainly comprises farmland and forestry.

Non-statutory Designated Sites

5.4.2 There are no non-statutory designated sites for nature conservation within the possible ZoI of the Proposed Development, as the nearest such site is Braco Castle Wood LNCS, which is discussed in **Table 5-4** below, and shown in **Figure 5-1, Appendix A Figures**.

Table 5-4 Statutory Locally Designated Nature Conservation Sites

Site Name	Reason for Designation	Relationship to the Proposed Development
Braco Castle Wood LNCS	Braco Pinewood, situated to the designed landscape northwest of Braco castle.	Located at closest point: Approximately 2.1 km northeast of the Site (greater than the 2 km ZoI but included for completeness – as almost within 2 km). Intervening land comprises a mix of arable/pastoral farming. There is no direct hydrological connection between the LNCS and the Site.

Waterbodies

5.4.3 The Keir Burn (hydrologically contiguous with the Bullie Burn, as named upstream of the Site), a tributary of the Allan Water, flows through the western area of the Site and would be crossed by the proposed haul track. The Keir Burn is a river classified by SEPA under the Water Framework Directive (WFD) as in 'Moderate' overall status. Ecological parameters such as invertebrates, fish and fish barriers meant the burn to achieve a 'High' status; however, the watercourse fails to reach more than 'Moderate' status for hydromorphological parameters. The watercourse has been impacted by historic straightening and the creation of artificial embankments (evident within the Site). The Keir Burn is listed by Marine Scotland as a river supporting Atlantic salmon *Salmo salar* and sea trout *Salmo trutta.* The River Knaik lies 230 m east of the Site, but there is no feasible hydrological link between the Site and this river.

5.4.4 Unnamed watercourses within the Site lead to the Feddal Burn, which ultimately discharges into the Allan Water (hereafter referred to as 'tributaries of the Allan Water'). The Feddal Burn passes to the south, beyond the Site boundary.

5.4.5 There are seven open water waterbodies within 500 m of the Site[42], of which six are located outside of the Site to the west, and one is located east of the Site, beyond the A822 and River Knaik.

Ancient and Native Woodland

5.4.6 Nine areas of long-established plantation (LEP) listed on the AWI[43] occur within 1 km of the Site, as shown on **Figure 5-2, Appendix A Figures**; however, none are within the Site. The closest area of LEP is located approximately 11 m east of the Site, on the other side of the A822 road. However, during field surveys within 50 m of the Site this was found to be dominated by sycamore *Acer pseudoplatanus* (a naturalised species) or Sitka spruce *Picea sitchensis* (a non-native plantation forestry species), see **Section 5.4.13** for more detail. The remaining LEP areas are located approximately 300 m to 1 km distant from the Site, two strips to the north, bordering the Keir Burn and Braco village, and in six blocks to the east of the A822.

5.4.7 The Native Woodland Survey of Scotland (NWSS)[44] also holds records of eleven woodlands within 1 km of the Site, all of which are defined as 'Native Woodland', according to the NWSS. There is a single area of native woodland (upland birchwood) that is within the central part of the Site, however during field surveys within 50 m of the Site this was found to be a mixed plantation woodland, see **Section 5.4.13**.

Peatland

5.4.8 A study of the data from NatureScot[45] indicated the absence of peatland within the Site, as shown on **Figure 5-2, Appendix A Figures**. The only habitats listed are mixed woodland, arable fields and grassland. The field study confirmed that there are no peatlands within the Site and the immediate area surrounding the Site.

Habitat Overview

5.4.9 Habitat survey results are shown on **Figure 5-3, Appendix A Figures**. The majority of the habitats within the Site are species-poor modified / agricultural improved grasslands and species-poor young, coniferous plantation with Nordmann fir *Abies nordmanniana* and neutral grasses. Other broadleaved woodlands bordering the A822 and B8033 roads, and the Keir Burn are little more than narrow strips with trees in a line. A strip of dense species-poor grey willow *Salix cinerea* scrub, with poor vertical structure is present in the east of the Site, bordered by modified grassland. Mixed woodland are present in the west of the Site. Associated with tributaries of the Allan Water are wetlands of damp grasslands and rush pasture which are considered as potentially groundwater dependent. The Site also possesses species-poor and disturbed areas of neutral grassland and mixed scrub. An existing access track is present in the west. Beyond the Site, the habitats are similar to those within the Site, a mosaic of woodlands and agricultural fields. Artificial waterbodies, associated with the Mill Burn and Feddal Burn are present to the northwest

[42] Great crested newts can use suitable terrestrial habitat up to 500 m from a breeding pond, though there is a notable decrease in great crested newt abundance beyond 250 m from a breeding pond.

[43] NatureScot, 2020. *A guide to understanding the Scottish Ancient Woodland Inventory (AWI)* [online]. [Accessed 14 February 2025]. Available from: www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi

[44] Scottish Forestry, 2025. *Native Woodland Survey of Scotland (NWSS)* [online]. [Accessed 14 February 2025]. Available from: forestry.gov.scot/forests-environment/biodiversity/native-woodlands/native-woodland-survey-of-scotland-nwss

[45] NatureScot, 2016. *Carbon and Peatland 2016 map* [online]. [Accessed 14 February 2025]. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map

and southwest of the Site. The River Knaik lies over 200 m to the east of the eastern boundary of the Site and flows into the Allan Water to the south.

5.4.10 **Table 5-5** shows a list of the habitat types (by UKHab and NVC) identified within the area surveyed, with the notable habitats SBL highlighted in bold. There are no Annex I habitats within the Site[46].

Table 5-5 Recorded habitat and NVC types (SBL priority habitats shown in bold, and Annex I habitats in bold underline)

UKHab Level 3	UKHab Level 4 (SBL[47] priority habitats in bold)	Constituent NVC types (code and name)	UKHab Level 5
Broadleaved, mixed and yew woodland	w1g Other broadleaved woodland	n/a	n/a
	w1h Other woodland; mixed	n/a	n/a
Coniferous woodland	w2c Other coniferous woodland	n/a	n/a
Dense scrub	h3j Willow scrub	n/a	n/a
	h3h Mixed scrub	n/a	n/a
Hedgerows	h2b Non-native hedgerow	n/a	n/a
Fen, marsh and swamp	f2b **Purple moor grass and rush pastures**	M23b	n/a
Neutral grassland	g3c Other neutral grassland	MG10	g3c8 *Holcus-Juncus* neutral grassland
	g3c Other neutral grassland	MG6b	g3c6 Lolium-Cynosurus neutral grassland
	g3c 16 Other neutral grassland - Tall herb	n/a	n/a
Modified grassland	g4 Modified grassland	Not classified	n/a
Built-up areas and gardens	u1b Developed land; sealed surface	n/a	n/a
		n/a	u1b5 Buildings
		n/a	u1b6 Other developed land

[46] Annex I habitats are habitats of European Community interest listed in Annex I of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (the 'Habitats Directive'). In summary, habitats of Community interest are those that: i) are in danger of disappearance in their natural range, ii) have a small natural range, or iii) are outstanding examples of habitats in (for the UK) the Atlantic biogeographic zone. 'Priority Annex I habitat' (shown with an asterisk, e.g. H7130*) means that i) is considered to apply and there is a particular responsibility to conserve it owing to the large proportion of its range within the EU.

[47] The Scottish Biodiversity List is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.

UKHab Level 3	UKHab Level 4 (SBL[47] priority habitats in bold)	Constituent NVC types (code and name)	UKHab Level 5
	u1c Artificial unvegetated, unsealed surface	n/a	n/a
Standing open water and canals	r1g 48 Other standing water – artificial	n/a	n/a
Rivers and streams	r2a **Rivers (priority habitat)**	n/a	r2a6 Other priority habitat rivers
	r2b Other rivers / streams	n/a	n/a

Woodland, Scrub, and Hedgerows

5.4.11 The proposed haul track would pass through three areas with Other broadleaved woodland: one strip of woodland on the east bank of the Keir Burn; one strip west of the A822; and, two strips of woodland either side of the B8033. The Other broadleaved woodlands within the Site have been disturbed through historic felling. The ground flora of these woodlands is not semi-natural, they have been disturbed through nutrient enrichment, lack of sustainable woodland management practices and have suffered from the invasion of weedy species.

5.4.12 The woodland adjacent to the Keir Burn has a canopy of native species with limited age classes of trees. There is some regeneration of trees, but the vertical structure of the woodland is simple, but occasionally with a layer of scrub. The woodland along the Keir Burn has likely been colonised with self-seeded trees. It has frequent grey willow, silver birch *Betula pendula* and hawthorn *Crataegus monogyna* with occasional sycamore and hazel *Corylus avellana.* The field layer has abundant bramble *Rubus fruticosus* and Yorkshire-fog *Holcus lanatus* with raspberry *Rubus idaeus,* rosebay willowherb *Chamaenerion angustifolium*, common nettle *Urtica dioica*, ground elder *Aegopodium podagraria* (a naturalised species), wood avens *Geum urbanum*, black knapweed *Centaurea nigra*, common sorrel *Rumex acetosa*, greater wood-rush *Luzula sylvatica* and lesser celandine *Ficaria verna*.

5.4.13 The trees along the A822 and B8033 are possibly 100-200 years old or more, clearly planted at regular intervals. The woodland bordering the A822 on the west side is dominated by pedunculate oak *Quercus robur* with a ground layer of Yorkshire-fog, cleavers *Galium aparine*, rosebay willowherb, ground elder and lesser celandine. On the east side of the A822, the woodland is similar in character but dominated by coniferous plantation woodland with Sitka spruce with little to no ground flora, although one area is dominated by sycamore. The woodland bordering the B8033 is dominated by a mix of unusual species (obviously planted) that include pedunculate oak, but also sycamore, small-leaved lime *Tilia cordata* and Norway maple *Acer platanoides*, with a ground flora of ground elder, Yorkshire-fog, lesser celandine, cow parsley *Anthriscus sylvestris*, broad-leaved dock *Rumex obtusifolius* and common nettle.

5.4.14 Other mixed woodland is present as three parcels within the west of the Site. These have likely been planted in recent years as shelterbelt for arable crops or for rearing of game birds. The proposed haul track would cut through two of these woodland parcels. The

woodlands are densely planted, single-age stands of immature sycamore, rowan *Sorbus aucuparia*, Sitka spruce, silver birch and ash *Fraxinus excelsior* with a grassy ground flora of Yorkshire-fog, creeping soft-grass *Holcus mollis* and other neutral grasses. An area defined according to the Scottish Forestry as 'Native Woodland' broadly corresponds to an area within the Site with the above species and some remnant native woodland species including bracken, red campion *Silene dioica* and wood sorrel *Oxalis acetosella*. However, this woodland is considered plantation due to its highly disturbed nature. Giant hogweed *Heracleum mantegazzianum* (an INNS) and dogwood *Cornus sanguinea* (considered an INNS in this region of Scotland) is present north of the existing access track and on the edge of other mixed woodland rhododendron *Rhododendron ponticum* is present in mixed woodland in a central area of the Site. (**Figure 5-3, Appendix A Figures,** Target Note 1, 2, 6, and 7).

5.4.15 Other coniferous woodland is present in two blocks within the west of the Site. These are species-poor, low-lying, immature stands of Nordmann fir with neutral grasses.

5.4.16 Willow scrub is present in the east of the Site, in a strip perpendicular to the Keir Burn bordered by modified grassland. The proposed haul track and proposed temporary works would cut through the southern end of the strip. The scrub is dominated by mature grey willow that forms a dense thicket. The ground flora has a thin cover of creeping buttercup *Ranunculus acris*, wood avens, pink purslane *Claytonia sibirica* (a naturalised species) and herb-robert *Geranium robertianum*. The scrub has a distinct lack of wetland herbs, which strongly indicates that the habitat is dry and therefore not a wet woodland habitat type.

5.4.17 Mixed scrub is present to the southeast of the Site. Within the Site, the proposed haul track would replace this habitat. The mixed scrub is dominated by immature grey willow, with occasional dogwood (an INNS), cherry laurel *Prunus laurocerasus* (a non-native plant, see **Figure 5-3, Appendix A Figures,** Target Note 4), hawthorn, blackthorn *Prunus spinosa* and a ground flora of rosebay willowherb, soft-rush *Juncus effusus* and Yorkshire-fog.

5.4.18 The Tayside LBAP (2016-2026)[15] includes Planted Coniferous Woodlands (especially the woodland edge / glades) as a priority habitat for local conservation. However, the Other Broadleaved / Mixed Woodland types within the survey area are non-notable woodland, as they lack the semi-natural ground flora associated with priority woodland.

5.4.19 All woodlands within the Site and survey area are of a low degree of naturalness and none are considered Annex I habitats[46]. Therefore, the woodlands described above are non-notable and do not merit inclusion in the NVC survey.

Non-native hedgerow

5.4.20 Non-native hedgerows are present along both sides of the B8033. The hedge is dominated by beech *Fagus sylvatica* (considered a non-native species in Scotland) is less 1.5 m wide and 1.5 m tall. The hedge has gaps that consist of less than 10% of the length, but there is a tall gap between ground and canopy of the hedge for more than 90% of the length, indicating that it has been poorly maintained. The herbaceous vegetation is nutrient enriched with ground elder, common nettle and broadleaved dock forming the ground layer.

5.4.21 The Tayside LBAP (2016-2026)[15] includes Hedgerows as a priority habitat for local nature conservation, however the habitat described above is of low conservation value, given its non-native nature and should not be considered an LBAP priority habitat.

Marsh

5.4.22 Rush pasture of the NVC-type M23b is present in the north of the Site, associated with the northern side of a minor tributary of the Allan Water. This rush pasture is not within the Site. The rush pasture is dominated by soft-rush with angelica *Angelica sylvestris*, common sorrel, marsh thistle *Cirsium palustre*, meadow sweet *Filipendula ulmaria*, creeping buttercup, Yorkshire-fog, greater bird's-foot trefoil *Lotus pedunculatus* and marsh horsetail Equisetum palustre. During consultation, a member of the public made reference to 'marsh orchid' in the area, presumably northern marsh orchid *Dactylorhiza purpurella*. No records of the species were made within the areas surveyed. However, the species is fairly common and widespread and it is possible it occurs within marsh habitats within the Site.

5.4.23 The Tayside LBAP (2016-2026)[15] includes Wetlands, such as that described above, as a priority habitat for local nature conservation.

Grassland and Arable

5.4.24 *Holcus-Juncus* neutral grassland of the NVC-type MG10 is present in the north of the Site, associated with the minor tributary of the Allan Water. The proposed haul track would pass through this damp grassland habitat on the southern tip of an area of this habitat that extends northwards. Yorkshire-fog is abundant with soft-rush, sweet vernal-grass *Anthoxanthum odoratum,* creeping buttercup, greater bird's-foot trefoil, cuckoo flower *Cardamine pratensis*, broad-leaved dock, daisy *Bellis perennis*, early forget-me-not *Myosotis ramosissima* and field wood-rush *Luzula campestris*.

5.4.25 The Tayside LBAP (2016-2026)[15] includes Wet Grassland as a priority habitat for local nature conservation, however the grassland described above is of low conservation value and should not be considered an LBAP priority habitat.

5.4.26 *Lolium-Cynosurus* neutral grassland of the NVC type MG6b is present in a field in the central area of the Site and in a small patch to the west of the Site. The proposed haul track would pass through both of these areas. In the central area of the Site, this habitat is species-poor and is dominated by red fescue *Festuca rubra*, with sweet vernal-grass, crested dog's-tail *Cynosurus cristatus*, Yorkshire-fog, white clover *Ranunculus repens* and meadow buttercup *Ranunculus acris*, and the agricultural weeds of mouse ear *Cerastium fontanum* and dandelion *Taraxacum officinale*.

5.4.27 On steeper slopes of thin, less nutrient-rich soils these grasslands are moderately species-rich with species such as ribwort plantain *Plantago lanceolata*, yarrow *Achillea millefolium* and pignut *Conopodium majus*. The proposed haul track would avoid this area of greater species-richness grassland, as it would pass to the south of it. The patch to the west of the Site has frequent red fescue, smooth meadow-grass *Poa pratensis* and yarrow, with pignut, redshank *Persicaria maculosa*, Yorkshire-fog, broad-leaved dock and germander speedwell *Veronica chamaedrys*.

5.4.28 Other neutral grassland with weedy tall herbs is present to the east of the Site, bordering a field of Modified grassland. The habitat is dominated by rosebay willowherb and has frequent dogwood (an INNS) with occasional cherry laurel (a non-native plant), see **Figure 5-3, Appendix A Figures,** Target Note 3.

5.4.29 Modified grassland is present in central of eastern areas of the Site. The proposed haul track would pass through this area. The grassland is well-drained, nutrient enriched and is dominated by perennial rye-grass *Lolium perenne* with Yorkshire-fog, white clover, creeping buttercup and daisy.

Other Terrestrial Habitats

5.4.30 Developed land (with sealed surface) are present as the A822 and B8033 roads within the Site and the residential areas beyond the boundary of the Site boundary. Artificial unvegetated, unsealed surface habitat is present as the existing access track in the west of the Site.

Aquatic Habitats

5.4.31 Other standing water - heavily modified is present beyond the boundary of the Site to the northwest. This waterbody does not appear on historic maps[48], even as late as the 1970s, and is therefore considered to be artificial. It is bordered by species-poor Other Neutral Grassland and Other Broadleaved Woodland dominated by alder *Alnus glutinosa*.

5.4.32 The Tayside LBAP (2016-2026)[15] includes Ponds and Pools as a priority habitat for local conservation, however, the artificial waterbodies described above are of low ecological importance and are therefore not be considered a priority.

5.4.33 Rivers, a Tayside LBAP priority habitat, is represented by the Keir Burn, a tributary of the Allan Water (within the River Forth catchment). The proposed haul track would cross the Keir Burn. The watercourse is 4 m in width and 0.2 to 0.4 m deep. The watercourse has a bed of rocks and vegetated banks. The very edge of the watercourse possesses some remnants of semi-natural vegetation dominated by greater wood-rush, but the majority of the riparian area is disturbed with young trees and weedy vegetation on the east bank, with Modified grassland bordering the west bank. The watercourse embankments are modified with rock placed to 2 m in height, this has led to the formation of frequently occurring steeply-sloping, rocky banks at the water's edge.

5.4.34 Other rivers / burns are present west of the B8033 road. These are minor tributaries of the Allan Water which are fed from field drains and the artificial waterbodies to the north of the Site. The channels have been artificially straightened over much of their length within the Site. The proposed haul track would cross a watercourse in a central area and in the west of the Site. The watercourse is 0.5 m wide and was 0.1 m deep at the time of survey. It has vegetated banks from 1 to 3 m wide and 0.5 m tall. It was moderately fast flowing, with clear water over a stony bed, at the time of survey.

5.4.35 The Tayside LBAP (2016-2026)[15] includes Rivers and Burns as a priority habitat for local conservation. The Keir Burn should be considered a priority for nature conservation, given its hydrological connection to the Allan Water and the likely presence of a notable fish population. The minor watercourses within the Site are small, at a of maximum width of 0.5 m, and modified / straightened within much of the Site, and therefore are not considered to be SBL or LBAP Priority habitat.

GWDTE

5.4.36 Potential GWDTE identified within 250 m of the Site are shown on **Figure 5-4, Appendix A Figures**. The following NVC vegetation communities were identified, within the area surveyed for the Proposed Development, that are potentially highly or moderately groundwater dependent, as defined in relevant guidance[30]:

- Potentially highly groundwater dependent:
  - M23b
- Potentially moderately groundwater dependent:

[48] National Library of Scotland, 2025. *Map* Images [online]. [Accessed 14 February 2025]. Available at: https://maps.nls.uk/

- MG10

5.4.37 Potentially highly GWDTE, of the NVC type M23b, are present outside of the Site, north of the tributary to the Allan Water. Potentially moderately groundwater dependant GWDTE were identified within the Site, represented by MG10.

5.4.38 The results of a high-level hydrological assessment undertaken in the field revealed that the potential GWDTE within the area surveyed were possibly maintained (at least in part) by groundwater flows. The Site is underlain by a moderately productive aquifer called the 'Arburthnott-Garvock Group'. However, the hydrological regime of these GWDTE is closely associated with surface waters, including the tributary to the Allan Water and artificial waterbodies, which are likely to maintain the wet / damp soils. This is consistent with the hydrological appraisal made in **Chapter 9 Hydrology, Hydrogeology, Geology and Soils**.

Bats

5.4.39 The desk study identified three records of bats within 1 km of the Proposed Development, two of soprano pipistrelle bats *Pipistrellus pygmaeus* and a single record of an unidentified pipistrelle bat *Pipistrellus sp*. Those records were provided by NatureScot and do not specify whether the records are of a single bat or a roost.

5.4.40 Habitats across the Site largely comprise modified grassland and coniferous plantation woodland, however, these are connected via hedgerows and lines of mature trees along the field edges, small watercourses and Keir Burn and patches of broadleaved woodland and semi-improved neutral grassland. Therefore, the Site is considered of 'High' suitability for foraging and commuting bats.

5.4.41 Within the Survey Area, GLTA identified 41 trees, of which 13 are classified as being 'PRF-M', 27 as 'PRF-I', and one as 'FAR' due to height of one PRF. Bats species identified during emergence surveys were soprano pipistrelle, common pipistrelle *Pipistrellus pipistrellus,* a *Myotis* sp. and brown long-eared bat *Plecotus auritus*. All of the bat species listed above are Tayside LBAP Priority Species[49].

5.4.42 No bat roosts were identified during bat emergence surveys. Details on bats within the Site and potential roost features are provided in the **Appendix E Bat Technical Appendix** and are shown on **Figure 5-7, Appendix A Figures** of this appraisal.

Otter and water vole

5.4.43 The desk study did not identify any records of otter or water vole within 1 km of the Site. Otter is listed in the Tayside LBAP (2016-2026)[49].

5.4.44 Three otter spraints were found within the Site, two on the Keir Burn and one on the minor tributary to the Allan Water. Beyond the Site to the northwest around artificial waterbodies, five otter spraints were found along with feeding remains (the leftovers of six frogs *Rana temporaria*, presumably the work of otter predation).

5.4.45 Otter undoubtably use the Site and the surrounding area's aquatic habitats for feeding (on prey items of fish and amphibians). However, no evidence of otter breeding sites or resting sites were noted. Otter are likely to use local watercourses to navigate through the landscape to commute to other areas within the Site and surrounding area, plus between the river catchments beyond the Site (e.g. via the River Knaik).

[49] Tayside Biodiversity, 2025. *Tayside Species List. LBAP Protected Species List*. [online] [Accessed 18 February 2025]. Available at: https://www.taysidebiodiversity.co.uk/wp-content/uploads/2016/08/Species-List-Amalgamated_2.pdf

5.4.46 No evidence of water vole was recorded during the field survey. The minor watercourses in the west of the Site have water vole habitat suitability, they possess vegetated banks, but they have shallow water depths. The Keir Burn is unsuitable for water vole due to the potential for strong flows. Furthermore, this lowland area has the potential for the presence of American mink *Neovison vison*. It is a non-native invasive mammal, a predator on water vole, common and widespread and highly likely to be partly responsible for the absence of water vole within much of lowland Scotland[32]. Given the above, habitat suitability for water vole within the Site is low.

Beaver

5.4.47 The desk study did not reveal any records of beaver within 1 km of the Site.

5.4.48 No evidence of beaver was recorded during the field survey. However, the known distribution of beaver includes the area of the Site. The nearby River Tay and its tributaries (c. 10 km north-east at the closest point) are a stronghold of beaver in Scotland, and the River Forth catchment have been colonised by beaver to a lesser extent[50]. Wooded riparian areas of the Allan Water provide excellent opportunities for beaver feeding and the creation of lodges, however, the potential for beaver within the Site and the immediate area is low. Nevertheless, the presence of beaver within the Site cannot be completely ruled out.

Pine marten

5.4.49 The desk study did not identify any records of pine marten *Martes martes* within 1 km of the Site. Pine marten is listed in the Tayside LBAP (2016-2026)[49] protected species list.

5.4.50 No evidence of pine marten was recorded incidentally during the field survey. However, the known distribution of pine marten includes the area of the Site[51].

5.4.51 No large, mature senescent trees or rock cavities (with suitability for dens) were found to be present during surveys. The woodlands within the Site and surrounding area offer little to no sheltering opportunities, any that do occur are likely to be too exposed to predation and the elements to be suitable for pine marten dens. Therefore, the habitat suitability of the Site for pine marten is low.

5.4.52 Given the above, pine marten dens are likely to be absent from the Site. Although pine marten individuals could potentially use the Site on a transient basis for foraging (e.g. for berries, small mammals, birds, and birds eggs).

Red squirrel

5.4.53 The desk study identified 100 records of red squirrel *Sciurus vulgaris* within 1 km of the Site, recorded between 2006 and 2013. The most recent record of red squirrel within the Site is from October 2024 and was noted in the Saving Scotland's Red Squirrel platform[16]. Red squirrel is listed in the Tayside LBAP (2016-2026)[49].

5.4.54 No evidence of red squirrel was recorded incidentally during the field survey.

5.4.55 Red squirrels exhibit a preference for habitats characterised by mature trees, providing good shelter and a diverse food source, including nuts and seeds. While the Site falls within the general distribution of red squirrel, the landscape in and around the Site is predominantly characterised by coniferous plantation woodland blocks with small trees

[50] N Campbell-Palmer, R., Puttock, A., Needham, R.N., Wilson, K., Graham, H. & Brazier, R.E., 2021. *Survey of the Tayside Area Beaver Population 2020-2021*. NatureScot Research Report 1274.

[51] Saving Britain's Wildlife, 2024. *Species – Pine Martin* [online]. [Accessed 01 July 2024]. Available at: https://www.mammal.org.uk/species-hub/full-species-hub/discover-mammals/species-pine-marten/

that are too young to bear cones and mixed woodland with immature trees. These wooded habitats provide little to no feeding opportunities for red squirrel. Feeding opportunities are available in relatively exposed, thin strips of broadleaved woodland, however, drey-building habitat is sub-optimal. During public consultation, local residents reported that red squirrel have been seen in the trees on the B8033.

5.4.56 Given the above, red squirrel are likely to be largely absent from the Site and at low population densities in the wider area. However, there is some potential for red squirrel to be present in the mixed and broadleaved woodland.

Badger

5.4.57 The desk study identified no badger records within 1 km of the Site. No badger setts or evidence of badger activity were recorded within the survey area. Badger is listed in the Tayside LBAP (2016-2026)[49].

5.4.58 The coniferous plantation woodland within the Site and surrounding area is highly sub-optimal habitat for badger setts. Badgers prefer sloping ground, often with woodland or other cover, with ease of access for digging setts, but do not favour coniferous plantation. Mixed and broadleaved woodlands within the Site and surrounding area provide better opportunities for badger, however, these are still considered sub-optimal because they are not semi-natural woodland types and are likely to provide limited feeding opportunities for badger (e.g. from invertebrate prey items), compared to more natural woodlands. The proposed haul track is within a landscape of deciduous woodlands (e.g. including LEP woodland) and agricultural land that are favoured by badger for sett establishment and foraging[52]. Even though signs of badger were not found during surveys, the species is common and widespread, and their presence on-site cannot be ruled out.

Amphibians and reptiles

5.4.59 The desk study identified no amphibian or reptile records within 1 km of the Site. The following species are listed in the Tayside LBAP: adder, slow-worm, common lizard and great crested newt, and common toad. All these species are listed in the Tayside LBAP (2016-2026)[49].

5.4.60 The desk study did not reveal any records of great crested newt within the desk study search area and this species is likely to be absent from the 10 km grid square (NN80) within which the Site is located. The closest hectad (10 x 10 km square) within which great crested newt potentially exists is NN70, which contained three records of great crested newt (two adult males and one dead individual). This record is to the southeast of Doune (approximately 9.5 km distant from the Site), isolated from the Site by major barriers and is listed on the NBN as ‘unconfirmed’.

5.4.61 Great crested newt Habitat Suitability Index survey results are shown on **Figure 5-6, Appendix A Figures** and in **Table 5-6** below.

Table 5-6 Great crested newt Habitat Suitability Index survey results

Pond reference	Distance from Site (m)	Description	HSI score	Pond suitability
WB03	430	Large artificial pond raised in elevation from WB04 – WB07. Area = 110m x 90m. Never	0.33	Poor

[52] Rainey, E., Butler, A., Bierman, S. and Roberts, A.M.I., 2009. *Scottish Badger Distribution Survey 2006 – 2009: estimating the distribution and density of badger main setts in Scotland.* Report prepared by Scottish Badgers and Biomathematics and Statistics Scotland.

Pond reference	Distance from Site (m)	Description	HSI score	Pond suitability
		dries. Water Quality – Poor. Shading 50%. Waterfowl – Major impact. Fish population – Likely. Terrestrial habitat for foraging/shelter – Moderate. No macrophytes cover.		
WB09	300	Artificial pond within broadleaved / mixed plantation. Area = 210m x 50m. Never dries. Water quality – Poor. Shading 90%. Waterfowl – Major impact. Fish population – Likely. Terrestrial habitat for foraging/shelter – Moderate. Macrophytes cover – 5%.	0.30	Poor
WB11	480	Artificial pond with rocky/silty substrate, inflow pipe at easterly side. Neutral grass. Area = 40m x 20m. Never dries. Water Quality – Poor. Shading – 0%. Waterfowl -Major impact. Fish population – Possible. Terrestrial habitat for foraging/shelter – Poor. No macrophyte cover.	0.26	Poor
WB14	40	Artificial loch adjacent to agricultural fields. Never dries. Area = 280m x 130m. Water quality – Poor. Shading 50%. Waterfowl – Major impact. Fish population – Possible. Terrestrial habitat for foraging/shelter – Moderate. No macrophytes cover.	0.33	Poor
WB15	90	Artificial loch adjacent to agricultural fields. Never dries. Area = 190m x 100m. Water quality – Poor. Shading 50%. Waterfowl – Major impact. Fish population – Possible. Terrestrial habitat for foraging/shelter – Moderate. No macrophytes cover.	0.31	Poor
WB17	250	Open water associated with the Feddal Burn. Running water unsuitable for great crested newt.	n/a	n/a

5.4.62 The Site is within 500 m of seven waterbodies (excluding flowing watercourses), see **Figure 5-6, Appendix A Figures.** One is east of the River Knaik which presents a major barrier[53] to movement; if great crested newt is present in those ponds, it is highly unlikely that they could use the Site. One waterbody is located south of the B8033 (WB03), 430 m distant from the Site. Woodland edge habitats in the area presents reasonable habitat for newt movement, however, the B8033 road is a barrier to great crested newt movement. Much of the intervening land between this pond and the Site is agricultural fields that are very much sub-optimal for the species.

5.4.63 Two other waterbodies are over 250 m from the Site, an artificial loch (WB09), and waterbody associated with artificial drainage that is linked to the Feddal Burn (WB11).

[53] The following constitute major barriers to dispersal and are unlikely to be traversed by great crested newts: rivers and larger brooks; main roads such as A-roads, motorways or any other road with high traffic volume (i.e. high traffic volume during the night when great crested newt are more likely to be dispersing/commuting); and major urban infrastructure including extensive areas of hardstanding and buildings and dense networks of minor roads with little green space.

Great crested newts generally move within 250 m of a breeding pond[54]. Given the intervening land of commercial forestry and / or agricultural land, which presents a significant barrier to movement, it is unlikely that any newts that may potentially breed in these ponds would be present on Site.

5.4.64 Three open waterbodies are within 250 m of the Site. These include two modified / artificial Standing Open Water Bodies to the northwest of the Site (WB14 and WB15 – within 40 and 90 m of the proposed haul track). These two large artificial ponds are likely to be stocked with fish and would therefore be unsuitable for great crested newt. An area of open water on the Feddal Burn (WB17) is located 250 m from the Site but has running water and is generally considered unsuitable for the species. The terrestrial habitat within the Site and the intervening land is sub-optimal for great crested newt (which prefers a mosaic of rough grassland, scrub, and semi-natural woodland).

5.4.65 All open waterbodies surveyed (see **Table 5-6** above) have poor habitat suitability for great crested newt. The largest of the lochs are almost certainly stocked for sport fishing, with the other waterbodies possibly or probably supporting fish populations (particularly as all are anticipated to never dry). No optimal quality terrestrial habitat (for foraging or hibernating) is present within close proximity to the waterbodies.

5.4.66 Given the above, the overall habitat suitability for great crested newt is poor and this species is considered likely to be absent from the Site.

5.4.67 The area of the Site comprises mainly agricultural grasslands and coniferous plantation woodlands that offer little to no opportunities for reptiles. Broadleaved and mixed woodland areas offer sub-optimal habitat for slow worm and very poor habitat for common lizard. The field surveys did not reveal any optimal features for refugia or hibernation (e.g. vegetated rock piles) or a varied spatial structure of habitats to provide good basking opportunities for reptiles including adder (e.g. woodland edge, scrubland, and heathland in good condition in a mosaic with bracken).

5.4.68 Given the above, the habitat suitability for reptiles is considered to be low.

Terrestrial invertebrates

5.4.69 The National Biodiversity Network (NBN)[55] Atlas desk study did not identify any notable terrestrial invertebrates within 1 km of the Site. There are no designated sites for nature conservation with terrestrial invertebrates as notified features within the potential ZoI of the Proposed Development.

5.4.70 Notable terrestrial invertebrate assemblages are most likely to be associated with high quality species-rich habitats, which are not present at the Site. Mixed and broadleaved woodland plantation provides limited opportunities for notable terrestrial invertebrates (e.g. beetles, butterflies, and moths), but this habitat is not semi-natural or in good condition (e.g. species-rich, semi-natural ground flora, good structural diversity, and presence of deadwood). Therefore, notable terrestrial invertebrates are considered unlikely to be present.

Fish and aquatic invertebrates

5.4.71 The desk study identified two records of lamprey *Lampetra* sp. within 1 km of the Site. No records of aquatic invertebrates were noted during the desk study. Tayside LBAP lists the

[54] NatureScot, 2020. *Standing advice for planning consultations - Great Crested Newts* [online]. [Accessed 04 April 2025]. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-great-crested-newts

[55] National Biodiversity Network, n.d. *National Biodiversity Network* [online]. [Accessed 04 April 2025]. Available at: https://nbn.org.uk/

following nine fish species[49]: Atlantic salmon, river lamprey *Lampetra fluviatilis,* sparling / smelt *Osmerus eperlanus*, twaite shad *Alosa fallax,* brown trout, allis shad *Alosa alosa*, Arctic charr *Salvelinus alpinus,* brook lamprey *Lampetra planeri*, and sea lamprey *Petromyzon marinus*. The Keir Burn and several small watercourses that cross the Site have a hydrological link to the Allan Water (which is connected to the River Teith SAC) and it is highly likely that notable fish occur in the Keir Burn and it is probable for notable fish to occur within the small watercourses.

5.4.72 The Keir Burn has potential to support notable aquatic invertebrates. The other watercourses within the Site and wider area are less likely to support notable aquatic invertebrates due to their small size and modified nature, but the presence of notable populations of aquatic invertebrates cannot be ruled out for any of the watercourses within the Site.

Invasive non-native species

5.4.73 The desk study identified one record of an INNS of plant within 1 km of the Site, which is giant hogweed, and 28 records of INNS fauna, which comprise 27 records of grey squirrel *Sciurus carolinensis* and a single record of New Zealand flatworm *Arthurdendyus triangulates.*

5.4.74 INNS plants found during field surveys are giant hogweed, dogwood and rhododendron. The location of INNS plants are described above corresponding to the habitat type in which they are present in **Section 5.4.14, 5.4.17,** and **5.4.26,** and are shown on **Figure 5-3, Appendix A Figures**. **Table 5-7** provides details of the INNS found during field surveys.

Table 5-7 INNS found during field surveys

INNS reference	Distance from Site	Description
1	Within Site	Giant hogweed in a dense patch of mature stems to 5 x 5 m in area.
2	Within Site	Dogwood in a dense stand of 60 x 10 m in area.
3	Within Site	Dogwood frequent and cherry laurel occasional within Other neutral grassland (weedy tall herb) habitat.
4	Within Site	Dogwood frequent and cherry laurel occasional within Mixed scrub habitat.
5	45 m	Rhododendron ponticum in a dense patch 20 x20 m in area.
6	Within Site	Giant hogweed of young low-growing plants, 20 x 5 m in area.
7	25 m	Rhododendron ponticum, frequent 20 x 20m

5.5 Embedded Mitigation

5.5.1 A range of measures that are standard good practice for a development of this type, and which are required to comply with environmental protection legislation, would be implemented. These are well-developed and have been successfully implemented on infrastructure projects across the country, and there is a high degree of confidence in their success. They can therefore be treated as embedded mitigation.

5.5.2 A CEMP would be prepared pre commencement of works and in consultation with SEPA and NatureScot where necessary, prior to commencement of construction. The CEMP

would set out all environmental management measures and the roles and responsibilities of construction personnel and would be developed in reference to the Applicant's applicable GEMPs and SPPs (**Appendix O GEMPs and SPPs)**. The CEMP would include:

- All personnel involved in the construction and operation of the Proposed Development would be made aware of relevant ecological features and the mitigation measures and working procedures that must be adopted. This would be achieved as part of the induction process and / or through Toolbox Talks;
- An Environmental Clerk of Works and Ecological Clerk of Works (ECoW) would be employed for the duration of construction and conduct regular site inspections. The ECoW would advise on and monitor implementation of mitigation measures and compliance with legislation concerning ecological features;
- A pre-construction survey (including a survey of trees with PRFs) would be undertaken to confirm that conditions remain as per the baseline detailed within this EA report, or if changes have occurred the survey should aim to identify the presence of any protected species within the Site and associated buffer to account for potential impacts. In line with NatureScot guidance, the pre-construction surveys would take place no more than three months before commencing works (including facilitating works such as vegetation clearance);
- During all phases of the Proposed Development, pollution prevention measures would be adopted, following SEPA Guidance on Pollution Prevention (GPP) and Pollution Prevention Guidelines (PPG)[56], including the following:
  - Controls and contingency measures to manage run-off from construction areas and sediment;
  - All oils, lubricants and other chemicals would be stored in appropriate secure containers in suitable storage areas, with spill kits at the storage location and at places across the Site; and
  - All refuelling and servicing of vehicles and plant would be carried out in a designated bunded area with an impermeable base, located at least 50 m from any watercourse;
- Works near or at any retained native trees or semi-natural woodland would follow tree protection guidance set out in British Standard 5837:2012[57];
- Implement standard measures to protected mammals during construction, including:
  - ensure excavations are left with a method of escape for any animals that may enter overnight (such as a battered slope sufficient for mammals to walk out), and check them at the start of each working day to ensure no animals are trapped;
  - ensure pipes are capped or otherwise blocked at the end of each working day, or if left for extended periods of time, to ensure no animals become trapped; and,

[56] Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA), the Scottish Environment Protection Agency (SEPA) and the Oil Care Campaign, 2024. *Guidance on Pollution Prevention* (online). Available from: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed 01 July 2024].

[57] British Standards Institution (2012) *BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations*

- Lighting – as far as possible, carry out works in daylight to minimise the risk of disturbing protected or notable nocturnal species. If any temporary artificial lighting is required for construction works, this should be strongly directional and directed only on to the works area, and be turned off when not required, to minimise light spill and adverse effects on nocturnal wildlife.

5.5.3 Embedded mitigation measures in relation to sensitive ecological features include:

- All soil stripping and storage to follow a process of soil management to ensure the protection of turfs and soil horizons, allowing for successful reinstatement and revegetation;
- Loss of woodland and native trees would be minimised. Retained native trees and their root zones should be avoided and protected during the works in accordance with standard guidance in British Standard 5837:2012[57];
- If otter refuges, bat roosts, beaver lodges, water vole burrows, pine marten dens, red squirrel dreys (or other protected breeding / resting sites) are found that would be subject to disturbance or damage, there would be a constraint to the Proposed Development[58]. If this becomes the case, obtain an appropriate license from NatureScot, which would require proportionate mitigation;
- If works carried out directly affect trees that have been identified as having PRFs, then carry out further assessment to check trees for roosting bats prior to felling, undertaken by a suitable experienced and licensed bat worker;
- If works carried out directly affect trees or woodland, or take place within disturbance distances (within 5 m of the works in the non-breeding season or 50 m of the works in the breeding season[59]) of any trees or woodland, then carry out red squirrel pre-construction surveys[60], for red squirrel dreys in suitable woodland; and,
- It is advisable to carry out removal of trees with potential for red squirrel dreys or actual red squirrel dreys outside of the breeding season. If red squirrel dreys are present, licensing through NatureScot is more difficult in the breeding season, and it is not normally permitted to destroy likely breeding dreys in the breeding season.

5.5.4 In regard to all other habitats there are no significant ecological constraints – all other habitats within the Site are common and widespread and are of minimal ecological value.

5.6 Appraisal

Issues Scoped Out

5.6.1 There is a hydrological link between the Site and the River Teith SAC, however, the Site is over 20 km downstream from the SAC. As per consultation feedback presented in **Section 5.2**, NatureScot stated that there would likely be no significant effects for the qualifying interests on the River Teith SAC. There is no downstream hydrological link between the Site and the features / qualifying interests of the Shelforkie Moss SAC / Carsebreck and Rhynd Lochs SSSI. Given a) the nature of the Proposed Development, b) the degree of dilution over 20 km or more to the SAC / no hydrological link to the SAC / SSSI, and c) that pollution controls can be expected to be required to be embedded in the CEMP, there is not likely to be any pollution impact within the SAC or the SSSI. Notable fish species associated with the River Teith SAC could be present within some of the

[58] Normal disturbance distance for otter refuges is 30 m, unless severe works such as piling are proposed. Works up to 10 m from water vole burrows are normally possible.

[59] The red squirrel breeding season is February to September, inclusive.

[60] Recommended to be conducted in good time to allow for licencing if required (e.g. three months prior to commencement).

watercourses within the Site and the surrounding area, however, fish would be suitably protected via embedded mitigation measures.

5.6.2 None of the other designated sites for nature conservation within the ZoI (i.e., Upper Strathearn Oakwoods SAC and Kippenrait Glen SAC), have any conceivable pathway for potential impacts on qualifying habitats because there is no hydrological connectivity (or any other connectivity via watercourses or otherwise). Furthermore, as per consultation feedback presented in **Section 5.2**, NatureScot stated that there would likely be no significant effects for the qualifying interests of the Kippenrait Glen SAC.

5.6.3 Given the distances from the Site at which all of the SSSIs / SACs within the ZoI are located, it is highly unlikely that any would be adversely affected by the Proposed Development, including via air pollution. Dust and gaseous air pollution can have an adverse impact on habitats over a distance, but such effects diminish rapidly from source and are generally considered negligible at 200 m[61]. There is no conceivable pathway for potential air pollution impacts on the qualifying habitats of the SACs (Shelforkie Moss SAC, River Teith SAC, Upper Strathearn Oakwoods SAC and Kippenrait Glen SAC) which are located approximately 1.3 km from the Site at their closest. This distance precludes any effect on habitats from air pollution. Consequently, and in view of the nature of the Proposed Development, potential effects on the SAC and SSSI above as a result of the Proposed Development are not possible. Given the above, the SAC and SSSI are scoped out of the appraisal.

5.6.4 Braco Castle Wood LNCS has no possible hydrological link with the Site. Moreover, the LNCS is at a distance from the Site (approximately 700 m at the closest point) at which no possible air pollution impacts are anticipated. Consequently, and in view of the nature of the Proposed Development, potential effects on the LNCS as a result of the Proposed Development are not possible and it is scoped out of the appraisal.

5.6.5 Ancient woodland, listed on the AWI, is present within 1 km of the Site but not within the Site. There are woodlands listed on the AWI (LEP) within close proximity to the Site (on the eastern side of the A822), however, these woodlands are in poor condition and do not possess a semi-natural ground flora. Moreover, none of the AWI-listed woodlands would be directly or indirectly disturbed by the Proposed Development. Given the above, it is highly unlikely that there would be any adverse effect on AWI woodlands given the nature of the Proposed Development. Therefore, AWI woodlands are scoped out of the appraisal.

5.6.6 Given the sub-optimal quality of habitat and lack of records of beaver, pine marten and water vole, they are not considered to represent a major ecological constraint to the Proposed Development. Therefore, the above species are scoped out of the appraisal. However, there remains a risk these species could be present in the future. As a precaution pre-construction checks are recommended for these species, and mitigation to protect these species implemented, if the baseline changes prior to or during construction.

5.6.7 Given the sub-optimal quality of habitat and lack of suitable refugia and resulting likely low frequency of reptile species, they are not considered to represent a major ecological constraint to the Proposed Development and additional survey or mitigation is not warranted. There is no requirement for a licence where development works affect

[61] Highways England, 2019. *Design Manual for Roads and Bridges – LA105 Air Quality.* Highways England.

common species of reptiles and, in this case, there is no need for any specific mitigation for their protection. Given the above, reptiles are scoped out of the appraisal.

5.6.8 As described in **Sections 5.4.60** and **5.4.64**, the waterbodies within 500 m of the Site have poor habitat suitability for great crested newt and the desk study did not indicate this species to be present within the search area. It is not anticipated that any optimal habitats that present good opportunities for great crested newt hibernacula would be subject to disturbance from the Proposed Development. Given the above, great crested newt is considered likely to be absent from the Site and no impacts upon potential breeding ponds are considered possible. Therefore, great crested newt is scoped out of the assessment.

Sensitive Ecological Receptors

5.6.9 The ecological baseline presented in **Section 5.4** has been used to identify important ecological features within the potential ZoI of the Proposed Development. The importance (and sensitivity) of a given ecological feature has been determined from information on distribution and status, a review of literature and guidance[1], field survey data and professional judgement.

5.6.10 Relevant ecological features considered to be of Local importance are listed below.

- Other broadleaved woodland;
- Marsh;
- GWDTE;
- Priority rivers / streams;
- Bats;
- Otter;
- Red squirrel;
- Fish; and
- Aquatic invertebrates.

5.6.11 Relevant ecological features considered to be of Site importance are listed below.

- Mixed broadleaved woodland;
- Other rivers / streams; and
- Badger.

Potential Significant Effects

5.6.12 Potential significant impacts and effects from the construction and operation of the Proposed Development on ecological features include the following:

- Permanent habitat loss (to e.g., felling of Other broadleaved woodland);
- Temporary habitat loss (to e.g. disturbance to Modified grassland, and disturbance to Mixed woodland and Other coniferous woodland);
- Habitat degradation as a result of pollution incidents (e.g., fuel or oil spills, silty run-off caused from the installation of the permanent abutments adjacent to the Keir Burn);
- Permanent or temporary changes to hydrological conditions which may affect vegetation and habitats (e.g., direct / indirect impacts on potential GWDTE);
- Loss of habitat supporting protected and / or notable species;

- Creation of barriers to animal movements (e.g., the construction of watercourse crossings could inhibit the movement of otter or fish);
- Temporary disturbance and / or displacement of species during construction;
- Disturbance and / or displacement of species during operation (e.g., the use of permanent lighting could impact upon bat foraging); and,
- Potential for direct mortality of species during construction (e.g., as a result of increased vehicular traffic, or as a result of pollution incident).

5.6.13 It is anticipated that the potential impacts on ecological features from the Proposed Development could be managed through mitigation and compensation. Further to mitigation and compensation, opportunities for ecological enhancement measures are available and likely to be sufficient to allow the Proposed Development to meet the objectives of NPF4.

GWDTE

5.6.14 Potentially highly and moderately GWDTE, of the NVC type M23b and MG10, are present to the west of the Site **Section 5.4.36 to 5.4.38**. The hydrological regime of the area is influenced by surface waters but may be (at least in part) fed by groundwater, due to the presence of a moderately productive aquifer.

5.6.15 Potentially highly GWDTE (NVC type = MG23) are outside of the Proposed Development footprint and would not be directly impacted. These GWDTE would be unlikely to suffer any potential indirect impacts from the Proposed Development, as there is no proposed construction within the immediate upslope area of these habitats and the intervening land. Therefore, indirect impacts as a result of a change in hydrological regime are considered to be unlikely. Direct impacts to potentially moderately GWDTE (NVC type = MG10) would result from the proposed haul track, however, this habitat is not species-rich or of high conservation value and could be considered “unimportant” (the term unimportant is to be understood as per SEPA guidance[30]). Therefore, the impacts to MG10 are not considered to be significant.

Bats

5.6.16 Nine trees (in total) with PRFs would be felled to accommodate the Proposed Development: five PRF-I and one PRF-M adjacent to the A822; and, two PRF-I and one PRF-M adjacent to the B8033 (identified on **Figure 5-7, Appendix A Figures** of this appraisal as T02 – T07, and T29, T30 and T31). The PRF-M trees were assessed following further night-time emergence surveys and bat roosts were <u>not</u> confirmed. Special protection measures would be required in order to protect bats during the construction of the Proposed Development, as per **Section 5.7.5** below.

Mammals

5.6.17 No positive evidence of beaver, pine marten, red squirrel or badger has been recorded within the Site, and no otter resting sites have been recorded. However, as the habitat present do have some suitability to support these species (and red squirrel have been reported in the area surveyed during public consultation), the use of the Site by such species in the future cannot be ruled completely out. Protection of otter, beaver, pine marten, red squirrel and badger can be suitably achieved by implementing mitigation measures as described in **Section 5.5**.

Fish and Aquatic Invertebrates

5.6.18 Protection of fish and aquatic invertebrates would be achieved via the implementation of special protection measures (as per **Section 5.7.7** below) at the Keir Burn and tributary to

the Allan Water, where works would be required to accommodate permanent bridge abutments / culverts, further to implementing mitigation measures as described in **Section 5.5** above.

Summary

5.6.19 The majority of habitats within the Site are non-notable grasslands and coniferous plantation. Other habitats include mixed and broadleaved woodlands, willow scrub, marsh (SBL priority habitat), neutral grassland and mixed scrub. The Keir Burn (an SBL priority watercourse) and minor, non-priority watercourses are within the Site. Artificial waterbodies, associated with the Mill Burn and Feddal Burn are present to the north-west and south-west of the Site. The habitats above are not of great ecological importance or sensitivity, except for marsh and priority watercourse. Regardless, potential impacts from the Proposed Development can be easily mitigated.

5.6.20 Notable watercourses were identified within and around the Site with potential to support notable populations of fish (e.g. the Keir Burn). It is possible for notable fish to occur within the small watercourses on the Site. All watercourses within the Site are hydrologically linked to the River Teith SAC via the Allan Water, which is designated for Atlantic salmon and all three UK species of lamprey. However, potential impacts to fish from the Proposed Development can be easily mitigated.

5.6.21 GWDTE were identified within the survey area. However, the potentially highly GWDTE (marsh) would not be impacted by the Proposed Development. In addition, the moderately groundwater dependent ecosystems (damp grassland) were assessed as being “unimportant” and therefore direct impacts to these habitats are not considered to be of concern, according to SEPA guidance[30]. Potential impacts to GWTDE from the Proposed Development can be easily mitigated.

5.6.22 Notable and protected species were found to be present on-site, the most notable of which are bats and otter. Bat suitability for feeding / commuting was assessed as High. No buildings with potential to support bat roosts were found during surveys. Nine trees with bat roost potential are proposed to be felled to accommodate the Proposed Development, but no confirmed bat roosts were recorded during surveys of these features. Potential impacts to bats from the Proposed Development can be easily mitigated.

5.6.23 No otter resting or breeding site were found. Habitat suitability for beaver, water vole, pine marten, red squirrel and badger were low, and no positive evidence of these species was recorded.

5.6.24 All potential impacts identified are minor / negligible (in EIA terms[1]) and therefore any possible impacts from the Proposed Development cannot be considered significant.

5.7 Recommendations and Mitigation

Designated Sites

5.7.1 As noted above, four European sites within 10 km of the Site and one SSSI within 2 km of the Site have been scoped out of the appraisal. However, the River Teith SAC, Kippenrait Glen SAC, Shelforkie Moss SAC, Upper Strathearn Oakwoods SAC, as European Sites, are subject to the Habitat Regulations Appraisal (HRA) process. A shadow ‘Appropriate Assessment’ report will be submitted to PKC, setting out the potential impacts of the Proposed Development on European sites. PKC will need to confirm agreement or

otherwise, as the competent authority for HRA matters. Non-statutory designated sites have been scoped out of the assessment (as none are present within the ZoI of the Site).

Habitats

5.7.2 Habitats including species-poor coniferous plantation, mixed and broadleaved woodland, neutral grassland and non-native hedgerows would be impacted by the Proposed Development. Where felling / removal of these habitats is proposed, then the habitats must be replaced on a like-for-like (or better) basis as a minimum, as close to the location of impact as possible. Such measures should also be considered for enhancement as described in **Section 5.7.11 – 5.7.14**, to go beyond like-for-like compensation by increasing local species diversity, for example by providing better foraging / commuting habitat for bats and other mammals.

GWDTE

5.7.3 It is considered unlikely that GWDTE would be significantly impacted by the Proposed Development. However, to minimise potential impacts on GWDTE all works must seek to minimise direct disturbance, where possible. Mitigation must be employed for individual GWDTE (where required) to ensure that the hydrological connectivity from upstream groundwater supplies to the downstream GWDTE is maintained (to maintain existing hydrological regimes). To aid in the maintenance of the current hydrological regime, suitable GWDTE mitigation methods for the proposed haul track include the use of:

- Permeable track (e.g. coarse aggregate base); and / or
- Culverts installed at regular intervals.

5.7.4 As potentially highly groundwater dependent ecosystems on the Site are unlikely to be directly or indirectly impacted by the Proposed Development and only non-notable habitat would be impacted, vegetation monitoring is not considered to be necessary.

Bats

5.7.5 Prior to felling of trees with potential to support bat roosts, PRFs must be inspected by a licenced bat worker (e.g. by tree climbing where possible and safe to do so). Felling of trees with PRFs must be conducted under the supervision of a licenced bat worker / suitably experienced ecologist. If bats are found during inspection, then advice must be sought from a licenced bat worker / suitably experienced ecologist.

Fish

5.7.6 Fish would be safeguarded by minimising works in or beside all watercourses and open water, where possible. During construction, all site staff would adhere to strict pollution control measures to ensure waterbodies are protected from pollution (by adhering to SEPA Guidance on Pollution Prevention[62]).

5.7.7 The Keir Burn crossing would require the creation of permanent bridge abutments. The tributary to the Allan Water in the west of the Site would require culverting over some of its length. Water crossings and culverts must be constructed in accordance with authorisations and Method Statements granted / accepted by SEPA. Bridge works and culvert installations would result in an overall biodiversity net gain, by increasing the overall length and / or quality of aquatic linear habitats, see **Section 5.7.11 – 5.7.14** for more information.

[62] SEPA, 2013. *PPC Technical Guidance Note* [online]. [Accessed 04 April 2025]. Available at: https://www.sepa.org.uk/media/155691/iedtg02_site_and_baseline_report-guidance.pdf

Invasive Non-native Species

5.7.8 It is an offence in Scotland to plant, or otherwise cause to grow, any plant in the wild at a location outside its native range. Appropriate actions (such as avoidance, specific treatment and/or standard best practice) should therefore be integrated into any works which may affect invasive non-native plant species, to manage the risks and avoid potential breaches of legislation. Such actions would be compiled in a Biosecurity Management Plan (BMP) or, at minimum, a Method Statement. These actions would include avoiding disturbance of invasive non-native plants as far as possible, cleaning of heavy plant, machinery and Personal Protective Equipment (PPE) used in the vicinity of these species, and careful management of any arisings (including potentially contaminated substrate) should they need to be removed. Note that it is best practice, more sustainable and more cost-effective, where feasible, for invasive non-native species arisings to be left within existing infested areas, or at least retained onsite, rather than removing material offsite – removal to landfill is the least sustainable and often the most expensive option.

5.7.9 A BMP or Method Statement is likely to be required, as INNS are located within the footprint of the Proposed Development and would be disturbed by works. Production of a BMP would require clarification of the exact locations of species with the potential to become invasive, particularly giant hogweed and dogwood. Establishing this would require a specific walkover survey of localised parts of the Site and should be carried out as a pre-construction survey, during the growing season (e.g. April to October, inclusive).

5.7.10 There are no specific requirements for the grey squirrel or New Zealand flatworm.

Opportunities for Ecological Enhancement

5.7.11 BNG would be achieved for the Site following implementation of compensatory / enhancement habitat measures advised in **Appendix D Biodiversity Net Gain Report**. This appendix demonstrates that a net gain of above 10% is predicted and thus demonstrates 'biodiversity benefits' required under Policy 3 of NPF4[63] will be achieved.

5.7.12 Moderately species-rich neutral grassland would be created on steep-sided slopes of the haul track batters through seeding of suitable wildflower seed mixes, of local provenance as possible to the Site would be undertaken.

5.7.13 Another enhancement measure, the creation of refugia for amphibians and invertebrates, could also be considered that does not contribute towards the calculation of BNG, but can still deliver improvements for biodiversity that would also work towards achievement of 'biodiversity benefits' under NPF4.This would involve the use of removed woody material to create log-piles in appropriate retained habitat, as advised by an ecologist.

Documents

5.7.14 Further specific mitigation measures will be detailed in the following documents:

- A Landscape Habitat Management Plan (LHMP) has been prepared (**Appendix C Landscape and Habitat Management Plan**) and will be submitted for approval by PKC, in consultation with SEPA and NatureScot where necessary, prior to

[63] National Planning Framework 4 (NPF4) includes the following statements of policy intent: "*To protect, restore and enhance natural assets making best use of nature-based solutions*" and "*To protect biodiversity, reverse biodiversity loss, deliver positive effects from development and strengthen nature networks*". Wherever possible, and proportionate to the scale and nature of the project, the Proposed Development should therefore seek to deliver benefits for biodiversity, in addition to protecting existing biodiversity. NPF4 also states that major development will only be supported where nature networks "*are in a demonstrably better state than without intervention*" using best practice and including future monitoring and management where appropriate.

commencement of construction. The LHMP will detail specific requirements for enhancement measures (e.g. woodland creation / enhancement, native hedgerow creation; moderately species-rich grassland creation);

- A Bat Species Protection Plan (SPP) will be prepared and for approval by PKC, in consultation with NatureScot, prior to commencement of construction. The Bat SPP will detail specific requirements for the protection of bats; and
- A Biosecurity Management Plan (BMP) or, at a minimum, an INNS Method Statement will be prepared and submitted for approval by PKC prior to commencement of works on site. The BMP / Method Statement will detail the mitigation measures required to prevent the spread of INNS.

5.8 Cumulative Effects

5.8.1 A cumulative appraisal was conducted taking into account the 'scoped in' planning applications as detailed in **Section 13.1.2** and **Table 13-1**. These are summarised below;

- 21/00756/FLM: 49.9MW BESS facility; and
- 22/02231/FLM: 49.9MW BESS facility compound.

5.8.2 The BESS developments are considered to be of importance to the cumulative appraisal concerning important ecological features, as they are developments which are located within the local area to the Proposed Development that could potentially give rise to cumulative effects.

5.8.3 During the appraisal process, the results of which are described in this chapter, there were no impacts identified that could possibly result in a residual effect[64] of greater than Negligible effect. Consideration during this cumulative appraisal would only be given to those impacts where a residual effect of significance was concluded for the Proposed Development.

5.8.4 For all impacts for which it was concluded that there would be No Effect or Negligible Effect, it is considered that the effect of that impact from the Proposed Development in isolation would be so minimal, that it is extremely unlikely that there is any possibility of significant cumulative effects arising from the combined impact(s) of projects in the list above. Similarly, the additive (or multiplicative) action of effect interactions are not anticipated, due to the same reasons given above, that all impacts were appraised to be so minimal, they could not possibly give rise to a cumulative effect.

5.8.5 It is concluded on the basis of the assessment presented above that the Proposed Development would not act cumulatively to give rise to significant adverse effects on ecological features. This relies on the mitigation described in this chapter to avoid or minimise the risk on important ecological features, and on the proposals also doing the same (e.g. managed through project-specific CEMPs).

[64] As described in CIEEM guidance. CIEEM, 2022. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2 – Updated April 2022. Chartered Institute of Ecology and Environmental Management, Winchester.

6. ORNITHOLOGY

6.1 Introduction

6.1.1 This EA chapter considers the potential effects of the Proposed Development on ornithological features within the Site and within the wider local area. Evaluation of the existing baseline environment has been made through a combination of desk-based study, field surveys and consultation. This EA chapter was written with cognisance of the methodology set out in Chartered Institute of Ecological and Environmental Management (CIEEM) guidance[1].

6.1.2 This chapter:

- Describes the key ornithological issues associated with construction and operation of the Proposed Development;
- Presents the desk study / survey methods that were used to generate ornithological baseline information;
- Includes details of any consultation undertaken to date to inform the EA;
- Presents the results of the surveys; and
- Provides an outline of embedded mitigation, an appraisal of ornithological features and potential significant effects, and recommends further mitigation measures and recommendations.

6.1.3 As the Proposed Development would be operational in perpetuity (see **Section 1.1.7**), this chapter does not consider decommissioning.

6.2 Information Sources

6.2.1 The chapter draws on the following technical figure (see **Appendix A Figures**):

- **Figure 6-1 Statutory Designated Sites.**

Consultation

6.2.2 At the time of writing this chapter, consultations have been held regarding the potential ecological impacts of the Proposed Development with the following consultees (note that relevant consultation responses are detailed in **Section 6.2.3** and some of the organisations are yet to respond): Perth and Kinross Council (PKC); Stirling Council; NatureScot; SEPA; Scottish Water; Scottish Forestry; Forth District Salmon Fishery Board; Forth Rivers Trust.

6.2.3 The assessment of impacts on terrestrial ecological features has been informed and influenced by consultation held with several statutory and non-statutory stakeholders. A summary of the consultation responses / recommendations provided (at the time of writing) by consultees are provided in **Table 6-1**.

Table 6-1 Summary of Consultation

Consultee	Summary of Relevant Pre-application Response
NatureScot	South Tayside Goose Roosts Special Protection Area (SPA)

[1]CIEEM, 2024. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.3, updated September 2024). Chartered Institute of Ecology and Environmental Management, Winchester.

Consultee	Summary of Relevant Pre-application Response
	The Proposed Development is located, at its closest point, approximately 1.3 km from South Tayside Goose Roosts SPA. The Proposed Development includes access through arable fields which may be used by geese associated with the site. There are historic records of geese using the 1 km squares where the proposed haul track is to be, however the Site is next to the road and near to housing so is unlikely to be important foraging ground. We therefore advise that there is a likely significant effect on the pink-footed goose *Anser brachyrhynchus* and greylag Anser anser goose qualifying features of the Site but, due to extent of other available foraging habitat, there will be no adverse effect on site integrity as a result of this proposal. Standing advice to be consulted for guidance on protected species (e.g. red kite *Milvus milvus*) surveys, mitigation and licensing. All survey work for protected species should be undertaken in line with the best practice guidance.
Perth and Kinross Council	The following designated sites were noted: • South Tayside Goose Roosts (SPA / Ramsar) • Carsebreck and Rhynd Lochs Site of Special Scientific Interest (SSSI) Reference was made to "*Protected species in surrounding area*", that could include breeding birds. The National Planning Framework 4 (NPF4) is referenced in regards to Policy 3: Biodiversity. PKC's Local Development Plan[2] is referenced in relation to Policy 38: Environment and Conservation, and Policy 41: Biodiversity. Detailed ecological survey is required. Farm buildings may contain breeding birds including owls. PKC also consulted with NatureScot who provided the following response: South Tayside Goose Roosts (STGR) Special Protection Area (SPA). The proposed site is located within foraging range of geese associated with STGRs. The SPA is protected for internationally important populations of non-breeding pink footed geese, greylag geese and its non-breeding waterfowl assemblage. The SPA is also protected for breeding wigeon. The SPA is underpinned by three Sites of Special Scientific Interest: Carsebreck and Rhynd Lochs, Drummond Lochs and Dupplin Lakes. Pink footed and greylag geese are known to forage up to 20 km from their roost sites, the proposed site is approximately 1.9 km from the nearest roost and cuts through a number of arable fields which are suitable foraging habitat for geese. We advise that proposal will not adversely affect the integrity of the site as: 1. There is sufficient alternative foraging habitat in the nearby vicinity for geese. 2. Historic data indicates the proposed site is not regularly used by foraging geese. 3. If works are to take place in the non-breeding season (October – March) we advise the applicant to consider mitigation to prevent disturbance to birds moving to and from their roost sites.

[2] PKC, 2019. *Local Development Plan* [online]. [Accessed 14 February 2025]. Available at: https://www.pkc.gov.uk/ldp2

Consultee	Summary of Relevant Pre-application Response
	South Tayside Goose Roost Ramsar site may also be affected but any concerns about the interest of this designation are fully addressed as part of the consideration of the European site.

Desk Study

6.2.4 Several data sources were used for the desk study, as set out in **Table 6-2**.

Table 6-2 Desk Study Data Sources

Data Source	Date Accessed	Data Obtained
OS 1:25,000 maps and aerial photography[3]	19 February 2025	Aerial imagery to identify potential habitats and connectivity relevant to interpretation of planning policy and potential protected or notable species constraints.
PKC Local Development Plan (LDP)[4]	19 February 2025	Information on local policies regarding the environment.
The PKC follows the Tayside Local Biodiversity Action Plan LBAP (2016-2026)[5]	19 February 2025	Information on protected or notable species. Includes a section Farmland Ecosystems.
NatureScot SiteLink webpage[6]	19 February 2025	SPA and Ramsar sites within 10 km of the Site. Sites of Special Scientific Interest (SSSIs) within 2 km of the Site.
National Biodiversity Network (NBN) Atlas Scotland[7]	19 February 2025	Commercially available records of protected and / or important species within 1km of the Site, made since 2000.

Preliminary Ecological Appraisal

6.2.5 The preliminary ecological appraisal included a walkover survey of the survey area, broadly following the Phase 1 habitat survey methodology as set out in Joint Nature Conservation Committee (JNCC) guidance[8] by which standard habitat types are mapped and ecological notes made. Records of notable birds and an assessment of habitat suitability for birds were made. The survey extended to 50 m from the Site. Surveys were conducted on 18,19 and 20 March, and 3 June 2024[9]. The field survey methodology is detailed further in **Sections 6.3.9** to **6.3.10**.

[3] Bing Maps, 2025. *Bing Maps* [online]. [Accessed February 2025] Available at: www.bing.com/maps/

[4] PKC, 2019. *Local Development Plan* [online]. [Accessed February 2025] Available at: https://www.pkc.gov.uk/ldp2

[5] Tayside Biodiversity, 2025. *Tayside Local Biodiversity Plan* [online]. [Accessed February 2025] Available at: https://www.taysidebiodiversity.co.uk/

[6] NatureScot, 2025. *SiteLink* [online]. [Accessed February 2025] Available at: https://sitelink.nature.scot/home

[7] NBN Atlas Scotland, 2025. *NBN Atlas Scotland* [online]. [Accessed February 2025] Available at: https://scotland.nbnatlas.org/

[8] JNCC, 2010. *Handbook for phase 1 habitat survey – a technique for environmental audit*. Joint Nature Conservation Committee, Peterborough

[9] Surveys were conducted in separate locations in March and June, not the same areas twice.

6.3 Methodology

Sensitive Ecological (Ornithological) Receptors

6.3.1 CIEEM guidance *Guidelines for EcIA in the UK and Ireland*[1] recommend that only those ecological features that are 'important' and that could be significantly impacted by a development require detailed assessment, stating that "*it is not necessary to carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*".

6.3.2 Consequently, for the purposes of the desk study, field survey and assessment of effects, 'important' ornithological features will be taken to include designated ornithological sites and bird species designated or listed on:

- Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive')[10];
- Convention on Wetlands of International Importance ('Ramsar Convention')[11];
- Wildlife and Countryside Act 1981 (as amended) (the 'WCA')[12];
- Species on the Scottish Biodiversity List (SBL)[13], which are thus identified as being of principal importance for biodiversity conservation in Scotland; and
- Birds of Conservation Concern (BoCC) Red List[14].

6.3.3 Other bird species that may be rare, scarce, or otherwise notable will be included where deemed appropriate through available information and / or professional judgement.

6.3.4 The Tayside Biodiversity Action Plan (2016-2026)[5] sets out Action Plans with relevance to ornithological receptors. Bearded tit *Panurus biarmicus* (a priority species) is specifically mentioned in 'Action for Species'. However, bearded tit is of a localised distribution and is a species associated with reed beds not present within or within close proximity to the Site. The Upland LBAP refers to upland birds with a specific mention of golden eagle *Aquila chrysaetos*, snow bunting *Plectrophenax nivalis* and common scoter *Melanitta nigra* – three species that are not anticipated to be onsite, according to their known distribution.

6.3.5 The Farmland LBAP refers to farmland bird species including barn owl *Tyto alba*, tree sparrow *Passer montanus*, grey partridge *Perdix perdix*, linnet *Linaria cannabina*, lapwing *Vanellus vanellus*, corn bunting *Emberiza calandra* and skylark *Alauda arvensis*. The Woodland LBAP makes reference to woodland birds such as great-spotted woodpecker *Dendrocopos major*, chiffchaff *Phylloscopus collybita* and blackcap *Sylvia atricapilla*. The Water & Wetlands LBAP is relevant to the Proposed Development in that it highlights the importance of SPA and Ramsar sites for migratory birds (see **Section 6.4.1** below).

Desk Study

6.3.6 A desk study was carried out in February 2025 which identified nearby designated sites and commercially available records of notable bird species.

6.3.7 The desk study sought to identify ornithological features within the likely Zone of Influence (ZoI) of the Proposed Development that could be significantly affected by its construction

[10] European Union, 2009. *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.* [online]. [Accessed 25 February 2025]. Available at: https://eur-lex.europa.eu/eli/dir/2009/147/oj/eng

[11] Convention on Wetlands Secretariat, 2024. *The List of Wetlands of International Importance* [online]. [Accessed 25 February 2025]. Available at: https://www.ramsar.org/sites/default/files/2023-08/sitelist.pdf

[12] Gov.uk, 1981. *Wildlife and Countryside Act 1981*

[13] NatureScot, 2020. *Scottish Biodiversity List* [online]. [Accessed 25 February 2025]. Available at: https://www.nature.scot/doc/scottish-biodiversity-list

[14] British Trust of Ornithology (2021) *Birds of Conservation Concern 5*

and operation. The ZoI is the area(s) over which ecological features may be affected by the biophysical changes caused by the Proposed Development and associated activities[1].

6.3.8 A stratified approach was taken when defining the desk Study Area based on the likely ZoI of the Proposed Development. Accordingly, the desk study searched for:

- SPA or Ramsar sites within 10 km of the Site;
- SSSIs within 2 km of the Site;
- Locally designated nature conservation sites within 2 km of the Site; and,
- Records of protected and / or important bird species within 1 km of the Site.

Habitat Survey

6.3.9 The Preliminary Ecological Appraisal included a walkover survey of the survey area (the survey area extended from 50 m beyond the Site), broadly following the Phase 1 habitat survey methodology as set out in JNCC (2010)[8]. Habitats were classified according to the UKHab system. The survey was 'extended' to record any evidence of and potential for protected or notable bird species. The survey involved assessing the potential of habitats within the survey area to support breeding, wintering, or migrating birds, either individually notable species or assemblages of both common and rarer species.

6.3.10 Habitat surveys were vital to understanding the opportunities for ornithological features, however, no specific ornithological surveys targeted on species of birds (e.g. for raptors or notable geese) were deemed to be required. This based on limited predicted impacts from the Proposed Development and that the habitats on Site are unlikely to be of great importance to notable species of birds. However, to ensure that notable species of birds are safeguarded, pre-construction surveys and mitigation will be carried out, see **Section 6.7**. The assessment was therefore informed by a detailed desk study, including habitat suitability assessment, which was complimented by ornithological records obtained during ecology and habitat surveys.

Ecological Appraisal

6.3.11 The results of the completed field surveys, in combination with the outcomes of the desk study and any consultation with relevant stakeholders, were used to inform the EA. This was conducted in accordance with the industry-standard guidelines published by the CIEEM[1]. The appraisal used the ecological baseline to identify the sensitive ecological receptors that could be affected by the construction or operation of the Proposed Development. Each receptor was assigned a geographic level of importance based on its national and local conservation status and population / assemblage trends and other relevant criteria (including size, naturalness, rarity, and diversity). Details of the Proposed Development were then used to assess if a significant environmental effect is anticipated for each receptor.

Limitations

6.3.12 The aim of a desk study is to characterise the baseline context of a proposed development and provide valuable background information that may not be captured by field surveys alone. Information obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular species does not necessarily mean that they do not occur in the Study Area. Likewise, the presence of records for particular species does not automatically mean that these still occur within the area of interest or are relevant to the Proposed Development.

6.4 Baseline Environment

Statutory Designated Sites

6.4.1 There are three statutory designated sites for ornithological features within the potential ZoI of the Proposed Development comprising South Tayside Goose Roosts SPA, South Tayside Goose Roosts Ramsar site, and Carsebreck and Rhynd Lochs SSSI. These are detailed in **Table 6-3** below and shown on **Figure 6-1, Appendix A Figures.**

Table 6-3 Statutory Locally Designated Nature Conservation Sites

Site Name	Reason(s) for Designation	Relationship to the Proposed Development
South Tayside Goose Roosts SPA	The qualifying features are: • Non-breeding greylag geese and pink-footed geese; • Breeding wigeon Anas penelope; and • The assemblage of non-breeding waterfowl.	Two distinct locations are close to the Site; located at closest: • Approximately 1.3 km east of the Site; and • Approximately 9.2 km north of the Site. There are several nearby watercourses, but none directly flow from the Site to the SPA, and there is no other hydrological connectivity. There is no hydrological connection between the Site and the SPA. Intervening land mainly comprises farmland as well as some forestry, Braco village, and associated roads.
South Tayside Goose Roosts Ramsar site	The Site incorporates three widely separated component sectors (only two of which are within the Study Area) consisting of seven permanent freshwater lochs, numerous smaller waterbodies, and various wetland habitats, including one of the largest raised bogs in the region. The lochs provide roost sites for internationally important numbers of wintering geese and for nationally important numbers of nesting ducks.	As above for South Tayside Goose Roosts SPA.
Carsebreck and Rhynd Lochs SSSI	The qualifying features relating to ornithology are: • Non-breeding greylag goose; and • Pink-footed goose.	Located at closest: • Approximately 1.3 km east of the Site. There is no hydrological connection between the Site and the SSSI. Intervening land mainly comprises farmland as well as some forestry and Braco village.

6.4.2 Ornithological features of International importance comprise South Tayside Goose Roosts SPA and Ramsar site (the boundary of which is concurrent with the Carsebreck and Rhynd Lochs SSSI). Greylag *Anser anser* and pink-footed geese *Anser brachyrhynchus* associated with the SPA above often use agricultural fields in the region

around such a SPA, in particular pasture fields, which could potentially then constitute functionally-linked supporting habitat for the relevant geese.

Non-statutory Designated Sites

6.4.3 The desk study did not identify any non-statutory designated sites with ornithological interests (e.g. Local Wildlife Sites, Royal Society for the Protection of Birds (RSPB) reserves, etc.).

Important Birds

6.4.4 The desk study identified 35 records of nine important species of birds within 1 km of the Site, described in the **Table 6-4** below.

Table 6-4 Notable Bird Species Identified in the NBN Atlas Data Search

Common Name	Binomial Name	No. of Records	Designation*
Black-headed gull	*Chroicocephalus ridibundus*	8	SBL
Eurasian curlew	*Numenius arquata*	1	BoCC Red List, SBL
Kestrel	*Falco tinnunculus*	2	SBL
Northern lapwing	*Vanellus vanellus*	9	BoCC Red List, SBL
Pochard	*Aythya ferina*	2	BoCC Red List, SBL
Siskin	*Spinus spinus*	3	SBL
Spotted flycatcher	*Muscicapa striata*	2	BoCC Red List, SBL
Woodcock	*Scolopax rusticola*	7	BoCC Red List, SBL
Yellowhammer	*Emberiza citrinella*	1	BoCC Red List, SBL

* Designations are follows: Stricter protection is afforded to birds listed on Schedule 1 of the Wildlife and Countryside Act (1981); SBL – Birds listed on the Scottish Biodiversity List; Annex 1 – Birds Listed on Annex 1 of Birds Directive; LBAP – Species listed on Tayside LBAP; BoCC – Birds of Conservation Concern.

6.4.5 The Site is likely to support breeding populations of common and widespread birds as well as those listed on the SBL and BoCC Red Lists. Almost all the habitats in the Site are also likely to be used by common nesting birds, including ground nesting species as well as species nesting in the plantation. The woodlands (e.g. coniferous, mixed and broadleaved plantation) within the Site are suitable for song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, siskin *Spinus spinus* and woodcock *Scolopax rusticola*. The habitat is less suitable for spotted flycatcher *Muscicapa striata* due to a lack of nesting opportunities (e.g. tree holes / buildings).

6.4.6 Curlew *Numenius arquata* and lapwing *Vanellus vanellus* may breed in open areas of rough grassland and open young plantation woodland with short vegetation, in central and western areas of the Site, however, no optimal habitat for these species is present on Site. Kestrel *Falco tinnunculus* could nest in the woodlands and forage over open areas. Black-backed gull *Larus fuscus* and pochard *Aythya ferina* could forage in the area and may congregate on open water, but nesting is unlikely due to the lack of typical habitats associated with these species (e.g. for gulls, coastal habitats including cliff tops or even flat roofs, and well-vegetated banks). Moreover, pochard are not likely to be breeding in this region of Scotland, but may be present in winter.

6.4.7 Red kite are known to be present across the land to the west of the Site[15] and may be present within the Site. The woodlands in the Site and surrounding area are sub-optimal for the creation of raptor nests, due to being commercial forestry and plantation woodlands, generally comprising immature trees. Red kite are likely to use the Site and wider area for foraging only.

6.4.8 Regarding the Schedule 1 species kingfisher *Alcedo atthis*, kingfisher may use the Kier Burn for foraging and commuting, but there is little to no suitable nesting habitat (tall, steep, soft river banks) within the Site or within 100 m of the Site.

6.4.9 Farmland birds prefer to breed in a mosaic of agricultural fields (including damp and low intensity managed meadows / pastures), native woodland and scrub, species-rich hedgerows (in good condition) and rough grassland. The Site has limited potential for skylark and meadow pipit *Anthus pratensis* due to the lowland nature of the Site with a lack of typical habitat for these species. The Site has a mosaic of relatively poor-quality habitats that could provide some suitability for farmland birds (such as yellowhammer *Emberiza citronella*) and waders such as lapwing and curlew to nest and forage. Wintering geese and swans are likely to forage in grasslands within the Site. The open habitats within the Site and wider area are of low ecological value and generally of poor suitability for the farmland birds mentioned in the Tayside Farmland LBAP (see **Section 6.2.4**). There appear to be no large trees or buildings present within 250 m of the Site that could support nesting Schedule 1 species barn owl *Tyto alba*.

6.5 Embedded Mitigation

6.5.1 A range of measures that are standard good practice for a development of this type, and which are required to comply with environmental protection legislation, would also be implemented. These are well-developed and have been successfully implemented on infrastructure projects across the country, and there is a high degree of confidence in their success. They can therefore be treated as embedded mitigation.

6.5.2 Mitigation measures to protect sensitive ornithological features include:

- Ideally, undertake all vegetation clearance outside of the breeding bird season, which is generally taken to be between March and August, inclusive;
- Where vegetation clearance must take place during the breeding season, the area must first be checked by a suitably experienced ecologist. A works exclusion zone must be implemented around any active bird's nest; and
- If breeding birds are present, the Ecological Clerk of Works (ECoW) can provide advice on measures to minimise the risk of disturbance being caused.

6.6 Appraisal

Potential Significant Effects

6.6.1 The potential significant effects from the construction and operation of the Proposed Development on ornithological features can be categorised as follows:

- Permanent or temporary loss of habitat which supports important species of birds (e.g. felling of woodland habitats);

[15] Recorded during field surveys for the proposed Cambushinnie substation 400 kV upgrade survey work, in March and May 2025. AECOM (2025) Cambushinnie 400 kV Substation Environmental Appraisal Report.

- Temporary disturbance and / or displacement of species of birds during construction (e.g. through noise and vibration disturbance);
- Potential for direct mortality of species during construction / operation (e.g. as a result of increased vehicular traffic); and
- Disturbance and / or displacement of species during operation (e.g. as a result of increased vehicular traffic).

Sensitive Receptors

6.6.2 The ecological baseline presented in **Section 6.4** has been used to identify important ornithological features within the potential ZoI of the Proposed Development. The importance (and sensitivity) of a given ornithological feature has been determined by assessing the distribution and status of species, a review of literature and guidance, field survey data, legal protection / conservation status and professional judgement.

Designated Sites – Permanent / temporary loss of habitat

6.6.3 Significant effects are considered highly unlikely as a result of the Proposed Development on the South Tayside Goose Roosts SPA and Ramsar site (and Carsebreck and Rhynd Lochs SSSI), for the reasons given below in **Sections 6.6.4 – 6.6.11**. Moreover, as mentioned above in **Section 6.2.3**, NatureScot responded in consultation and stated there would be no adverse effect on site integrity as a result of this proposal (with regard to the qualifying interests of the South Tayside Goose Roosts SPA).

6.6.4 It is highly unlikely that the permanent loss of habitat as a result of the Proposed Development would cause an impact to the SPA. Notable geese may use the pastures around the Site; however this will be infrequently / sporadically and therefore not important enough to be functionally linked. Firstly, there would be a relatively minor (approximately 2.31 ha) permanent loss of pasture as a result of the Proposed Development. Secondly, there is an abundance of similar or more suitable pasture fields around the SAC. For example, considering only the land between the A9 (from Greenloaning eastwards to Blackford) and the A822 (from Greenloaning northwards past Braco village to Muir of Orchil), and considering only brighter-green pasture on current aerial imagery, there is over 5 km^2 of such pasture, often in large flat fields that geese prefer (for increased safety from ground predators).

6.6.5 Whilst certain other bird species might occur as part of the general qualifying waterbird assemblage and might at times also use pasture fields for foraging (such as ducks), the same arguments apply of negligible habitat impact and plentiful local abundance of such habitat. The other qualifying species (wigeon *Anas penelope*) does not use such pasture anywhere near as often or as distantly from relevant standing waters as geese and is highly unlikely to make any use of the fields adjacent to the Site.

Designated Sites – Temporary disturbance and / or displacement of species, mortality

6.6.6 While potential disturbance to birds may arise from both noise and visual stimuli associated with the presence of personnel, machinery, and construction activities, the likelihood of such disturbance from the Site affecting the qualifying birds of South Tayside Goose Roosts SPA / Ramsar site is minimal. This assessment takes into account the substantial 1.3 km distance separating the Site and the SPA, at the closest point and the anticipated level of disturbance from the construction of the Proposed Development.

6.6.7 There are no optimal waterbodies for waterfowl to use (e.g. for roosting) within the Site. Only one waterbody within 1 km of the Site provides reasonable potential opportunities for roosting geese. This is a natural lochan approximately 140 x 100 m in area, with marginal vegetation, that lies 480 m to the east of the Site (at the closest point), located between the Site and the South Tayside Goose Roosts SPA. Given that pink-footed goose and greylag goose are considered to be potentially sensitive to disturbance between 500 - 1000 m and 200 - 600 m[16], respectively, roosting geese (if present) on this waterbody could potentially be disturbed by the Proposed Development. However, the waterbody is relatively small compared to those of optimal goose roosts. The waterbody is heavily wooded around the edges, which would strongly dissuade geese from roosting, as these species would be vulnerable to predation (e.g. from fox *Vulpes vulpes* hunting roosting geese from the cover). Moreover in the unlikely event that geese would roost there, the wooded margin of the lochan would likely provide a reasonable level of screening from potential visual and noise impacts and any roosting birds on this lochan would be already habituated (to some degree) to existing vehicle traffic on the A822.

6.6.8 The vast majority of habitat in the west of the Site is of no value to the qualifying birds of South Tayside Roosts SPA, as it comprises forestry plantation. It is possible that greylag and pink-footed geese (and possibly other species, such as ducks) associated with South Tayside Goose Roosts SPA could be disturbed during construction if present in the agricultural fields in central and eastern areas of the Site. However, as with the reasoning made in **Section 6.6.4**, there is such an abundance of similar and often more suitable pasture fields around the SPA. The likelihood of direct mortality to geese, ducks and waterfowl during construction and operation as a result of the Proposed Development is highly unlikely. This is because the Proposed Development does not include infrastructure that would be likely to result in collision, the species mentioned above are highly mobile and capable of avoiding traffic collision and nests (with chicks) for these species are highly unlikely to occur within the Site.

Designated Sites – Potential impacts during operation

6.6.9 It is highly improbable that the South Tayside Goose Roosts SPA and Ramsar site / Carsebreck and Rhynd Lochs SSSI, would be affected by the operation of the Proposed Development given the habitats within the Site and distance from the designated sites. Notable species of geese may occasionally use the agricultural fields adjacent to the Site, but the potential for operational impacts from disturbance (e.g. including construction traffic for the proposed Cambushinnie 400 kV substation and occasional movements of staff vehicles) would be low and would be similar to that experienced during construction of the haul track itself, as discussed in the preceding section, and therefore significant effects are not likely.

Designated Sites – Summary

6.6.10 Given the above, it is concluded that significant impacts on the South Tayside Goose Roosts SPA (and Ramsar site / Carsebreck and Rhynd Lochs SSSI) are unlikely, during construction and operation of the Proposed Development. To re-iterate, NatureScot responded during consultation and stated that there would be no adverse effect on site integrity as a result of this proposal (with regard to the qualifying interests of the South Tayside Goose Roosts SPA).

[16] Goodship, N.M. and Furness, R.W., 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected birdspecies. NatureScot Research Report 1283.

Raptors

6.6.11 Active nests and their eggs of all wild birds are protected under the WCA from destruction, damage, or obstruction whilst in use. Schedule 1 species are also protected from disturbance whilst nesting. Schedule 1 raptors (e.g. red kite) may nest within the woodlands within or beyond the boundary of the Site. For red kite, the recognised disturbance zone (for forestry works) is between 300-600 m[16]**.** However, red kite have a medium level of sensitivity to human disturbance and so it is possible that nesting red kite (if present at all) would habituate to construction disturbance. In order to ensure the protection of nesting raptors from potential disturbance, further special mitigation is proposed in **Section 6.7**.

Farmland LBAP

6.6.12 Notable farmland bird species, as listed in the Tayside Farmland LBAP (see **Section 6.2.4**), are unlikely to find the Site's habitats to be of great importance for nesting or foraging, as these comprise generally poor-quality habitats, with low ecological value and a dearth of nesting opportunities (e.g. plantation woodlands, species-poor hedges and highly managed agricultural land). See **Chapter 5 Ecology and Nature Conservation** for details of the habitat types present. Wading birds, such as lapwing, could potentially nest in open ground adjacent to the Site. Direct mortality to these species, as a result of vehicle movements, is considered to be unlikely, due to the lack of optimal nesting habitat for these species within the Site and that vehicle movements of site traffic would be restricted to slow speeds, as a matter of course.

Woodland LBAP

6.6.13 The Woodland LBAP and Water & Wetland LBAP are of little relevance to the Site's ornithological interests due to the low degree of naturalness of the woodlands and the limited extent and quality of wetlands on Site. The Upland LBAP lists birds that are highly unlikely to be present on Site and therefore is not relevant.

Common breeding birds

6.6.14 Ornithological features of Local importance include common breeding birds (which include important / notable birds listed on the SBL and BoCC Red and Amber lists). These species are only of local importance because they are common and widespread species. Loss of breeding sites (e.g. as a result of tree felling) for some species of the general breeding bird assemblage would have a minimal effect because the Site development footprint is small compared to surrounding very extensive habitats of the same types. Plus, the habitat types within the Site and the surrounding area of not of great importance to birds in general. However, active nests and their eggs of all wild birds are protected under the WCA from destruction, damage, or obstruction whilst in use.

Summary

6.6.15 All potential impacts identified are minor / negligible (in EIA terms[1]) and therefore any possible impacts from the Proposed Development cannot be considered significant.

Enhancement

6.6.16 The environmental effects of the Proposed Development on ornithological features are not likely to be significant and can easily be mitigated. Further to mitigation and compensation, opportunities for ecological enhancement as per NPF4 objectives for developments is also likely to be feasible. Habitat compensation and enhancement measures are outlined in **Chapter 5 Ecology and Nature Conservation**.

6.7 Recommendations and Mitigation

6.7.1 As noted above, there is one European site designated for ornithological interests located within 10 km of the Site. As a European site, the South Tayside Goose Roosts SPA is subject to the HRA process a shadow 'Appropriate Assessment' report has been submitted to PKC, setting out the potential impacts of the Proposed Development on European sites. PKC will undertake the Appropriate Assessment in their role as Competent Authority. Non-statutory designated sites have been scoped out of the assessment (as none are present within the ZoI of the Site).

6.7.2 All wild birds in Scotland are protected under the WCA. Further protection is given to some rarer species and to species vulnerable to disturbance and / or persecution. This is done through various schedules attached to the WCA, including Schedule 1.

6.7.3 Therefore, in addition to the embedded mitigation measures outlined in **Section 6.5**, the following further specific mitigation measures are:

- For the duration of the construction period, a suitably experienced ornithologist would conduct watching briefs (under licence) of active Schedule 1 raptors nests (if present), within recognised disturbance zones to the Site[16];
- An ornithologist would carry out an assessment of the suitability of the nearby conifer plantation for nesting raptors (e.g. red kite to 600 m from the Site), and to carry out survey(s) for nests, if required, according to guidance[17]. The first visit would take place from March, if construction occurs within the breeding bird season (March to end of August, inclusive);
- If raptors are confirmed or suspected of breeding, construction phase mitigation measures would be required, as per those afforded to breeding sites of Schedule 1 species. This would depend on a number of factors including: proximity to works; the nature of the works; and, the susceptibility to disturbance of the individual bird(s); and,
- Where required to safeguard breeding raptors, a suitably experienced ornithologist / ECoW would set in place a 'no works zone' within the disturbance distance of a suspected or confirm nest (March to August, inclusive). Within this no works zone, all construction work (including felling works or any site movements) would cease for the duration of the nesting period. Restrictions may be eased or lifted entirely if disturbance to nesting Schedule 1 raptors is ruled out according to the professional opinion of the suitably experienced ornithologist.

6.7.4 Mitigation measures will be detailed in a Breeding Bird Protection Plan (BBPP). This document will be prepared and submitted for approval by PKC, in consultation with NatureScot where necessary, prior to commencement of construction. The BBPP will detail the mitigation measures proposed in this EA Report to safeguard breeding birds (including raptors).

6.8 Cumulative Effects

6.8.1 A list of developments which are programmed to be under construction or operational at the same time as the Proposed Development as detailed in **Section 13.1.2** and **Table 13-1**. These are summarised below:

[17] Hardy, J., Crick, H., Wernham, C., Riley, H., Etheridge, B., and, Thomson, D., 2013. Raptors: A Field Guide for Surveys and Monitoring (3rd edn.). Scottish Natural Heritage.

- 21/00756/FLM: 49.9MW BESS facility; and
- 22/02231/FLM: 49.9MW BESS facility compound.

6.8.2 The BESS developments included within **Table 13-1** are considered to be of importance to the cumulative appraisal concerning important ornithological features, as they are developments which are located within the local area to the Proposed Development that could potentially give rise to cumulative effects.

6.8.3 During the appraisal process, the results of which are described in this chapter, there were no impacts identified that could possibly result in a residual effect of greater than Negligible effect. Consideration during this cumulative appraisal would only be given to those impacts where a residual effect of significance was concluded for the Proposed Development.

6.8.4 For all impacts for which it was concluded that there would be No Effect or Negligible Effect, it is considered that the effect of that impact from the Proposed Development in isolation would be so minimal, that it is extremely unlikely that there is any possibility of significant cumulative effects arising from the combined impact(s) of developments detailed in **Table 13-1**. Similarly, the additive (or multiplicative) action of effect interactions are not anticipated, due to the same reasons given above, that all impacts were appraised to be so minimal, they could not possibly give rise to a cumulative effect.

6.8.5 It is concluded on the basis of the assessment presented above that the Proposed Development would not act cumulatively to give rise to significant adverse effects on ornithological features. This relies on the mitigation described in this chapter to avoid or minimise the risk on important ornithological features, and on the proposals also doing the same (e.g. managed through project-specific CEMPs).

7. CULTURAL HERITAGE

7.1 Introduction

7.1.1 This chapter assesses the potential effects of the Proposed Development on archaeology and cultural heritage.

7.1.2 Cultural heritage in this context refers to the above and below-ground archaeological resource, built heritage, the historic landscape, and any other elements which may contribute to the historical and cultural heritage of the area. The aim of this chapter is to provide:

- A summary of the baseline conditions of the combined project development boundary (as defined in **Section 7.3.1**);
- A concise appraisal of the direct and indirect risks posed by the Proposed Development on cultural heritage; and
- Recommendations for additional mitigation measures as required.

7.1.3 The decommissioning stage of the Proposed Development has been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity, as outlined **Section 1.1.7**.

7.2 Information Sources

7.2.1 The report draws on the following technical figures (see **Appendix A Figures**):

- **Figure 7-1 Heritage Assets within the 1 km Study Area adopted for the baseline study;**
- **Figure 7-2 Proposed Development Site and Heritage Assets within the 1 km Study Area adopted for the baseline study;**
- **Figure 7-3 Heritage Assets within 2 km Study Area Adopted for Setting Impacts and Zone of Theoretical Visibility Analysis;**
- **Appendix F Gazetteers** of designated and non-designated assets; and
- **Appendix G Site Photographs.**

7.2.2 External sources used to inform the baseline and appraisal are referenced appropriately.

Legislation

7.2.3 The assessment was conducted within the context of the legislative and planning framework designed to protect and conserve heritage resources. There are several statutory instruments and policies governing the approach to cultural heritage. The main pieces of legislation are:

- Town and Country Planning (Scotland) Act 1997 (as amended by the Planning (Scotland) Act 2019)[1];
- The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 (as amended by the Town and Country Planning (Historic Environment Scotland) Amendment Regulations 2015)[2];
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[3];

[1] Scottish Government, 1997. *Town and County Planning Act.* Edinburgh: Scottish Government.
[2] Scottish Government, 2013. *The Town and Country Planning (Development Management Procedure) (Scotland) Regulations.* Edinburgh: Scottish Government.
[3] Scottish Government, 1997. *Planning (Listed Buildings and Conservation Areas) (Scotland) Act.* Edinburgh: Scottish Government

- Ancient Monuments and Archaeological Areas Act 1979[4]; and
- Historic Environment Scotland Act 2014[5].

National Planning Policy

7.2.4 The principal elements of national policy and guidance comprise:

- National Planning Framework 4 (NPF4)[6];
- Historic Environment Policy for Scotland (HEPS)[7];
- Our Past, Our Future - The Strategy for Scotland's Historic environment[8];
- Planning Advice Note (PAN) 2/2011 – Planning and Archaeology[9];
- PAN 71 – Conservation Area Management[10]; and
- The HES 'Managing Change in the Historic Environment' series of guidance notes (particularly *Managing Change in the Historic Environment: Setting*[11]).

7.2.5 NPF4 represents the latest national planning policy document relevant to the Proposed Development. Policy 7 relates to cultural heritage and key elements of the policy include 'point h' which relates to Scheduled Monuments (SMs) and states:

"h) Development proposals affecting SMs will only be supported where:

- *direct impacts on the scheduled monument are avoided;*
- *significant adverse impacts on the integrity of the setting of a SM are avoided; or*
- *exceptional circumstances have been demonstrated to justify the impact on a SM and its setting and impacts on the monument or its setting have been minimised."*

7.2.6 Impacts on non-designated assets are covered by 'points n and o':

"n) Enabling development for historic environment assets or places that would otherwise be unacceptable in planning terms, will only be supported when it has been demonstrated that the enabling development proposed is:

- *essential to secure the future of an historic environment asset or place which is at risk of serious deterioration or loss; and*
- *the minimum necessary to secure the restoration, adaptation and long-term future of the historic environment asset or place.*

o) Non-designated historic environment assets, places and their setting should be protected and preserved in situ wherever feasible. Where there is potential for non-

[4] UK Government, 1979. *Ancient Monuments and Archaeological Areas Act.* Edinburgh: HMSO.
[5] Historic Environment Scotland, 2014. *Historic Environment Scotland Act.* Edinburgh: HMSO.
[6] Scottish Government, 2023. *National Planning Framework 4* [online]. [Accessed 01 April 2025]. Available from: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf
[7] Historic Scotland, 2019. *Historic Environment Policy for Scotland.* Edinburgh: Historic Environment Scotland.
[8] Historic Environment Scotland, 2023. *Our Past, Our Future: The Strategy for Scotland's Historic Environment.* Edinburgh: Historic Environment Scotland.
[9] Scottish Government, 2011. *Planning Advice Note 2/11 – Planning and Archaeology.* Edinburgh: Scottish Government.
[10] Scottish Government, 2004. *Planning Advice Note 71 – Conservation Area Management.* Edinburgh: Scottish Government.
[11] Historic Environment Scotland, 2016. *Managing Change in the Historic Environment.* Edinburgh: Historic Environment Scotland.

designated buried archaeological remains to exist below a site, developers will provide an evaluation of the archaeologic.al resource at an early stage so that planning authorities can assess impacts. Historic buildings may also have archaeological significance which is not understood and may require assessment.

Where impacts cannot be avoided, they should be minimised. Where it has been demonstrated that avoidance or retention is not possible, excavation, recording, analysis, archiving, publication and activities to provide public benefit may be required through the use of conditions or legal/planning obligations. When new archaeological discoveries are made during the course of development works, they must be reported to the planning authority to enable agreement on appropriate inspection, recording and mitigation measures."

7.2.7 Policy 11 relates to energy and as such is also relevant to the Proposed Development. 'Point e' relates to impacts resulting from renewable developments and states:

"e) In addition, project design and mitigation will demonstrate how the following impacts are addressed:

- *ii – significant landscape and visual impacts, recognising that such impacts are to be expected for some forms of renewable energy. Where impacts are localised and/ or appropriate design mitigation has been applied, they will generally be considered to be acceptable; … [and]*
- *vii – impacts on historic environment"*

7.2.8 A new strategy entitled 'Our Past, Our Future - The Strategy for Scotland's Historic environment' was released in June 2023[8]. The three main priorities identified in this document are:

- Priority 1: Delivering the transition to net zero;
- Priority 2: Empowering resilient and inclusive communities and places; and
- Priority 3: Building a wellbeing economy.

Local Planning Policy

7.2.9 The process of preparing a new Perth and Kinross Local Development Plan (LDP) commenced in 2024, however, until this has been agreed and adopted, the Perth and Kinross LDP 2 ("PKLDP2"), adopted in 2019[12], remains valid. Policies considered relevant to this chapter are:

- Policy 26a – Scheduled Monuments;
- Policy 26b – Archaeology;
- Policy 27a – Listed Buildings;
- Policy 29 – Gardens and Designed Landscapes;
- Policy 30 – Protection, Promotion, and Interpretation of Historic Battlefields; and
- Policy 31 – Other Historic Environment Assets.

[12] Perth and Kinross Council, 2019. *Perth and Kinross Development Plan 2* [online]. [Accessed 01 July 2024]. Available at: https://www.pkc.gov.uk/ldp2

Guidance

7.2.10 The assessment has been undertaken following the Chartered Institute for Archaeologists (CIfA) Standards and Guidance for Historic Environment Desk-Based Assessment[13].

7.3 Methodology

7.3.1 As part of this appraisal exercise, a search of relevant data has been undertaken with material collected for a Study Area of 1 km. To enable a holistic approach, this Study Area was based on a combined project development boundary which encompassed the Proposed Development, as well as the proposed Cambushinnie 400 kV substation and associated development including the OHL and UGC. These sources include:

- PastMap[14];
- Historic Environment Scotland (HES) website[15];
- Historic mapping on the National Library of Scotland website[16];
- Perth and Kinross Council (PKC) Historic Environment Record (HER) data[17]; and
- Other available online sources.

7.3.2 A search of designated assets of a wider Study Area of approximately 2 km has also been undertaken to allow consideration of setting issues.

7.3.3 All assets are listed in the gazetteers provided in **Appendix F Gazetteers**, these are also shown on **Figure 7-1 and Figure 7-2, Appendix A Figures**. Assets are referred to in the text by their HES number, with Scheduled Monuments (SM) and Listed Buildings (LB) identified by their prefixes. Non-designated assets from the Canmore database[18] have no prefix, while assets from the PKC HER have the prefix 'MPK'. Assets recorded as part of the walkover survey and documentary research has the prefix 'AECOM'.

Appraisal of Impacts

7.3.4 While the Proposed Development was deemed not to require a full EIA, this methodology set out below has been followed when defining the level of potential impact in **Section 7.6** of this chapter.

7.3.5 The impact assessment will consider any impacts to the value (significance) of an asset, either physically or through changes to its setting.

7.3.6 The value (significance) of a heritage asset is determined by professional judgement, guided but not limited to any designated status the asset may hold. The value of an asset is also judged upon a number of different factors including the special characteristics the assets might hold which can include evidential, historical, aesthetic, communal, archaeological, artistic and architectural interests. This value of a heritage asset is assessed primarily in accordance with the guidance set out in NPF4 and the HEPS[7]. The value (significance) is defined by the sum of its heritage interests. Taking these criteria into account, each identified heritage asset can be assigned a level of value (significance) in accordance with a five-point scale as set out in **Table 7-1**.

[13] Chartered Institute for Archaeologists, 2020. *Standard and guidance for historic environment desk-based assessment* [online]. [Accessed 01 July 2024]. Available from: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf
[14] Historic Environment Scotland, n.d. *PastMap* [online]. [Accessed 01 July 2024]. Available from: https://www.pastmap.org.uk/
[15] Historic Environment Scotland, n.d. *Home* [online]. [Accessed 01 July 2024]. Available from: www.historicenvironment.scot
[16] National Library of Scotland, 2024. *Map Images* [online]. [Accessed 01 July 2024]. Available from: https://maps.nls.uk/
[17] Perth and Kinross Heritage Trust, n.d. *Perth and Kinross Historic Environment Record* [online]. [Accessed 01 July 2024]. Available from: https://www.pkht.org.uk/pkher/
[18] Canmore, n.d. *Canmore* [online]. [Accessed 01 July 2024]. Available from: https://canmore.org.uk/

Table 7-1 Heritage Value (Significance) Criteria

Value (Significance)	Examples
Very High	• World Heritage Sites (WHS); • Assets of acknowledged international importance; and • Historic landscapes of international sensitivity, whether designated or not.
High	• SMs; • Non-designated sites/features of schedulable quality and national importance; • Category A Listed Buildings; • Gardens and landscape on the Inventory of Designed Landscapes of outstanding archaeological, architectural, or historic interest; and • Registered Battlefields.
Medium	• Sites/features that contribute to regional research objectives; • Category B and C Listed Buildings; • Locally listed or non-designated buildings that can be shown to have special interest in their fabric or historical association; • Conservation areas; • Historic townscapes or built-up areas with historic integrity in their buildings, or built settings; and • Non-designated historic landscapes of regional sensitivity.
Low	• Non-designated sites/features of local importance; • Non-designated buildings of modest quality in their fabric or historical association; and • Historic landscapes whose sensitivity is limited by poor preservation and / or poor survival of contextual associations or with specific and substantial importance to local interest groups.
Negligible	• Assets with very little or no surviving archaeological interest; • Buildings of no architectural or historical note; buildings of an intrusive character; and • Landscapes with little or no significant historical interest.

7.3.7 Having identified the value of the heritage asset, the next stage in the appraisal will be to identify the level and degree of impact to an asset arising from the Proposed Development.

Impacts may arise during construction or operation and can be temporary or permanent. Impacts can occur to the physical fabric of the asset or affect its setting.

7.3.8 When professional judgement is considered, some sites may not fit into the specified category in **Table 7-1**. Each heritage asset will be assessed on an individual basis and take account of regional variations and their individual qualities.

7.3.9 The level and degree of impact (magnitude of impact) will be assigned with reference to a four-point scale as set out in **Table 7-2**. In respect of cultural heritage, an assessment of the level and magnitude of impact is made in consideration of any scheme design mitigation (embedded mitigation). Where no change to the significance of the asset is caused, this will be stated, and a full assessment will not be carried out for that asset.

Table 7-2 Magnitude of Impact Criteria

Magnitude of Impact	Examples
High	Total removal or alteration of an asset, such that the physical resource and / or the key components of its setting are totally altered resulting in complete change to an asset's setting and loss of heritage value of the asset.
Medium	Partial alteration of an asset, such that the heritage value of the resource and / or the key components of its setting are clearly modified.
Low	Minor alteration of an asset, such that the components of its setting are noticeably different, but the physical characteristics are not affected, and the impact does not result in a noticeable loss of heritage value.
Negligible	Slight changes to historic elements that hardly affect the setting of an asset and do not result in any loss of value.

7.3.10 This assessment has been undertaken in line with guidance published by the Chartered Institute for Archaeologists[13].

Consultation

7.3.11 An initial response to the pre-application submission was received from PKC on 23 November 2023 which noted that some form of archaeological assessment was required, although this response did not contain direct feedback from the Perth and Kinross Heritage Trust (PKHT). Direct consultation was undertaken with the PKHT in April 2024 when HER data was requested as part of the assessment. This was followed by a Teams meeting on 31 July 2024, where the project was discussed and the approach relating assessing the proposed Cambushinnie 400 kV substation and associated development was discussed. The PKHT agreed that producing one baseline for all elements of the overall project (i.e. the proposed Cambushinnie 400 kV substation, proposed OHL, proposed UGC, and the Proposed Development), as described in **Section 7.3.1** was the best approach for reviewing existing conditions as it allowed the landscape to be examined in a holistic way, which would allow a better assessment of the archaeological potential as well as impacts resulting from the Proposed Development. PKHT noted the large quantities of archaeology that had been recorded through the Strathallan

landscape, although also acknowledged that the potential for new archaeological discoveries in most areas of the Combined Project Development Boundary (see **Section 7.4.1**) was limited due to aspects such as previous disturbance from commercial forestry operations and arable cultivation.

7.3.12 During these initial phases of consultation it was noted that mitigation would likely consist of avoiding historic landscape features (such as drystone walls, gateposts, etc) where possible to avoid accidental damage. Any sections of wall (bonded or drystone) that need to be removed for construction should be reinstated. If the wall cannot be reinstated because a permanent access is needed, the wall ends should be 'made good' and finished in a way that would avoid further damage through collapse.

7.3.13 Further mitigation with PKHT relating to the Proposed Development was undertaken in early 2025, with a pre-application response received on 25 March 2025. This noted that a programme of archaeological works would be required as a condition of planning. The initial stage of these works would be a phase of archaeological evaluation trenching in the area of the Proposed Development. The results of this would be used to agree detailed mitigation, which could include archaeological excavation and recorded, archaeological monitoring, or 'strip, map, and record'. All works would be agreed with PKHT in accordance with a Written Scheme of Investigation (WSI).

7.3.14 Initial consultation with HES was a pre-application response provided on 5 October 2023. While this noted the project as a whole, it focused on the main elements (i.e. the proposed Cambushinnie 400 kV substation and associated developments), and HES acknowledged the Proposed Development did not have the potential to result in physical impacts on designated assets. It also noted that HES considered the potential for impacts on the setting of designated assets to be low due to the distance between the Proposed Development and the nature of the designated assets identified in the surrounding landscape. Further discussion regarding impacts on setting is discussed in **Section 7.6.6** to **7.6.11** below.

7.3.15 Follow up consultation was undertaken with HES in May 2024 by email to provide an update on the wider project, and the revised scope of the various elements. During this consultation HES noted that the case officer was changing as the proposed Cambushinnie 400 kV substation had been deemed non-EIA, and that they would reply once the new case officer had been able to review. The Proposed Development has not been subject to the formal EIA Screening process, however, it is assumed to be non-EIA based on current relevant EIA regulations.

7.3.16 A response relating to the Proposed Development was received in writing on 12 June 2024, and this confirmed that HES did not expect the haul track south of Braco village to result in significant impacts on the setting of Grinnan Hill Fort (SM3088).

7.4 Baseline Environment

Study Area

7.4.1 This chapter examines the potential effects and impacts on sites of archaeological and cultural heritage interest resulting from the Proposed Development. As outlined in **Section 7.3.1**, the baseline for this chapter examines the following components (hereafter referred to as the "Combined Project Development Boundary"), this is shown on **Figure 7-1, Appendix A Figures**:

- Proposed Development;

- Substation;
- OHL tie in; and
- UGC route.

7.4.2 A detailed baseline of information for the Combined Project Development Boundary was obtained as part of the assessment, with a Study Area of 1 km from the Combined Project Development Boundary (**Figure 7-1, Appendix A Figures**). The subsequent assessment of potential impacts in this chapter focuses on the Proposed Development only (**Figure 7-2, Appendix A Figures**).

7.4.3 A larger Study Area of 2 km was used for assessing changes to the setting of designated assets. This was focused on 2 km from the Combined Project Development Boundary and is referred to as the 'Wider Study Area'.

Land use and Topography

7.4.4 The main focus of the Combined Project Development Boundary is on the proposed Cambushinnie 400 kV substation, which is centred on NGR NN 79394 09313 and is located adjacent (southwest) to the existing Braco West Substation, approximately 3.5 km west of the Braco village (previously known as Ardoch[19]) in Perth and Kinross (**Figure 7-1, Appendix A Figures**). Located at approximately 255 m above ordnance datum (AOD), the proposed Cambushinnie 400 kV substation sits on the lower southeast slopes of an area of high ground that overlooks Strathallan and the Allan Water. However, supporting works also include an upgrade to the existing access track which runs from the existing Braco West Substation to a point on the B8033 southwest of Braco village, as well as a new haul track (the Proposed Development). The existing access track to be upgraded largely passes through a landscape used for commercial forestry, while the new haul track (the Proposed Development) passes through agricultural land on the fringes of Strathallan.

7.4.5 While the high ground above the proposed Cambushinnie 400 kV substation rises to over 600 m AOD to the west and north of the Proposed Development, the valley of Strathallan, which is the main focus of settlement and infrastructure (with both the A9 road and the main rail link following the valley), lies between 90 m and 100 m AOD.

7.4.6 The upland landscape of the Combined Project Development Boundary, as well as the immediate surroundings, is dominated by dense commercial forestry that screens the existing Braco West Substation from the surrounding landscape. The wider upland landscape is dominated by rough grazing, while the Strathallan valley, where the Proposed Development is focused, is a mixture of improved / semi-improved grazing, as well as arable agriculture.

Designated Assets

7.4.7 A total of ten designated assets have been identified within the 1 km Study Area, including two SMs (SM3088 and SM1601), seven LBs (LB5801, LB5796, LB72, LB5795, LB5797, LBLB1259 and LBN5794), and one Gardens and Designed Landscape (GDL) (GDL000067) (see **Table 1, Appendix F Gazetteers,** and **Figure 7-3, Appendix A Figures**).

7.4.8 The majority of the designated assets are located in Braco village near the eastern end of the proposed existing access track upgrades and the Proposed Development. The SMs consist of a fort on Grinnan Hill which has been dated to the prehistoric period (SM3088), and the Ardoch Roman military complex north of Braco village (SM1601). Grinnan Fort is

[19] Smith, R, 2001. *The Making of Scotland.* Edinburgh: Canongate Books Limited.

located approximately 176 m north of the haul track, and approximately 3.8 km from the proposed Cambushinnie 400 kV substation platform (SM3088), with traces of the ramparts on the north side visible in the woodland that covers the hill. The site of the Grinnan Fort would have originally commanded views over the low-lying ground of the Allan Water to the south and east, although these views have been lost due to the woodland that covers the hill and immediate surroundings. Much of the fort's dominance when viewed from the surrounding area has also been lost due to the expansion of Braco village, and the hill is only visible due to the woodland that covers it.

7.4.9 The Roman complex of Ardoch is located on the north side of Braco village and includes very well-preserved earthworks associated with several Roman camps and forts occupied over various periods in the first and second century Anno Domini (AD) (SM1601).

7.4.10 The LBs are all post-medieval and consist of the Category B listed Feddal Castle (LB5801) and Ardoch Bridge (LB5796), as well as the Category C listed Wester Ardoch Manse (LB72), Ardoch Free Church Tower (LB5795), Ardoch Parish Church (LB5894), and a number of residences in Braco village (LB5795 and LB51259). Most of these assets are located within Braco village, with only Feddal Castle located outside of the settlement.

7.4.11 The GDL consists of the western limits of Braco GDL (GDL00067), which is located approximately 419 m north of the western end of the Proposed Development, and approximately 1.5 km northeast of the proposed Cambushinnie 400 kV substation. The landscape is associated with the Category B listed Braco Castle (LB5804), with both the castle and associated designed landscape dating to the post-medieval period.

7.4.12 A review of designated assets within the Wider Study Area of 2 km of the Combined Project Development Boundary for the assessment of impacts on setting recorded a further seven LBs (see **Table 3, Appendix F Gazetteers and Figure 7-3, Appendix A Figures**). These included assets in the settlement of Greenloaning to the south of the Wider Study Area (LB5799), as well as Braco Castle (LB5804) and Blackhill Old Toll House to the north (LB5806).

Non-designated Assets

7.4.13 A total of 62 non-designated assets were recorded within 1 km of the Combined Project Development Boundary on the Canmore and Perth and Kinross HER, with two assets recorded through a review of online mapping and the Site walkover survey (see **Table 2, Appendix F Gazetteers** and **Figure 7-1, Appendix A Figures**). The majority of these assets have been dated to the post-medieval period and relate to settlement activity in Braco village, as well as agricultural activities in the surrounding landscape.

7.4.14 Previously recorded heritage assets in the 1 km Study Area are discussed by period below.

Prehistoric and Roman (10,000BC to AD400)[20]

7.4.15 Limited evidence for prehistoric activity has been recorded within the 1 km Study Area, with a total of five prehistoric assets identified, all of which are near the eastern end of the Study Area and the low-lying land around Braco village. These include the scheduled Grinnan Hill Fort (SM3088) and a cropmark site (MPK688), as well as a number of findspots from around the general Braco area. These finds include a stone axe from

[20] Due to the varied nature of the Scottish landscape, and the resulting variations in settlement / land use, there is no agreed chronology at a national level. As such, the dates that have been assigned to the various periods for the baseline study are those set out in the Regional Archaeological Research Framework for Argyll (RARFA) which was produced as part of the Scottish Archaeological Research Framework (ScARF) (https://scarf.scot/regional/)

Carsemeg (MPK7032), a bronze axehead from the north of Braco village (25237), and a small grouping of bronze objects from the Glassick Farm area (25259; 25264; 25265; 25252).

7.4.16 While there is no clear evidence of features dating to the early prehistoric period within the Study Area, the finds that have been recorded do suggest a human presence. The stone axe, while not positively dated, is assumed to date to the Neolithic period (MPK7032), and therefore represents the earliest evidence of human activity within the Study Area. Evidence of Bronze Age activity is also limited to find spots with the remaining finds all assumed to date to this period (25237, 25259; 25264; 25265; 25252).

7.4.17 The earliest evidence for settlement remains is the fort on Grinnan Hill (SM3088). The site, which is located in an elevated position at the southern side of Braco village, includes a series of well-preserved ramparts on the northern side where the relatively flat ground means natural defences are limited, while the steep sides of the hill to the west, south, and east form natural defences[21]. While this has not been subject to detailed archaeological investigations, its form would suggest it dates to the Iron Age period[22].

7.4.18 The previously recorded assets would suggest that prehistoric activity in the Study Area was focused on the lower lying land of Strathallan which follows the Allan Water, and aerial photography in the wider Strathallan area has identified a number of cropmarks along the lower lying river valley, as well as Strathearn to the northeast of the Study Area[23]. These include cropmarks recorded in the Study Area that have been tentatively dated to the prehistoric period but have not been subject to excavation (MPK688). Most of the remains recorded as cropmarks appear to relate to prehistoric settlement and agricultural activity and include features such as enclosures and possible field systems.

7.4.19 Evidence for prehistoric activity in the wider upland landscape includes limited settlement remains in the form of possible hut circles, with the nearest being the Cromlix Lodge hut circle approximately 3.3 km to the southwest of the Combined Project Development Boundary. More extensive evidence of burial activity has been noted on the upland fringes, with a number of burial mounds recorded in the wider area. The nearest of these is Cromlix Lodge long cairn approximately 4.1 km to the southwest of the Combined Project Development Boundary, with a greater concentration of burials 10 km to the south of Study Area along the valley of the River Teith between Callander and Dunblane.

7.4.20 While there is no evidence for prehistoric activity around the Site in the upland section of the Study Area, it seems likely that the area would have been exploited on a seasonal basis, with the archaeological evidence suggesting the main focus of activity was the lower ground near Braco and Strathallan.

7.4.21 There is extensive evidence of Roman activity in the Study Area, although as with the prehistoric period, this is focused on the low-lying area around Braco village. The main evidence for activity during the Roman period is the extensive Roman fort and associated military works of Ardoch located to the north of Braco village and on the eastern side of the River Knaik (SM1601). Originally assumed to have been constructed in the 1st century AD to support the campaigns of Agricola, the fort was later reoccupied and

[21] Christison, D., 1899. 'The Forts, Camps, and Other Field-Works of Perth, Forfar, and Kincardine' *in The Proceedings of the Society of Antiquaries of Scotland.*
[22] Christison, D., 1900. The forts, "camps", and other field-works of Perth, Forfar and Kincardine. *Proceedings of the Society of Antiquaries of Scotland* 34, Society of Antiquaries of Scotland, Edinburgh, pp. 43-120
[23] Stevenson, J., 1999. "Prehistory" *in* Omand, D. (ed.), 1999. *The Perthshire Book*, Edinburgh: Birlinn Limited.

remodelled in the 2nd century[24]. The site was one of the main forts on the Gask Ridge complex of forts and associated defensive structures and signal stations that ran northeast into Perthshire, and which were linked by a road which roughly follows the A822 towards Crieff. Other Roman sites in the wider landscape are largely concentrated on the alignment of the Roman Road on the southeast and northeast of Braco village and include the signal stations or towers of Shielhill[25] and Greenloaning[26].

7.4.22 In addition to the main Roman complex north of Braco village, a further non-designated asset has been recorded within the Study Area, this being the find spot of a coin to the northwest of Braco village, and on the western side of the Keir Burn (363221). This is assumed to be a stray loss associated with the general Roman activity recorded in the area.

Early Medieval (AD400 – AD1100)

7.4.23 Only a single asset dating to the early medieval period has been recorded within the Study Area, this being a long cist noted in an antiquarian account in the 19th century (MPK671). The location of the asset was noted as Ardoch Roman Fort, or immediately south of the Roman Fort, and the lack of details relating to the asset (both its location and description) would suggest the dating is tentative and unreliable.

7.4.24 While there is limited archaeological evidence for early-medieval activity in the Study Area, it seems likely that the better agricultural ground on the fringes of Strathallan continued to be exploited throughout this period. Documentary sources state this area of Perthshire was relatively well settled by the 12th century, with key settlements including Muthill, 8 km to the northeast, Auchterarder, 10 km to the east[27], and Dunblane, 9 km to the southwest[28]. Accounts do note, however, that the valley bottom of Strathallan was a wet boggy area that was often difficult to traverse[29][27], and as a result it seems likely that the areas such as Ardoch (as Braco village was previously known) would have represented prime settlement areas, being slightly elevated.

7.4.25 There is no evidence for activity in the upland regions of the Study Area during this period, although it is possible that the grazing land on offer in these areas would have been exploited on a seasonal basis as is common in upland areas of Scotland.

Medieval (AD1100 – AD1600)

7.4.26 As with the early medieval period, there is limited archaeological evidence for activity within the Study Area during the medieval period. Four assets have been recorded within the Study Areas, two of which have been positively dated to the medieval period. These are both findspots and include a gold button (MPK1852) found within Braco village, and pottery (MPK17590) recorded to the north of Braco village within the limits of Ardoch Roman Fort.

7.4.27 The remaining two assets dating to the medieval period have both been tentatively dated by form and not detailed excavation and could also be post-medieval in date. The first is the site of a possible chapel located within the centre of Ardoch Roman Fort (MPK686),

[24] Breeze, D. J., 1973. 'Exacations at Ardoch 1970' *in Proceedings of the Society of Antiquaries of Scotland,* Volume 102: Pages 122-129.
[25] Woolliscroft, D. J. & Hoffmann, B., 1998. 'The Roman Gask System Tower at Shielhill South, Perthshire: Excavations in 1973 and 1996' *in Proceedings of the Society of Antiquaries of Scotland,* Volume 128: Pages 441-460.
[26] Woolliscroft, D. J. & Hoffmann, B., 1987 'The Roman Gask System Tower at Greenloaning, Perth and Kinross' *in Proceedings of the Society of Antiquaries of Scotland,* Volume 127: Pages 563-576.
[27] Foster, J., 1999. "Strathearn" *in* Omand, D. (ed.), 1999. *The Perthshire Book.* Edinburgh: Birlinn Limited.
[28] Smith, R., 2001. *The Making of Scotland.* Edinburgh: Canongate Books Limited.
[29] Foster, J., 1999. "Strathearn" *in* Omand, D. (ed.), 1999. *The Perthshire Book*, Edinburgh: Birlinn Limited.

while the second is an area of ridge and furrow cultivation as well as possible shielings (used for transhumance or seasonal pastoral activities) on the Crocket Burn (MPK6625).

7.4.28 The assets recorded within the Study Area would suggest that some level of settlement activity continued around the Braco area, potentially as a result of its slightly elevated positioning above Strathallan, while the upland area was used for seasonal grazing with some limited arable farming taking place.

7.4.29 It has been suggested that the Grade B listed Braco Castle (LB5804), approximately 1.5 km north of the Study Area, originally dates to the 16th century[30]. Located to the west side of the River Knaik, and to the northwest of Braco village, the house has been extensively remodelled in the post-medieval period making its original date and form difficult to discern.

Post-Medieval (AD1600 – AD1900)

7.4.30 The post-medieval period represents the most visible period when considering previously recorded heritage assets in the Study Area, with a total of 46 non-designated assets and eight designated assets recorded. As with earlier periods, the majority of these are located in Braco village, as well as the lower slopes of ground rising from Strathallan, with assets in Braco village largely linked to settlement and assets on the fringes of Strathallan linked to agriculture.

7.4.31 Assets within Braco, or Ardoch as it was originally known, include key public buildings such as the parish church (LB5794) and the Free Church tower (LB5795), as well as Ardoch Bridge (LB5796) all of which are listed. Other non-designated assets around Braco include the cemetery (MPK8072), a well record near the centre of the village (MPK8072), and the military road that runs through the settlement (MPK8269). The military road (MPK8269), a result of the unrest caused by the Jacobite rebellions of the first half of the 18th century, is thought to have been one of those built by Caulfield between 1741-42 and was designed to link Stirling, to the southwest, and Crieff, to the northeast[31]. It is, however, likely that the road formalised the network of drove roads that connected the cattle trading centre of Crieff to the markets of Edinburgh, Glasgow and England to the south. The modern A822 continues to use the alignment of the military road, although a more recent bridge (MPK17567) now carries the road over the River Knaik to Braco village, by-passing the original bridge which is a Listed Building (LB57967).

7.4.32 Features recorded in the more upland areas contain evidence for permanent farmsteads on the lower slopes where better ground was available and some level of enclosure was undertaken, while the assets on the higher ground are linked to seasonal grazing. Permanent farmsteads include sites such as Wester Feddal Farmstead (MPK15095), Carsemeg (MPK9768), Crofthead (MPK15055), and Whistlebrae (MPK11733), while evidence of seasonal activities on the uplands include shielings and associated enclosures along the Crocket Burn (MPK6624) and Froskin Burn (MPK6626).

7.4.33 A review of early cartographic sources provides little information, as most are county-wide and therefore at a scale that does not provide any great detail, although Moll (1732)[32] does show the castle / tower house at Braco as well as the Roman fort at Ardoch, while the Rutherford survey of military roads undertaken in 1745 shows only settlements such

[30] Tranter, N., 1963. *The Fortified House in Scotland: Volume Two – Central Scotland.* Edinburgh: Oliver and Boyd.
[31] Taylor, W., 1976. *The Military Roads in Scotland.* London: David & Charles.
[32] National Library of Scotland, n.d. *The South Part of Perth Shire Containing Perth, Strathern, Stormount and Cars of Gourie &c* [online]. [Accessed 24 May 2024]. Available from: https://maps.nls.uk/view/00000293.

as Drummond (assumed to be Dunblane due to its position on the south side of the River Allan), to the southwest, and Crieff, to the northeast[33].

7.4.34 The first detailed survey of the Study Area identified as part of the current assessment is the General Roy Survey undertaken between 1747 and 1755[34]. This shows the modern settlement of Braco named as Ardoch, focused on the southern side of the Roman Fort at the point where the military road north (the modern A822) crosses the River Knaik. The survey also shows the Roman Fort (SM1601) and the fort on Grinnan Hill (SM3088) as clear earthworks, while the area currently occupied by Braco village is depicted as arable fields. This depiction of arable fields includes the land adjacent to the A822 at the eastern limit of the Study Area, however, an area of land immediately to the southwest of Grinnan Hill, and on the line of the Keir Burn, appears to be shown as a pond or area where the water course widens.

7.4.35 The survey also shows a small grouping of houses on the line of the A822 near the southern limits of modern Braco village, and these appear to relate to a farmstead named as Greenhaugh on late 19th / early 20th century mapping but removed in the second half of the 20th century to make way for new housing (AECOM002).

7.4.36 The name ‘Braco’ is assigned to Braco Castle (LB5804) rather than the settlement, and the house is depicted as a large property with associated enclosure and woodland planting surrounding the main house as well as lining the main access route to the property.

7.4.37 A number of farmsteads and houses that survive in the contemporary landscape are also depicted on the survey, including Middle Feddal (named as Nether Fedall) and Wester Feddal (named as West Fedall), while a number of unnamed houses or groupings of structures appear to relate to farmsteads such as Silverton (MPK11835), Whistlebrae (MPK11733), and Carsemeg (MPK9768).

7.4.38 No features are marked on the upland section of the Study Area, with the landscape depicted as grazing or unimproved.

7.4.39 The First Statistical Account of Scotland provides an overview of the situation within the Parish of Muthill, of which Braco was part, in the late 18th century, and this notes that the landscape of the Study Area largely consisted of poor-quality soils[35]. Braco village (or Ardoch) is not named as a settlement, although the Roman Fort of Ardoch is described, while the bridge crossing the River Knaik is also recorded (LB57967). This may further suggest that the settlement of Braco / Ardoch was, at this time, still small and more of a large farmstead. The author also noted that the fort had been used for pasture grounds, and that the owner had recently erected a wall around the fort to stop locals attempting to plough the earthworks to ensure it was preserved.

7.4.40 The Second Statistical Account, published in 1845, provides a brief account of the settlement of Ardoch, and notes that the chapel was built in the late 18th century and that a “thriving village is now rising beside it, named Braco village, from the circumstances that it consists of feus on the estate of Braco”[36]. The account goes on to note that the population of the village was 384, with facilities including four public houses, a school,

[33] National Library of Scotland, n.d. *An Exact Plan of His Majesty's Great Roads through the Highlands of Scotland* [online]. [Accessed 24 May 2024]. Available from: https://maps.nls.uk/view/74414122.
[34] National Library of Scotland, n.d. *Roy Military Survey of Scotland*, 1747-55 [online]. [Accessed 24 May 2024]. Available from: https://maps.nls.uk/geo/roy/#zoom=14.8&lat=56.26440&lon=-3.90113&layers=0.
[35] Scott, J., 1793. ‘Parish of Muthil’ in Sinclair, J. (ed.) The Statistical Account of Scotland, Volume 8: Perth, Edinburgh.
[36] Walker, J., 1845. ‘Parish of Muthill’ in Gordon, J. (ed.) *The New Statistical Account of Scotland*, Volume 10: Perth.

and a library, suggesting a settlement that was flourishing by the mid-19th century. Two cattle markets were also held in the village annually, also hinting at the continued importance of pastoral agriculture in the Study Area.

7.4.41 This depiction of the village is repeated on the First Edition OS plan of 1863 which shows the settlement expanding south from the crossing point of the River Knaik[37]. The OS mapping also shows the prehistoric fort on Grinnan Hill as being separate from the settlement, while the land to the south of the fort (where the haul track is proposed) is occupied by a series of enclosed fields flanking the Keir Burn. This pattern of fields is largely respected by the contemporary field system in this area, and traces of a 'sluice' marked on the OS survey also appear to survive in the watercourse (AECOM001).

7.4.42 The OS mapping for the Study Area outside of the settlement of Braco depicts a landscape with farmsteads and associated enclosed fields on the lower slopes, giving way to unimproved or semi-improved rough pasture on the high ground near the proposed Cambushinnie 400 kV substation. There are no features marked on the Crocket Burn (MPK6624) and Froskin Burn (MPK6626), also suggesting that transhumance / the use of the shielings had ended in this area by the 1860s.

7.4.43 Very little had changed in the Study Area by the time of the Second Editon OS survey of the area which was conducted in 1899, with the settlement of Braco to the north of the haul track largely representing that surveyed in 1863. Likewise, the upland regions of the Study Area had changed very little with the farmsteads focused on the lower slopes and the high ground, where the proposed Cambushinnie 400 kV substation is located, shown as unimproved or semi-improved rough pasture.

Modern (AD1900 – Present)

7.4.44 Three assets dating to the modern periods have been recorded within the Study Area, all of which are located around Braco. These include a memorial to the men of the village killed in the Great War (MPK18669), the site of a now demolished Second World War pillbox on the south side of Braco (MPK10915), and the golf course (348440).

7.4.45 The settlement of Braco continued to grow throughout the 20th century, with the village expanding south up to the limits of the prehistoric fort on Grinnan Hill, as well as on the lower ground to the east of Grinnan Hill, to take its current form. The Third Statistical Account published in 1979 again records the generally poor agricultural land within the area, and highlights this is a contributing factor to the pattern of many small farms on the fringes of Strathallan. Many of these farmsteads, some of which have been recorded on the mid-18th century Roy survey, still survive in the Study Area and include Silverton (MPK11835), Whistlebrae (MPK11733), and Carsemeg (MPK9768). The farmstead of Greenhaugh also still appears to survive, albeit in a much-reduced form, within the late 20th century housing estate that forms the southeastern limit of Braco (AECOM002), while the land in which the haul track is located remained in agricultural use.

7.4.46 In the upland regions of the Study Area, where the proposed Cambushinnie 400 kV substation site is located, the main change in land use during the 20th century was the introduction of largescale commercial forestry which dominates the landscape. Much of this dates to the second half of the 20th century, with the Forestry Commission originally establishing the woodland in the area in the mid-1970s[38]. These areas of woodland continue to be harvested and replanted across the higher ground in the Study Area, with

[37] National Library of Scotland, n.d. *Perthshire, Sheet CXVII* [online]. [Accessed 24 May 2024]. Available from: https://maps.nls.uk/view/228779812

[38] Perth and Kinross Archives, 1974. MS195, Plans 7/1-7/77, Forestry Commission plan of proposed Strathyre Forest, plan dated 20 September 1974.

the only other significant change to the landscape of the Study Area being the introduction of the operational OHL and Braco West Substation.

Walkover Survey

7.4.47 A walkover survey was undertaken on 1 February 2024 of the Combined Project Development Boundary, excluding the haul track as the location of the haul track had not been established at this stage. Visits were also undertaken to Braco village, as well as Grinnan Fort (SM3088), Ardoch Fort (SM1601), and parts of Braco GDL (GDL00067) to examine possible impacts on the setting of heritage assets.

7.4.48 The walkover survey of the Combined Project Development Boundary found the area to have suffered from extensive disturbance from commercial forestry operations, with evidence of recent felling operations, drainage works, and young established trees across parts of the Site.

7.4.49 No new heritage assets were recorded as part of the walkover survey in the area of the Site.

7.4.50 A second site visit was undertaken on the 23 April 2024 to examine the eastern end of the Combined Project Development Boundary, and specifically the eastern section of the haul track south of Braco village between the A822 and the B8033 where the route of the haul track had been defined. This noted that the fields through which the Proposed Development passes are largely used for pasture, with no new features recorded in the fields. The survey did, however, note traces of a possible structure in the channel of the Keir Burn, and these are assumed to relate to ‘sluice’ features recorded on the First Edition OS mapping of the area (AECOM001).

7.4.51 A third site visit was undertaken on the 1 July 2024 to examine the Combined Project Development between the B8033 and Easter Feddal, and specifically the route of the western end of the haul track. This did not identify any previously unrecorded assets.

Archaeological Potential

7.4.52 While evidence for human activity has been recorded within the Study Area from the prehistoric period onwards, the focus of settlement has been the low-lying area around the Braco village and Strathallan, with the upland areas used on a more seasonal basis. Activity in the lower land includes Grinnan Fort scheduled monument (SM3088), as well as the Ardoch roman complex to the north of Braco (SM1601), and it is likely that the main focus of settlement was in the area now occupied by Braco village between Grinnan Fort and Ardoch, with the landscape of the Proposed Development, near the Keir Burn, being flood plain unsuitable for settlement.

7.4.53 As a result, the archaeological potential for all periods within the Site is considered to be low.

7.5 Embedded Mitigation

7.5.1 Due to the lack of heritage assets recorded within the Site, as well as the low potential for further archaeological discoveries, no embedded mitigation for cultural heritage is considered appropriate.

7.6 Appraisal

7.6.1 The appraisal of potential impacts resulting from the Proposed Development has been divided into the construction and operational phases. These are discussed below.

Construction Phase

7.6.2 The construction phase has the potential to result in the following impacts:

- Permanent physical impacts on previously unrecorded heritage assets due to construction of the Proposed Development;
- Permanent physical impacts on previously recorded heritage assets due to construction of the Proposed Development;
- Permanent physical impacts on previously unrecorded heritage assets due to construction of temporary construction compounds or other works areas; and
- Impacts on the setting of designated assets due to the introduction of the Proposed Development.

7.6.3 The walkover survey demonstrated that the majority of the Combined Project Development Boundary has been subject to previous ground disturbance associated with commercial forestry in the upland areas and arable agriculture in the lower lying ground. Furthermore, the review of previously recorded heritage assets, historic mapping, and the walkover survey, did not identify any heritage assets within the Site, and as a result the potential for the discovery of previously unrecorded assets was considered to be low. It is also assumed that human activity in the area of the Proposed Development is limited to agricultural activity, and that any assets that might be recorded or identified during works would be of low value.

7.6.4 A single asset has been recorded within the Site, this being a former weir structure (AECOM001). The asset is of a form that is common in the area, as well as Scotland in general, and is also in a poor state of repair with only limited sections of stonework surviving. It is therefore considered to be of low value. This feature is located under the proposed bridge, however, as there will be no construction works undertaken in or immediately adjacent to the river channel, impacts on the structure are not predicted. As a result, the magnitude of impacts is assessed to be ‘no change’.

7.6.5 The walkover survey and review of historic mapping of the proposed haul track alignment did not identify any other previously unrecorded heritage assets, and the potential for previously unrecorded assets to be discovered is considered to be low. Based on a review of previously recorded assets in the Study Area, as well as a review of other sources such as historic cartographic sources, it is assumed that human activity in the Site is limited to agricultural activity in the post-medieval period, with human activity focused on the higher ground due to the low-lying land near the watercourse being susceptible to flooding in the past. Any assets that might be recorded or identified during works would likely be of local importance and therefore of low value. Due to the low archaeological potential, the potential for physical impacts is considered to be low.

Operational Phase

7.6.6 Due to the nature of the Proposed Development, operational impacts are expected to be limited to impacts on the setting of heritage assets. The proposed haul track represents the key element of above ground infrastructure, and while the bridge deck would be removed following the construction of the proposed Cambushinnie 400 kV substation and associated developments, the embankment carrying the haul track would be retained. As a result, there is the potential for impacts on the setting of designated assets.

7.6.7 A review of designated assets within 2 km of the proposed haul track identified 17 designated assets, however, their positioning means they are screened by topography, as well as the existing built environment and trees / vegetation (see **Table 3, Appendix F**

Gazetteers, and **Figure 7-3, Appendix A Figures**). As a result, no impacts are predicted to the majority of these assets through change to their settings.

7.6.8 A single instance where the Proposed Development had the potential to result in impacts though change to setting was identified, this being the scheduled fort on Grinnan Hill to the north of the haul track (SM3088). The fort is located in an elevated position overlooking the Keir Burn and would have potentially originally commanded views over the surrounding landscape. These would have been most clear to the southwest, south, east, and northeast, where the landscape opens out as a result of the Keir Burn, River Knaik, and Allan Water converging.

7.6.9 Views out from the asset are now limited as a result of woodland planting on the hill, while views into the fort are also limited as a result of woodland, although the trees on the hill are relatively prominent when viewed from the south. The prominence of the fort has been further reduced as a result of the development of Braco village, with elements such as the 20th century expansion of the settlement to the south partially surrounding the asset.

7.6.10 While the Proposed Development would introduce an embankment and track to the agricultural landscape to the south of the asset, the low-lying nature of the Proposed Development would not result in views of the asset from the south being severed or blocked. Furthermore, the Proposed Development would not alter the prominence of the asset when viewed from the south, or from other directions as the prominence is largely derived from the woodland that now occupies the hill.

7.6.11 As a SM, the asset is considered to be of high value, and it is assumed that the limited alterations to the setting of the asset resulting from the introduction of the Proposed Development would result in a Negligible magnitude of impact.

7.7 Recommendations and Mitigation

7.7.1 Due to the nature of the Proposed Development, as well as the results of the appraisal, the potential for impacts is considered to be low. Consultation with the PKHT noted that while the archaeological potential is considered to be low, there is still the potential for previously unrecorded assets to remain within the footprint of the Proposed Development. As a result, a phase of archaeological evaluation trenching would be required to fully assess the archaeological potential of the Proposed Development. The results of these works would be used to agree the final mitigation which may include, but not be limited to, full archaeological excavation, recording, and publication, or monitoring during construction work (i.e. soil stripping) of the Proposed Development. All works would be agreed with PKHT and undertaken in accordance with a WSI approved by PKHT.

7.7.2 Based on the current design, no construction works are predicted in the area of the weir on the Keir Burn (AECOM001), with all construction works associated with the temporary bridge located away from the watercourse. However, the asset will be fenced off during construction to avoid any accidental damage.

7.7.3 It was also noted that historic features such as drystone walls, gate posts, and dykes should be avoided where possible, and fenced off to avoid accidental damage. If these features cannot be avoided mitigation would be required. This is likely to include reinstating any features that are removed. If sections of drystone wall cannot be reinstated due to the need for a permanent access, end sections of wall should be ‘made-good’ to avoid the risk of sections of wall collapsing.

7.7.4 All proposed mitigation works would be agreed with the PKHT and approved in a WSI.

7.8 Cumulative Effects

7.8.1 A cumulative appraisal was conducted taking into account the 'scoped in' planning applications as detailed in **Section 13.1.2** and **Table 13-1.** These are listed below;

- 21/00756/FLM: 49.9MW BESS facility; and
- 22/02231/FLM: 49.9MW BESS facility compound.

7.8.2 There are no cumulative effects on cultural heritage predicted with the two proposed BESS developments that would result in impacts to heritage assets assessed as part of the current assessment for the Proposed Development. This includes potential impacts to previously unrecorded heritage assets due to the low archaeological potential resulting from limited settlement activity and previous disturbance from commercial forestry operations, as well as the limited potential for impacts on setting.

8. FORESTRY

8.1 Introduction

8.1.1 The potential impact on trees resulting from the construction and operation phases of the Proposed Development is more appropriately expressed in terms of arboriculture than effects on forestry. The term forestry covers both commercial and non-commercial woodland (such as farm woodland) but it is not an appropriate term for the potential effects to individual trees, particularly highway trees, or to small groups of trees, including riparian habitat. Christmas trees, present within the Site, are identified as a rural land use but do not constitute forestry or arboricultural impacts (unless trees are left unharvested, to grow to maturity, at which point forestry regulations would then apply). These potential effects, and recommendations for tree protection measures during the construction period, are addressed in an Arboricultural Impact Assessment (AIA) (**Appendix H Arboricultural Assessment**).

8.1.2 The standalone AIA is presented in **Appendix H Arboricultural Impact Assessment** of this EA, and recognises the presence of A category individual trees and tree groups within the Site. The AIA defines tree categorisation but A category trees and groups can be summarised as being of high quality and significant value, with an estimated remaining life expectancy of at least 40 years. The AIA is the appropriate assessment model, as no high sensitivity forestry receptors, such as ancient woodland or mature native woodland, are present within the Site.

8.1.3 The information addressed in the AIA includes:

- Information Sources;
- Methodology;
- Baseline Environment, including a tree survey schedule and tree constraints plan;
- Embedded Mitigation;
- Appraisal; and
- Recommendations and Mitigation, including a tree protection plan.

9. HYDROLOGY, HYDROGEOLOGY, GEOLOGY AND SOILS

9.1 Introduction

9.1.1 This chapter assesses the potential effects relating to Hydrology, Hydrogeology, Geology and Soils in relation to the construction phase of the Proposed Development.

9.2 Information Source

9.2.1 This chapter is supported by **Figure 9-1** and **9-2, Appendix A Figures**.

9.2.2 The data relating to the Study Area (see **Section 9.4.1**) used to develop a baseline for soils, geology, hydrogeology, land contamination, Water Framework Directive (WFD) catchments, watercourses and surrounding areas is summarised below:

- The Mining Remediation Authority Map Viewer (2025)[1];
- British Geological Survey (BGS) mapping (2025)[2];
- National River Flow Archive for surface water flow and rainfall information (2024)[3];
- Met Office (2023)[4];
- Scotland's Aquaculture website (2024)[5];
- Scotland's Environment website (2024)[6];
- Hydrogeological Map of Scotland (2024)[7];
- Scottish Environment Agency (SEPA) Water Classification Hub (2024)[8];
- NatureScot (2024)[9];
- Zetica Unexploded Ordnance (UXO) risk map (2025)[10];
- Zetica Pre-Desk Study Assessment (PDSA) (2025) (appended in Appendix B of **Appendix I Geo-environmental Desk Study**);
- UK Radon Map (2025)[11];
- UK Topography map (2025)[12];
- Scottish Government Energy Infrastructure (Energy Consents - Scottish Government) (2024)[13];

[1] Mining Remediation Authority, 2023. *Mining Remediation Authority Map Viewer* [online]. [Accessed 21 February 2025]. Available at: https://datamine-cauk.hub.arcgis.com/

[2] BGS, 2020. *Onshore Geoindex* [online]. [Accessed 18 February 2025]. Available at: https://mapapps2.bgs.ac.uk/coalauthority/home.html.

[3] UK Centre for Ecology and Hydrology, 2024. *National River Flow Archive* [online]. [Accessed 18 February 2025]. Available at: https://nrfa.ceh.ac.uk/.

[4] Met Office, 2023. *UK and regional series* [online]. [Accessed 28 February 2025]. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-and-regional-series

[5] Scotland's Aquaculture, 2024. *Scotland's Aquaculture* [online]. [Accessed 28 February 2025]. Available at: https://aquaculture.scotland.gov.uk/map/map.aspx?postcode=&layers=AQUA_1,AQUA_6.

[6] Scotland's Environment, 2024. *Map Contents* [online]. [Accessed 09 May 2024]. Available at: https://map.environment.gov.scot/sewebmap/

[7] BGS, 2024. *Hydrogeological Maps of Scotland* [online]. [Accessed 28 February 2025]. Available at: https://www.bgs.ac.uk/datasets/hydrogeological-maps-of-scotland/

[8] SEPA, 2015. *Water Classificaion Hub* [online]. [Accessed 18 February 2025]. Available at: https://www.sepa.org.uk/data-visualisation/water-classification-hub/

[9] NatureScot, 2025. *Site Link Map Search* [online]. [Accessed 21 February 2025]. Available at: https://sitelink.nature.scot/map.

[10] Zetica, 2025. *UXO Risks Map* [online]. [Accessed 18 February 2025]. Available at: https://zeticauxo.com/guidance/risk-maps/

[11] UKradon, 2025. *UK maps of radon* [online]. [Accessed 18 February 2025]. Available at: https://www.ukradon.org/information/ukmaps

[12] United Kingdom topographic map, 2024. *Topographic-map.com* [online]. [Accessed 09 May 2024]. Available at: https://en-gb.topographic-map.com/map-cgt/United-Kingdom/

[13] Scottish Government, 2024. *Energy Infrastructure* [online]. [Accessed 09 May 2024]. Available at: https://www.gov.scot/policies/energy-infrastructure/energy-consents/.

- Google Earth satellite imagery (Google Earth) (2025)[14];
- Carbon and Peatland 2016 Map (2025)[15];
- National Library of Scotland Map Side by Side Viewer (2025)[16];
- National Soil Map of Scotland (2025)[17];
- Historic Environment Scotland (HES) PASTMAP[18];
- Geo-Environmental Desk Study Cambushinnie Haul Track (AECOM, February 2025) (**Appendix I Geo-Environmental Desk Study**);
- Cambushinnie Haul Track: Flood Risk Assessment (Jacobs, January 2025);
- Proposed Cambushinnie 400Kv Substation Haul Track, Cambushinnie, Perth and Kinross, Report on Ground Investigation (Igne, December 2024) (appended in Appendix H of **Appendix I Geo-Environmental Desk Study)**;
- Groundsure Enviro+Geo Insight (ref. GSIP-2024-14502-17022) (January 2024) (appended in Appendix D of **Appendix I Geo-Environmental Desk Study)**;
- Email correspondence with the Local Authority (Perth and Kinross Council (PKC)) on potentially contaminated land (6 March 2025); and
- Private water supply information received from PKC on 17 January 2024. An update was requested in March 2025. Field surveys were also carried out on 15 January and 26 March 2024.

9.3 Methodology

9.3.1 The general methodology used to assess the potential effects of the Proposed Development on the hydrology, hydrogeology, geology and soils of the Site is as follows:

- Consultation with SEPA, and PKC to identify any information relating to water abstractions, contaminated land, historical land use and areas of sensitivity;
- Desktop study to obtain baseline and historical data;
- Field survey undertaken on 26 March and 11 June 2024 to obtain baseline data;
- Identification of the potential effects of the Proposed Development and assessment of their magnitude and potential impact on sensitive receptors; and
- Identification of options for the mitigation of potential effects taking account of the SSEN Transmission GEMPs (**Appendix O GEMPs and SPPs**).

9.3.2 The significance of the impacts upon the baseline environment will be defined as a function of the sensitivity of receptors and the magnitude of change (**Section 9.4.68**).

9.3.3 This assessment will include the impacts from the Proposed Development shown in **Figures 2-3** and **2-4, Appendix A Figures** and the surrounding area. The Study Area is described in **Section 9.4.1** below. Particular attention will be paid to the potential hydrological and water quality impacts upon any water supplies within the vicinity of the Site and any aquatic ecological features identified within the **Chapter 5 Ecology and Nature Conservation**.

[14] Google Earth, 2024. *Google Earth* [online]. [Accessed 18 February 2025]. Available at: https://earth.google.com/web/@-3.47981663,150.00030013,-3256.63719952a,18709751.81607485d,35y,165.58670573h,0t,0r/data=OgMKATA

[15] Carbon and Peatland 2016 Map, 2024. *Map Contents* [online]. [Accessed 09 May 2024]. Available at: https://map.environment.gov.scot/Soil_maps/?layer=1

[16] National Library of Scotland, 2024. *Side by Side* [online]. [Accessed 18 February 2025]. Available at: https://maps.nls.uk/geo/explore/side-by-side/#zoom=5.0&lat=56.00000&lon=-4.00000&layers=1&right=ESRIWorld

[17] Scotland's' Soils, 2024. *Map Contents* [online]. [Accessed 09 May 2024]. Available at: https://map.environment.gov.scot/Soil_maps/?layer=1

[18] Historic Environment Scotland, 2024. *Past Map* [online]. [Accessed 19 March 2025]. Available at: https://pastmap.org.uk/map

9.3.4 The National Planning Framework 4 (NPF4) was published in February 2023[19] and replaces the previous National Planning Framework 3 and Scottish Planning Policy[20]. In line with NPF4, a full flood risk assessment (FRA) has been undertaken for the Proposed Development in support of the planning application. Details on flood risk and the methods whereby this risk are mitigated are found in the standalone FRA. No further discussion of the issue is found in this chapter.

9.3.5 Within a catchment that drains to a public water supply, fish farm or waters that support priority species or habitats within any 3-year period, forestry felling of more than 20% of the catchment should be avoided[21]. Given the Proposed Development's relatively small scale removal of forestry relative to the catchment's size, no adverse effects on water quality or aquatic ecosystems are anticipated. Therefore, a forestry hydrological assessment has been scoped out of this EA.

9.4 Baseline Environment

9.4.1 Based on AECOM's standard methodologies and in-house experience, for the assessment of the hydrology, hydrogeology, geology, and soils, a Study Area of up to 1 km from the boundary of the Site was used. For contaminated land risk assessment purposes, a Study Area of up to 250 m from the boundary of the Site was used (based on the lower likelihood of contamination sources beyond 250 m impacting the Site).

Surface Water Hydrology

9.4.2 Surface water features (and their attributes) within the Study Area are described in this section. The locations for the surface water features are described within **Figure 9-1, Appendix A Figures.**

9.4.3 Under the Water Framework Directive (WFD), 'water bodies' are the basic management units, defined as all or part of a river system or aquifer. Water bodies form part of larger 'river basin districts' (RBD), for which River Basin Management Plans (RBMPs) are used to summarise baseline conditions and set broad improvement objectives. This baseline is presented by each water body, noting that some features are present within the catchments of designated WFD water bodies rather than being designated as a WFD water body in their own right.

9.4.4 As not all the watercourses in the Study Area are named, and some have multiple tributaries, each watercourse has been given a unique reference number.

9.4.5 The Proposed Development is situated within the Allan Water Catchment (ID:55). Within that catchment, the Proposed Development is located within the Bullie Burn sub-catchment. Within the Bullie Burn sub-catchment there are three main water features; the Keir Burn (WF2), Unnamed watercourses (WF3) and ditches (WF7) and Unnamed ponds/lakes, as shown in **Figure 9-1, Appendix A Figures**.

<u>Allan Water (WF1)</u>

9.4.6 Allan Water (WF1, **Figure 9-1, Appendix A Figures**) is a large watercourse which is sourced from a small lochan situated around NN 91354 10193. The river flows roughly west, before it flows south into the River Forth at NS 78670 95998. Flow data from the

[19] The Scottish Government. 2023. *National Planning Framework 4*. [online]. [Accessed June 2025]. Available at: https://www.gov.scot/publications/national-planning-framework-4/

[20] The Scottish Government. 2014. *National Planning Framework 3.* [online]. [Accessed June 2025]. Available at: https://www.gov.scot/publications/national-planning-framework-3/

[21] Forest Research, 2019. *Forest and water guidelines for forest management plans* [online]. [Accessed 08 May 2025]. Available at: https://www.charteredforesters.org/wp-content/uploads/2019/06/Nisbet-Dr-Tom.-Forest-and-Water-Guidelines..pdf

National River Flow Archive gives a Q95 result of 0.857 m^3/s at the Allan Water at Kinbuck Station[22]. **Plate 9-1** and **Plate 9-2** show the water feature (Allan Water) from the site walkover. The location of **Plate 9-1** and **Plate 9-2** is shown in **Figure 9-1, Appendix A Figures**. It was observed to have sand, gravel and cobbles deposited to the centre around the bridge and along the banks.

Plate 9-1 Allan Water taken at NN 83463 07879 looking upstream (taken on 15 January 2024)

[22] National River Flow Archive, 2025. *Station 18001 – Allan Water ant Kinbuck* [online]. [Accessed 3 March 2025]. Available at: https://nrfa.ceh.ac.uk/data/station/meanflow/18001.

Plate 9-2 Looking downstream (Taken on 15 January 2024)

9.4.7 No data was received on what species are contained within Allan Water from SEPA. However, it could be assumed that trout, salmon and sea trout are likely to inhabit the river as suggested by online fishing websites[23] and due to the reported presence of these species in Keir Burn, a tributary of Allan Water.

9.4.8 Upstream there is the South Tayside Goose Roosts Special Protection Area (SPA), Carsebreck and Rhynd Lochs Site of Special Scientific Interest (SSSI) and the Shelforkie Moss Special Areas of Conservation (SAC) (NN 85197 08738) (shown in **Figure 3-1a, Appendix A Figures**). These protected areas are situated outside of the Study Area and are upstream of the works and so will not be considered within the appraisal.

9.4.9 Chemistry data was supplied by SEPA on 22 March 2024. The supplied chemistry data was from water samples collected from Allan Water at the Knaik Confluence (NN 83733 07870) between January to September 2019 (total of 9 samples). A summary of the results is shown below in **Table 9-1**.

Table 9-1 Chemistry data collected from Allan Water at the Knaik Confluence (NN 83733 07870) between January to September 2019 (total of 9 samples)

Parameter	unit	Average	Max	Min
Alkalinity (as CaCO3)	mg/l	66.36	99.80	14.80
Ammoniacal Nitrogen (as N)	mg/l	0.05	0.13	0.02
Biochemical Oxygen Demand – ATU suppressed	mg/l	1.56	2.50	1.00
Chloride	mg/l	10.16	17.10	3.25

[23] Fishforth, 2025. *Fishing around the Forth* [online]. [Accessed 3 March 2025]. Available at: https://www.fishforth.org/rivers/allan-water/allan-water-angling-improvement-association/

Parameter	unit	Average	Max	Min
Electrical conductivity (25°C)	µS/cm	175.29	265.00	43.30
Nitrate (as N)	mg/l	0.62	1.10	0.15
Nitrite (as N)	mg/l	0.01	0.01	0.01
Non-ionised ammonia (as N)	mg/l	0.00	0.00	0.00
Oxygen – dissolved	mg/l	11.78	14.60	10.60
Oxygen – dissolved - % saturation	%	105.61	133.00	94.30
pH	pH units	7.76	8.47	6.90
Reactive Phosphorus (as P)	mg/l	0.01	0.02	0.01
Sample Temperature	°C	10.48	18.40	5.20
Suspended Solids (105°C)	mg/l	4.67	7.82	2.00
Total Oxidised Nitrogen (as N)	mg/l	0.63	1.11	0.15

9.4.10 Allan Water (Greenloaning to Dunblane) (ID: 6833) has been classified as having good overall status (2023). It has also been designated as a heavily modified water body (HMWB) due to the surrounding agricultural land drainage systems. Further information is shown in **Table 9-2**.

Table 9-2 WFD Parameters for the Allan Water (Greenloaning to Dunblane)[8]

WFD Parameter	Allan Water- Greenloaning to Dunblane (ID: 6833) (2023)
Overall status	Good
Pre-HMWB status	Poor
Overall ecology	Poor
Biological elements	Good
Fish	Good
Fish barrier	Good
Specific Pollutants	Pass
Ammonium	Pass
Hydromorphology	Poor
Morphology	Poor
Overall hydrology	Good
Modelled hydrology	Good
Hydrology (medium / high flows)	High
Hydrology (low flows)	High
Water Quality	n/a

Keir Burn (WF2)

9.4.11 Keir Burn (WF2) is sourced from Bullie Burn which is sourced from NN 76328 11041 and splits at NN 81122 10301 into the Keir Burn and Mill Burn, approximately 1.69 km upstream from the Site. Keir Burn enters Allan Water at NN 83471 07902, approximately 1 km downstream from the Site.

9.4.12 **Plate 9-3** to **Plate 9-5** displays photographs taken from the Site walkover at Bullie Burn on 15 January 2024. In general, Keir Burn has a bedrock typology overlain by cobbles and boulders with a plane-riffle bed in the reach adjacent to Braco. At the site of proposed bridge, the Keir Burn is embanked which provides flood defence, and is lined with trees and has a straight and stable planform.

Plate 9-3 Bullie Burn taken at NN 80048 09954 facing downstream on 15 January 2024

Plate 9-4 Keir Burn taken at NN 83348 09521 facing upstream on 15 January 2024

Plate 9-5 Photo taken at NN 83410 09063 of the existing embankment along Keir Burn facing northwest on 16 April 2024

9.4.13 No SEPA water chemistry or flow data was provided for Keir Burn or associated tributaries. However, pre-construction monitoring was carried out by RSK Geosciences.

There have been four rounds of monitoring since November 2024, the latest monitoring round being in March 2025. However, no sample at Keir Burn was collected on the third monitoring round due to weather conditions. Keir Burn is monitored in two locations: Location 4 (L4) upstream of works sample (NN 83337 09208) and Location 5 (L5) downstream of work sample (NN 83519 08943).

9.4.14 Overall, the results show that Keir Burn has a good overall water quality. The latest monitoring round showed that Keir Burn has a slightly alkaline pH with a value of 7.9. At the time of writing, neither monitoring locations have exceeded the Environmental Quality Standards (EQS) for any of their parameters. All samples collected for Keir Burn have also been below the detection limit for monoaromatics, oxygenates and petroleum hydrocarbons.

9.4.15 The Keir Burn is listed by Marine Scotland as a river supporting Atlantic salmon and sea trout. More information is available in **Chapter 5 Ecology and Nature Conservation**.

9.4.16 Keir Burn is included within the WFD classification for Bullie Burn which has been classed as having a moderate overall status (2023). Further WFD parameters are shown in **Table 9-3**.

9.4.17 Bullie Burn waterbody has a 'Moderate' status under the WFD for hydromorphology (2023) due to modifications such as a barriers which are passable for fish, historic realignment, a mill lade and constructed embankments.

Table 9-3 WFD Parameters for Bullie Burn[8]

WFD Parameter	Bullie Burn (ID:4605) (2023)
Overall status	Moderate
Pre-HMWB status	Moderate
Overall ecology	Moderate
Biological elements	High
Fish	High
Fish barrier	High
Specific Pollutants	n/a
Ammonium	n/a
Hydromorphology	Moderate
Morphology	Moderate
Overall hydrology	High
Modelled hydrology	High
Hydrology (medium / high flows)	High
Hydrology (low flows)	n/a
Water Quality	High

Unnamed Water Feature (WF3)

9.4.18 WF3 is an unnamed tributary of Feddal Burn, which it flows into at approximately NN 82769 07772, 1.28 km downstream from the Study Area (see **Figure 9-1, Appendix A**

and **Table 9-4** for details). Feddal Burn joins Allan Water 45 m downgradient of its confluence with WF3 at NN 82745 07729. WF3 is sourced from a small, unnamed pond at NN 82597 09685 and is also fed into by the two unnamed ponds/lakes (WF4, scoped out – see **Table 9-4** below). WF3 is fed by approximately 5 different tributaries within the Study Area concentrated at the centre and west of the Site.

9.4.19 **Plate 9-6** and **Plate 9-7** display some photographs of WF3 from the site walkover on the 11 June 2024. The watercourse was heavily vegetated on the surrounding banks. The bed of the watercourse was typified by boulders, cobbles and some sediment. The water appeared clear with a slightly brown/yellow tinge but overall, in good quality.

Plate 9-6 WF3 taken at NN 82938 09203 facing upstream on 11 June 2024

Plate 9-7 Taken at NN 83185 09095 facing downstream at culvert at the B8033 on 11 June 2024

9.4.20 According to the National Library of Scotland ordnance survey viewer the alignment of WF3 appears to have remained unchanged since at least the 1830s – 1880s[16]. However, it is possible that the feature has undergone small amounts of re-alignment, and it is also possible that tributaries may have been re-aligned and/or be artificial in origin.

Summary of Surface Water Features

9.4.21 There are many water features present within the Study Area. **Table 9-4** below, summarises these features with reasoning given for scope in or out of the appraisal.

Table 9-4 Summary of Water Features within the Study Area

Water Feature	Description	Distance to the Site	Scoped In / Out for Appraisal
Allan Water (WF1, **Figure 9-1, Appendix A Figures**)	The source is a small lochan situated around NN 91354 10193. The river flows roughly west, before flow south in the River Forth at NS 78670 95998.	The Site is approximately 1 km upstream from Allan Water.	**Scoped In** Indirect construction runoff from catchment.
Keir Burn, Bullie and associated tributaries (WF2, **Figure 9-1, Appendix A Figures**)	Originates from NN 76220 11136 as Bullie Burn and becomes Keir Burn at approximately NN 81210 10340 on steep terrain upstream of the Site. Enters Allan Water at approx. NN 83462 07899 to the south of the Site.	Bullie Burn flows through the Site and would have a temporary bridge as well as other works within 1 km including earthworks, temporary site compounds and the construction of a new track.	**Scoped In** Indirect construction runoff from catchment Potential modifications to channel from bridge construction.
Unnamed tributary of Feddal Burn (WF3, **Figure 9-1, Appendix A Figures**)	Tributary of Feddal Burn sourced from a small pond at NN 82597 09685 and is also fed into by WF4. Flows into Feddal Burn at NN 82769 07772.	Flows through the Site and crosses haul track, earthworks, and filter drains. Borders temporary compound. May have culverts.	**Scoped In** Indirect and direct construction runoff from catchment. Potential modifications to channel from culvert installation.
Unnamed ponds / lakes (WF4)	Two small ponds / lakes located at NN 82422 09326 and NN 82316 09253. Feeds into WF3 and WF8.	Approximately 0.04 and 0.08 km from the Site.	Scoped Out Upstream of works
River Knaik (WF5)	The River Knaik is a WFD waterbody with a status of 'good' (2023). It is sourced at NN 78699 13793 at the confluence of Corriebeagh Burn and Allt an t-Seilich and joins WF1 at NN 83477 07895.	Located 0.16 km from the Site at nearest point.	Scoped Out No direct pathway. Keir Burn is within a different catchment and there are no flow paths connecting the Site to the water feature.
Unnamed ponds / lakes (WF6)	Series of five small ponds fed by WF7 located at NN 82671 08656, NN 82777 08536, NN 82826 08469, NN 82819 08411 and NN 82777 08383.	Located 0.45 km from the Site at nearest point.	Scoped Out No direct pathway, upstream of potential sediment laden flow path.
Feddal Burn and associated tributaries/ponds (WF7, **Figure 9-**	Sourced around NN80000888, Feddal Burn flows roughly south through approximately four	Located 0.11 km from the Site at nearest point (tributary).	**Scoped In** Indirect construction runoff from catchment

Water Feature	Description	Distance to the Site	Scoped In / Out for Appraisal
1, Appendix A Figures)	small lochans (largest 7,000m^2 in area). Feddal Burn eventually flows into Allan Water at NN82740773.		
Mill Burn and associated tributaries/ponds (WF8)	Flows from Bullie Burn at NN 81122 10300, flows south easterly to join Feddal Burn at NN 82309 08986 which then joins Allan Water at NN 82744 07730 south of site. Flows through three lochans (NN82451034, NN 82308 09236 and NN82020985) before joining Feddal Burn.	Located 0.27 km from the Site at nearest point.	Scoped Out No direct pathway, upstream of works.
Small Pond (WF9)	Small pond located at approximately NN 82898 09896, fed by a small tributary.	Located approximately 0.60 km from the Site.	Scoped Out No direct pathway
Small Pond (WF10)	Small isolated pond located at approximately NN 81358 09903.	0.59 km from the Site.	Scoped Out No direct pathway

Geology and Soils

9.4.22 According to BGS mapping[2], the drift geology within the east of the Site is shown to comprise Alluvium (of clay, silt, sand and gravel). Alluvium is also shown up to 260 m southwest of the Site. A small section of Glaciofluvial Sheet Deposits (of gravel, sand and silt) and Glaciofluvial Ice Contact Deposits are present within the north and the west of the Site, respectively. An area of Glacial Till is shown within the north of the Site. River Terrace Deposits (of Gravel, Silt, Sand and Clay) are shown at approximately 410 m east of the Site.

9.4.23 Peat deposits are located approximately 830 m northwest of the Site.

9.4.24 The bedrock geology underlying the Site is shown as the Dunblane Sandstone Formation from the Strathmore Group.

9.4.25 There are two inferred faults of unknown displacement at approximately 510 m northeast of the Site.

9.4.26 There are no BGS designated areas of Made Ground or artificial ground recorded beneath the Site (or Study Area). Although no Made Ground is shown on published BGS mapping of the Site and within 1 km, localised Made Ground may be present.

9.4.27 According to BGS mapping[2], no boreholes are present on the Site. The nearest boreholes NN80NW10064/BH1 and NN80NW10064/TP2 are located at approximately 150 m east of the Proposed Development. BGS[2] borehole logs recorded the following geology:

- Topsoil – encountered form surface to 0.60 metres below ground level (m bgl);
- Alluvium of clay, sand and gravel – encountered between 0.40 m bgl-7.95m bgl;

- Glaciolacustrine deposits – encountered between 6.4 m bgl and 21.4 m bgl;
- Bedrock of sandstone – encountered between 7.95 m bgl and 10.00 m bgl; and
- Made Ground was not encountered.

9.4.28 The 2024 Igne Ground Investigation (GI) Factual Report (appended in **Appendix I Geo-Environmental Desk Study**) was carried out in the area of the Site. A summary of the geological strata encountered during the ground investigation is presented below:

- Topsoil encountered in BH01, BH02, WS01-WS07, between 0 m bgl and 0.50 m bgl;
- Natural superficial deposits encountered in all locations (BH01, BH02, WS01-WS07, TP01-TP22) comprised a combination of clay, sand, gravel and silt between 0m bgl-16.50m bgl;
- Bedrock of sandstone and basalt was encountered in two locations (BH01, BH02) between 13.60-17.70 m bgl; and
- Made Ground was not encountered.

9.4.29 According to the Mining Remediation Authority mapping[1], the Site does not lie within a Coal Mining Reporting Area.

9.4.30 According to both BGS mapping[2] and the Groundsure Report, there are no mines or quarries on the Site. The sources of information indicate the nearest quarries as Nether Braco & Silverton Farms, Glassick Sand Pit and Braco approximately 140 m northwest, 240 m southwest and 420 m northeast of the Site, respectively.

9.4.31 A review of the National Soil Map of Scotland[17] indicates 'Alluvial Soils' within the east, north and south of the Site, and in the Study Area (to the southeast and southwest). 'Balwronie (Brown Earths)' is located within the west of the Site, and in the study area (north, east, south and west).

9.4.32 According to the Carbon and Peatland 2016 Map[15], no areas of Class 1 or Class 2 (designated as nationally important) soils are present on the Site (or the Study Area). Soils across the Site and Study Area are classed as Class 0 (mineral soils).

9.4.33 A review of the NatureScot Map[9] indicates that there are no recorded sensitive sites or geological related designated sites within the Site or within the 1km Study Area.

9.4.34 According to the UK Radon website[11], the Site and Study Area are located within an area where the potential for radon is less than 1%. It is therefore anticipated that radon protective measures would not be necessary should the construction of any new occupied buildings within the Site be undertaken (none are proposed currently).

9.4.35 According to the Zetica UXO risk map[10], the Site and Study Area are in a low risk area, which is defined by Zetica as an '*area indicated as having 15 bombs per 1000 acres or less*'. However, a Zetica Pre-Desk Study Assessment (PDSA)[10] has identified WWII military activities on or affecting the Site. Zetica had previously recommended that a detailed desk study was commissioned to confirm these findings. A detailed desk study and risk assessment was completed Spring 2025, with the findings confirming this low risk, with no significant sources of unexploded ordnance (UXO) hazard being identified. The key action from this study was a recommendation that a UXO awareness briefing is provided to staff involved in excavations and peat probing.

Groundwater

Bedrock Hydrogeology

9.4.36 According to the Hydrogeology 625K[24] map on BGS GeoIndex, the Study Area is underlain by the Arbuthnott-Garvock aquifer. This aquifer comprises sandstone with interbedded siltstone, conglomerates and lavas. It has been classified as a moderately productive aquifer (Class 2B) with flow virtually through fractures and other discontinuities. The aquifer productivity typology is classed as moderate to high. This is shown in **Figure 3-1b, Appendix A Figures.**

9.4.37 The Arbuthnott-Garvock aquifer is a part of the wider Older Red Sandstone Aquifer. This aquifer is said to have a moderate to very high productivity. These aquifers are typically well cemented with low intergranular porosity and permeability but highly fractured. **Table 9-5** displays the aquifer properties which further evidence the moderate to very high productivity.

Table 9-5 Aquifer properties of the Old Red Sandstone[25]

Porosity (%)	Transmissivity (m^2/d)	Specific Capacity (m^3/d/m)	Storativity	Operational Yield (m^3/d)
~10	150-200	50-120	~0.0001	800-1000

Superficial Hydrogeology

9.4.38 As described earlier, the drift geology comprises Alluvium (of clay, silt, sand and gravel), Glaciofluvial Sheet Deposits (of gravel, sand and silt), Glaciofluvial Ice Contact Deposits, River Terrace Deposits (of Gravel, Silt, Sand and Clay) and Glacial Till. It is likely that sand and gravel within the deposits will hold small volumes of groundwater especially around surface water features such as Keir Burn. There is no information about groundwater aquifers on the Hydrogeology 625K map[7]. However, there is a groundwater body recorded on the WFD Classification Hub[8], the Strathearn Sand and Gravel water body. Therefore, it is likely that there is shallow groundwater within the superficial deposits underlying the Proposed Development.

Groundwater Levels and Flow

9.4.39 According to the BGS[26] borehole logs, Groundwater was encountered in boreholes NN80NW11 (5 m bgl), NN80NW8 (16.28 m bgl), and NN80NW15 (2.03 m bgl). These were located approximately 0.12 km south, 0.39 km south and 0.80 km east respectively from the Site. The groundwater level was also recorded in NN80NW10064/BH1 (2.40 m bgl), approximately 0.16 km east of the Site. Overall, although these records give a glimpse into groundwater levels in the area, they do not represent groundwater levels at the Site.

9.4.40 A review of the most recent ground investigation (2024 Igne GI Factual Report, appended in **Appendix I Geo-Environmental Desk Study**) has identified that during drilling,

[24] BGS, 2025. *Hydrogeology 625K digital hydrogeology map of the UK* [online]. [Accessed 3 March 2025] Available at: https://www.bgs.ac.uk/datasets/hydrogeology-625k/

[25] BGS, 2015. *Scotland's aquifers and groundwater bodies* [online]. [Accessed 3 March 2025]. Available at: https://nora.nerc.ac.uk/id/eprint/511413/1/OR15028.pdf

[26] BGS, 2025. *GeoIndex (onshore)* [online]. [Accessed 14 April 2025]. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

groundwater ingress was recorded as either moderate inflow, seepage, or rapid ingress in 21 boreholes / trial pits between 1.00m bgl (TP17) and 2.50m bgl (WS01, TP20). Subsequent monitoring encountered groundwater in all eight standpipes monitored. Depth to groundwater varied between 3.30 m bgl in BH01 (onsite at NN 83425 09083) to ground level in WS03 (onsite at NN 82975 09193) as shown in Figure B103 within the Igne-Report (appended in **Appendix I Geo-Environmental Desk Study**).

9.4.41 It is likely that groundwater flow would be directed by the topography and the flow direction of surface water features such as Keir Burn and Allan Water.

WFD Groundwater Bodies

9.4.42 The Site is underlain by a bedrock WFD groundwater body 'Dunblane' (SEPA ID: 150628). As of 2023, it had a classification of 'Good' for water quality, and a classification of 'Poor' for overall condition. It has an area of approximately 181.3 km^2 and is dominated by fracture flow. The Site is also underlain by the superficial WFD groundwater body 'Strathearn Sand and Gravel' (ID: 150811). This is a superficial aquifer which is dominated by intergranular flow. It has an area of 112.6 km^2 and a 'good' overall status (2023). WFD parameters for each of the groundwater bodies are shown in **Table 9-6**.

9.4.43 Both of these WFD bodies have been classified as being situated within a Groundwater Drinking Protection Area.

Table 9-6 WFD Parameters for the Dunblane Groundwater Body and the Strathearn Sand and Gravel Groundwater Body

WFD Parameter	Dunblane (ID: 150628)	Strathearn Sand and Gravel (ID: 150811)
Overall status	Poor	Good
Quantitative status	Poor	Good
Quant – Saline Intrusion	Good	Good
Quant – SW Interaction	Poor	Good
Water balance	Good	Good
Chemical status	Good	Good
Interaction	Good	Good
Specific pollutants	Good	Good
Chromium	Good	Good
Zinc	Good	Good
Manganese	Good	Good
Other Substances	Good	Good
Nitrate	Good	Good
Priority substances	Good	Good
Cadmium	Good	Good
Lead	Good	Good
Drinking Water Protected Area	Good	Good
Priority substances	Good	Good

WFD Parameter	Dunblane (ID: 150628)	Strathearn Sand and Gravel (ID: 150811)
Atrazine	Good	Good
Simazine	Good	Good
Other Substances	Good	Good
Epoxyconazole	Good	Good
Nitrate	Good	Good
General tests	Good	Good
Priority substances	Good	Good
Atrazine	Good	Good
Simazine	Good	Good
Trichloroethene	Good	Good
Benzene	Good	Good
Specific pollutants	Good	Good
Chromium	Good	Good
Other Substances	Good	Good
Electrical Conductivity	Good	Good
Epoxyconazole	Good	Good
Nitrate	Good	Good
Free Product	Good	Good
Vinyl Chloride	Good	Good
Water quality	Good	Good

Abstractions

9.4.44 According to SEPA, there are no Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) authorisations applicable within the 1 km Study Area.

9.4.45 There are no groundwater abstractions listed under CAR licence which have been recorded for the Site. Hence no further considerations are taken in this appraisal.

9.4.46 Private Water Supply (PWS) data was received from PKC on 17 January 2024, however no PWS were identified within the 1 km Study Area. Therefore, PWS have been scoped out and are not assessed or discussed further in this chapter. **Appendix J Private Water Supply Assessment** includes a PWS assessment outlining the PWS identified in the wider area and distance to the Proposed Development.

Groundwater Dependent Terrestrial Ecosystems

9.4.47 It was identified that there are potentially high and moderate Groundwater Dependent Terrestrial Ecosystems (GWDTEs) present which are likely to be fed by the shallow superficial Strathearn Sand and Gravel groundwater body. However, the potentially highly GWDTE was present outside the Site and so would not be impacted. However, the moderately GWDTE (damp grassland) could be impacted by the Proposed Development.

It is possible that this GWDTE is partially fed by groundwater due to the presence of the moderately productive aquifer but will also be associated with surface water features to maintain the wet/damp soils. More details can be found within **Chapter 5 Ecology and Nature Conservation**.

Land Contamination-Historical Land Use

9.4.48 A review of publicly available Ordnance Survey (OS) maps on the National Library of Scotland[16], the Groundsure Report (appended **in Appendix I Geo-Environmental Desk Study**) and Google Earth Pro[14] have been used to assist with a high-level identification of potential land contamination sources.

9.4.49 According to the National Library of Scotland[16], the earliest historical maps reviewed (1840-1915) show the Site as vacant land. A 'weir' is shown within the centre of the Site from 1888. A lodge including a well is shown within the southeast portion of the Site. The 'Grinnan Hill Fort', Glassick village, Silverton village, and Greenhaugh village are shown at approximately 121 m north, 215 m southwest, 230 m northeast and 100 m northeast of the Site, respectively. Keirallan House is shown at approximately 140 m south of the Site.

9.4.50 The Groundsure Report records the weir as 'a sluice' gate from 1863 (map 1:10560) until 1901 (map 1:10560), and the Grinnan Hill Fort as 'Ancient Earthwork from 1954 (map 1:10560). A sand pit is located at approximately 200m from the Site from map 1901 (1:10560).

9.4.51 Maps from 1937-1961 show pylon towers within the east of the Site. This is shown on Groundsure Report 1954 (1:10560). Maps from 1948 to 1973, show the A822 and B8033 roads within the east and south of the Site, respectively. New sewage works with unspecified tanks are located approximately 140 m northeast of the Site. This is also confirmed by the Groundsure Report (1978 map 1:10000).

9.4.52 The Groundsure Report (2010 map 1:10000) shows a new cemetery at approximately 125 m east of the Site. This is also shown on Google Earth Pro pre-2021.

9.4.53 The Study Area is shown mainly as vacant and potential forestry and agricultural land. Additional tracks are shown within 250 m of the Site.

9.4.54 Sources of contamination which may impact the Site area include:

- **Agricultural land** (on-site), with potential for contaminants such as pesticides, herbicides and hydrocarbons;
- **Sewage treatment works and tank** (off-site) with potential for contaminants such as metals, inorganic compounds, total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), micro-organic pathogens, treatment chemicals (including ferric chloride, calcium oxide and aluminium chlorohydrate), asbestos;
- **Made Ground** associated with the construction of access roads and tracks (on-site/off-site), pylon towers (on-site), construction of villages (off-site), sewage works (off-site), weir (on-site) and infilling of sand pit (off-site). These features could have the potential for contaminants such as metals and inorganic compounds, polycyclic aromatic hydrocarbons (PAHs), TPH including benzene, toluene, ethylbenzene, xylene (BTEX) and methyl-tert-butyl-ether (MTBE), semi volatile organic compounds (SVOCs), volatile organic compounds (VOCs), sulphates, sulphides, cyanides, phenols, asbestos / asbestos containing materials (ACM);
- **Cemetery** (off-site) with potential for contaminants such as ammoniacal nitrogen, nitrite, nitrate, sulphate, metals, pathogens, formaldehyde; and

- **Potential ground gas** generation from Made Ground, cemetery and infilled sand pit (off-site).

Land Contamination-Soil Chemistry

9.4.55 The 2024 Igne Ground Investigation Factual Report (appended in **Appendix I Geo-Environmental Desk Study**) included test results from geo-environmental soil samples. Chemical contamination testing was carried out on 36 samples from natural deposits. Chemical results were generally close to or below the method detection limit, except for generally higher total chromium, arsenic, boron, zinc, lead, nickel, copper and sulphate. Whilst a formal quantitative risk assessment of the data provided for review has not been undertaken, a preliminary overview of the concentrations does not appear to indicate contamination impacts for a road end use. Furthermore, no visual or olfactory evidence of contamination was noted during the ground investigation. No asbestos containing material was identified.

Land Contamination - Ground Gas

9.4.56 Three rounds of ground gas monitoring (including groundwater level monitoring) were undertaken within eight locations on the Site. The wells were screened in superficial deposits, to depths between 0.50 m bgl and 10.00 m bgl. The following measurements (peak levels) were recorded:

- Methane (CH_4) at 0% v/v (by volume) in all locations;
- Carbon dioxide (CO_2) between 0 % v/v and 6.20% v/v (WS02);
- Oxygen (O_2) between minimum 12.10% v/v (BH01) and 20.70% v/v (WS06);
- Hydrogen sulphide (H_2S) as 0ppm in all locations;
- Carbon monoxide (CO) between 0 ppm and 5 ppm (BH01);
- Groundwater levels were recorded in all 8 locations between ground level and 3.30m bgl (BH01); and
- Atmospheric pressure ranged between 980 and 1027 mbar.

9.4.57 Methane was not detected during the gas monitoring, but carbon dioxide and depleted oxygen concentrations were recorded. Gas flows were generally low.

9.4.58 The responses zones of between 0.50m bgl (WS01-WS03, WS07) and 10.00m bgl (BH01, BH02) are below the groundwater levels. According to CIRIA C66527, the response zone should be above the groundwater level to allow soil gas ingress into the monitoring well. Hence, based on AECOM's review of the available data, flooding appears to have impacted the dataset outlined above. However, based on the absence of a potential receptor post-development (i.e. the absence of enclosed buildings), this limitation is unlikely to impact the Proposed Development post-completion. In addition, potential risks to construction workers would be managed by typical safe work practices and safe system of work.

Preliminary Conceptual Site Model and Risk Assessment

9.4.59 The risk assessment methodology followed is set out in the Environment Agency's Land Contamination Risk Management (LCRM)[28] guidance. In May 2025, SEPA published an

[27] CIRIA, 2007. *Assessing Risks Posed By Hazardous Ground Gases To Buildings* [online]. [Accessed 14 April 2025]. Available from: https://www.ciria.org/CIRIA/ProductExcerpts/C665.aspx

[28] GOV.UK, 2020. *Land Contamination Risk Management (LCRM)* [online]. [Accessed 14 April 2025]. Available: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

information note, confirming the use of LCRM guidance in Scotland[29]. The Geo-Environmental Desk Study (**Appendix I Geoenvironmental Desk Study**) includes a preliminary Conceptual Site Model (CSM) based on plausible complete contaminant linkages. A qualitative risk assessment has been undertaken for these potential source-pathway-receptor linkages based on current DEFRA guidance (Guidelines for Environmental Risk Assessment and Management)[30] and CIRIA C552[31] guidance. The desk-based preliminary conceptual site model and risk assessment for the Site considered risks based on identified existing sources of contamination on the Site and in the surrounding area. These risks are summarised below including a commentary on how the Proposed Development may directly or indirectly impact on the identified environmental risks.

9.4.60 The main potential on-site sources of contamination associated with the Proposed Development relates to the Site's history as agricultural land and the presence of minor roadways and tracks. Agricultural land is unlikely to represent a significant source of contamination unless, for example, contaminated materials have been buried. Made Ground may be present, associated with roads and tracks on site.

9.4.61 Additional features of interest in the surrounding area include historical pits and sewage works. These features do pose a potential for contamination to the Site. However, as the contamination from these sources is expected to be limited in extent and unlikely to be able to migrate onto site given the distance at which they are from site. These features are therefore considered to represent low risks to the Proposed Development.

9.4.62 The Proposed Development includes a large portion of hardstanding. As such, the hardstanding across the Proposed Development reduces potential impacts to on-site human health receptors by severing pathways. The most sensitive receptors from land contamination are considered as follows:

- The water environment with granular superficial geology potentially enabling migration of contamination (if present). However, where hardstanding is present this would reduce the potential for leaching to groundwater; and
- Construction / Maintenance Workers via inhalation of vapours and / or ground gas in excavations / confined spaces as well as dermal contact with contaminated soil.

9.4.63 No potentially significant sources of ground gas have been identified onsite or within the immediate surrounding area. Whilst there are a number of infilled pits, given the age of filling and / or distance, the potential for gas migration towards the Site and resulting in an impact is considered unlikely.

9.4.64 In general, the majority of potential risks were assessed as low, very low or moderate / low with the exception of the following:

- A moderate risk was identified to surface water features (Bullie Burn/ Keir Burn) from potential on-site contamination associated with potential Made Ground via discharge of contaminants entrained in surface water run-off followed by overland flow and discharge. However, this is an existing source, and not a source introduced by the Proposed Development. The haul track would intercept rainwater

[29] LCRM guidance has been formally adopted in Scotland. SEPA, 2025. *Information note on the use of Land Contamination Risk Management (LCRM) guidance in Scotland*. [online]. [Accessed 11 June 2025]. Available at: lcrm-information-note-guidance-scotland.docx.

[30] Cranfield University and DEFRA, 2011. *Guidelines for Environmental Risk Assessment and Management - Green Leaves III* [online]. [Accessed 14 April 2025]. Available: https://assets.publishing.service.gov.uk/media/5a79d20540f0b66d161ae5f9/pb13670-green-leaves-iii-1111071.pdf

[31] CIRIA, 2001. *Contaminated land risk assessment, guide to good practice* [online]. [Accessed 14 April 2025]. Available from: https://www.ciria.org/CIRIA/ProductExcerpts/C552.aspx

and discharge to drainage systems embedded as part of the design, reducing runoff to land and leaching of potential Made Ground.

9.4.65 As the Proposed Development is a haul track, this is unlikely to mobilise contaminants (if any) and its end use is considered of low sensitivity. The construction of the road may also reduce risks to controlled waters and human health of site end users by reducing leaching through any potential Made Ground and severing pathways to end users via inhalation, ingestion or dermal contact.

9.4.66 Construction workers could be exposed to sub-surface contaminants or ground gas during construction works including during excavations and the Geo-Environmental Desk Study (**Appendix I Geo-environmental Desk Study**) identified moderate / low risks. However, significant contamination has not been identified and the risks would be mitigated by suitable and sufficient risk assessment and adoption of appropriate control measures including adequate welfare facilities and PPE, avoidance of confined space entry and appropriate controls to monitor any gas / vapours in any confined spaces.

9.4.67 Based on the available information found in **Appendix I Geo-Environmental Desk Study** information, the Proposed Development is classified overall as having Low risk with respect to contaminated land.

Summary of Sensitivities

9.4.68 **Table 9-7** summarises the sensitivities assigned to the various resources/receptors as discussed in this chapter.

Table 9-7 Sensitivity of Resources / Receptors

Parameter	Sensitivity	Justification
Allan Water (WF1)	High	Allan Water has a Good overall classification and according to the NRFA the water feature has an estimated flow of Q95 m^3/s <1.0 m^3/s. It is also likely the water features hosts salmon and trout.
Keir Burn (WF2) (within the Bullie Burn WFD classification)	High	Part of Bullie Burn WFD body which has a 'good' status and is reported to contain salmon and sea trout.
Unnamed Tributary of Feddal Burn (WF3)	Medium	Series of tributaries/ditches which flow into Feddal Burn, approximately 1.28 km downstream from the Site.
Feddal Burn (WF7)	Medium	Non WFD status water feature which flows in the WFD waterbody Allan Water.
Dunblane Groundwater WFD Body (Including the Arbuthnott-Garvnock Aquifer)	High	Moderately productive aquifer which is within a groundwater drinking water protection zone. Possibly could be supplying nearby PWS.
Strathearn Sand and Gravel (including any superficial aquifers)	High	Has a 'Good' WFD classification and is within a groundwater drinking water protection zone. Possibly could be supplying nearby PWS.
Geology/Sensitive Sites	Not applicable	No geological conservation review sites (GCR) identified.
Soil	Low	Low as peat soils across the Site are classed as Class 0, hence not of nationally important resource (**Section 9.4.31**)

Parameter	Sensitivity	Justification
Receptors of Land Contamination: Human Health, Water Environment and the Built Environment	Low to Medium	Limited potential sources of contamination, with Made Ground on-site and off-site associated with historical development; Sewage treatment works and tank (off-site); Cemetery (off-site) and ground gas from infilling of pit (**Section 9.4.53**). Furthermore, as the Proposed Development is a road, this is unlikely to mobilise contaminants (if any) and its end use is considered of low sensitivity. Overall Low risk posed by the Proposed Development.

9.5 Embedded Mitigation

Good Practice Measures

9.5.1 The adoption of the CEMP produced pre commencement of works and applicable GEMPs would reduce the probability of a pollution incident occurring and reduce the magnitude of any incident that may occur through a combination of good site environmental management procedures, including minimising storage of topsoil strip volumes, soil management, staff training, availability of contingency equipment and emergency plans.

9.5.2 SSEN Transmission's GEMPs (**Appendix O GEMPs and SPPs**) applicable to this chapter are:

- Watercourse Crossings GEMP;
- Working In or Near Water GEMP;
- Private Water Supplies GEMP;
- Soil Management GEMP;
- Contaminated Land GEMP;
- Working with Concrete GEMP;
- Oil Storage and Refuelling GEMP;
- Waste Management GEMP;
- Working in Sensitive Habitats GEMP;
- Dust Management GEMP;
- Restoration GEMP;
- Forestry GEMP; and
- Bad Weather GEMP.

Design of Watercourse Crossings

9.5.3 SEPA have prepared guidance on good practice for river crossings[32] which describes the impact on rivers from different types. The recommended single span structures which retain the natural channel bed have less impact than closed culverts. Therefore, it is proposed that a clear span bridge would be constructed to reduce impact to the watercourse.

9.5.4 All new crossings must be sized appropriately to allow bank and riparian habitat to remain under the new crossing to facilitate crossings for mammals. Where this cannot be

[32] SEPA, 2010. *Engineering in the water environment: good practice guide, River Crossings* [online]. [Accessed 14 April 2025]. Available from: https://www.sepa.org.uk/media/151036/wat-sg-25.pdf

achieved or may be routinely impassable, a mammal ledge or alternative tunnel near the watercourse crossing should be incorporated into the crossing design.

9.5.5 A temporary bridge spanning Keir Burn is proposed which would be 4.1 m in height and 48 m in length (ground elevation in this area around 109 m AOD). The bridge would be clear span with permanent bridge abutments to support the bridge either side of the burn. The abutments would be concrete. This would require the creation of crane pad areas formed from type 1 stone and geogrid construction material. However, at the end of the proposed Cambushinnie 400 kV substation construction period, the crane pads and bridge deck would be removed and stored locally for future use. The abutments would remain in place permanently. There would be no in-channel work or piling associated with installation of the bridge abutments.

9.5.6 Temporary culverts located adjacent to the eastern temporary construction compound, to the north and south of the haul track, and adjacent to the access control compound which would run alongside the haul track and would be in place during construction.

9.5.7 For all other permanent crossings along the haul track it is proposed that bottomless arched culverts or single spanning bridges would be used for new crossings, to minimise the impact of the haul track.

9.5.8 Where there are any requirements to replace or install culverts at any encountered crossings these would need to be designed to current standards and would be designed to accommodate the 1 in 200-year flow plus an allowance for climate change.

Drainage Design

9.5.9 Surface water from the haul track would be managed and treated by a new surface water drainage system. These would comprise of filter drains along the haul track which would discharge to swales at the end of the embankments. The proposed swales would also act as pre-earthworks drainage and would discharge to WF2 and WF3. The discharge rates have been restricted to the greenfield runoff rate in line with PKC requirements.

9.6 Appraisal

9.6.1 This appraisal assumes that good practice measures (including GEMPs (**Appendix O GEMPs and SPPS**)) and a Surface Water Management Plan would be adopted to manage potential effects, notably sedimentation of watercourses, surface water and groundwater contamination, and hydromorphological impacts. The Surface Water Management Plan would outline the management of surface water flooding and drainage, and abide with any authorisation requirements for CAR controlled activities, as well as any conditions or requirements of other permits / licences / authorisations required for other permitted activities. The CEMP would identify and set out measures to prevent pollution and manage drainage.

Construction Phase

9.6.2 During the construction phases of the Proposed Development, there is the potential for the following short-term impacts on the hydrology, hydrogeology, geology and soil environment. Throughout this appraisal, a ‘worst-case’ scenario is assumed for all construction effects.

<u>Pollution of Surface Watercourses, Groundwater, and Soils</u>

9.6.3 During the construction phase a number of potential pollutants would be introduced during the site works (from construction, equipment and materials) including oils, hydrocarbons, inorganics, sulphates, sulphides, cement, concrete, waste and

wastewater. The potential sources of pollution and pathways to receptors listed in **Table 9-7** are described below.

Disturbance of Made Ground and Soils

Sources of Pollution

9.6.4 The 2024 Igne Ground Investigation Factual Report (appended in **Appendix I Geo-Environmental Desk Study**) undertaken at the Site did not record the presence of Made Ground. Similarly, previous BGS logs[4] did not record the presence of Made Ground either (**Section 9.4.26**). However, there is the potential for Made Ground associated with the access roads and tracks (on-site/off-site), pylon towers (on-site), construction of villages (off-site), sewage works (off-site), weir (on-site) and infilling of sand pit (off-site). Potential contaminants include metals and inorganic compounds, pH, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) including benzene, toluene, ethylbenzene, xylene (BTEX) and methyl-tert-butyl-ether (MTBE), semi volatile organic compounds (SVOCs), volatile organic compounds (VOCs), sulphates, sulphides and phenols. It should be noted that based on the baseline evidence gathered to date, the likelihood of contamination being encountered is low, and if present, it is likely to represent relatively localised and low-level contamination.

9.6.5 Disturbance of soil, peat and Made Ground for the construction of the Proposed Development has the potential to release potential contamination, and impact surrounding soil and groundwater, however this is considered unlikely. For the majority of the Proposed Development the reduced level dig to enable the Proposed Development construction would be a relatively shallow topsoil strip. Deeper excavations may be required locally to construct the bridge abutments which would be undertaken in accordance with relevant GEMPs (**Appendix O GEMPs and SPPs)** to minimise impact.

9.6.6 The Proposed Development would not be located within an area underlain by peat. The nearest recorded peat deposits are located approximately 830 m from the Site. It is not envisaged that any peat would be removed from the Site as part of the construction works.

Potential Pathways for Pollution

9.6.7 The most direct pathway for contaminants to reach surface waterbodies is via surface water run-off followed by overland flow and discharge, and lateral migration of contaminants via shallow deposits and/or groundwater.

9.6.8 The most direct pathway for contaminants to reach groundwater within the superficial deposits is by leaching and migration of contaminants via shallow Made Ground (if present) and natural permeable superficial deposits.

9.6.9 The most direct pathway for contaminants to reach groundwater within the underlying bedrock is by leaching and migration of contaminants via shallow Made Ground (if present) and natural permeable superficial deposits into the bedrock aquifer.

9.6.10 Excavation below the water table (if required) may introduce a more direct pathway for potential contaminants (if present) to leach into groundwater. This could have a minor impact on groundwater quality. During the 2024 GI (appended in **Appendix I Geo-Environmental Desk Study**), Groundwater was encountered between 1.00m bgl and 2.50m bgl (during drilling), and between 0.00m bgl and 3.30m bgl (during gas monitoring), hence, excavations would likely reach groundwater, and dewatering may be required temporarily during construction (**Section 9.6.35**).

9.6.11 The most direct pathway for contaminants (if present) to reach construction / maintenance workers would be via inhalation of vapours and / or ground gas in excavations / confined spaces.

9.6.12 Superficial geology underlying the eastern portion of the Site comprises Alluvium (**Section 9.4.22**). The 2024 ground investigation encountered the presence of clay, gravel and sand within Alluvium. Cohesive clay present within BH01, BH02, WS03, WS05, WS06, TP20 would reduce contaminant mobility. However, sand and gravel present within all 31 investigated locations may introduce preferential pathways for contaminant migration (if present). Similarly, fractures identified within BH01, BH02 may allow preferential pathways for contaminant migration (if present).

Mitigations

9.6.13 Where encountered, Made Ground would be sampled and tested and a risk assessment undertaken to determine whether it is potentially contaminative and implement appropriate management practices in accordance with GEMP – Unexpected Contaminated Land and GEMP -Waste Management (**Appendix O GEMPs and SPPs**) (if asbestos is encountered) to mitigate potential risks, as necessary.

9.6.14 Assuming that GEMP – Oil Storage and Refuelling (**Appendix O GEMPs and SPPs**) would be implemented, impacts on groundwater, soil and geology from routine construction activities are not considered likely to be significant.

9.6.15 Management of soil on-site would be undertaken in accordance with Soil Removal, Storage and Reinstatement GEMP and Waste Management GEMP (**Appendix O GEMPs and SPPs**), which should minimise potential impacts to soil.

9.6.16 If peat is encountered during construction, to prevent potential peat disturbance, Management of Peat would be undertaken in accordance with Working in Sensitive Habitats GEMP (**Appendix O GEMPs and SPPs**).

Oils and Hydrocarbons

Sources of Pollution

9.6.17 Sources of oils and hydrocarbons relevant to the Proposed Development includes the plant and equipment used, and sewage works and tanks (off-site). These pollutants can affect the water quality of the nearby surface waters and groundwaters and can also infiltrate and contaminate soils and bedrock.

Potential Pathways for Pollution

9.6.18 Potential for hydrocarbons contaminants through small leaks and / or spillages.

9.6.19 The most direct pathway for contaminants to reach surface waterbodies is via surface water run-off followed by overland flow and discharge, and lateral migration of contaminants via shallow deposits and/or groundwater.

9.6.20 Both the Dunblane and Strathearn Sand and Gravel WFD groundwater bodies are classed as moderately productive aquifers. It is possible that any accidental spills of oils and hydrocarbons would infiltrate the aquifer via fracture and intergranular flow.

Mitigations

9.6.21 Assuming that GEMP Oil Storage and Refuelling (**Appendix O GEMPs and SPPs**) would be implemented, impacts on water quality from proposed routine construction activities are not considered likely to be significant. Additionally, GEMP Unexpected Contaminated

Land and GEMP Waste Management (**Appendix O GEMPs and SPPs**) are implemented to mitigate potential risks from oils and hydrocarbons.

Concrete and Cement

Sources of Pollution

9.6.22 Concrete and cement products are highly alkaline and their release into the water environment could have an adverse effect on water quality and ecology. There is also the potential for localised pollution of groundwater during the proposed construction of foundations (reinforced in-situ concrete). Mobilisation of concrete and cement products may occur during on-site concrete mixing and washing down of areas where mixing has taken place.

Potential Pathways for Pollution

9.6.23 The major pathways for cement contaminated water to reach soil and groundwater is via direct contact with construction materials (suspended in surface water runoff into drains and watercourses, especially during periods of high runoff rainfall events), aggressive ground conditions (pH and sulphate) and accidental wash downs.

Mitigations

9.6.24 It is proposed that cement would be brought to site ready-mixed and poured in-situ. Other elements would be pre-cast. These measures significantly reduce the potential impact from cement contamination to negligible. Should it be necessary to mix concrete on-site, the measures within GEMP Working with Concrete (**Appendix O GEMPs and SPPs**) would be adhered to.

Sediment Laden-Runoff

Source of Pollution

9.6.25 There is the potential for adverse effects on the water environment from site run-off contaminated by excessive fine sediments (including the potential wash-out of fine sediment from embankments, vehicle cleaning point and access tracks), which may reduce water quality, smother habitats, and physically impact aquatic organisms; chemical spillages; and physical changes to the form and function of water features as a consequence of:

- Vegetation clearance, topsoil/subsoil stripping and stockpiling;
- General construction activities including runoff and activities at temporary construction compounds, the movement of plant and other vehicles, and their maintenance and washing out of vehicles;
- Excavation, crushing and transportation by overland conveyors of excavated materials to temporary stockpile locations;
- Construction of haul track; and
- Construction of temporary bridge deck.

Potential Pathways for Pollution

9.6.26 Due to the proximity of Keir Burn and WF3 to the works there is the potential of a minor adverse impact as a result of sediment-runoff and chemical spillages which could indirectly and directly wash from the works.

9.6.27 Allan Water and Feddal Burn are approximately 1 km downstream from the Site and have the potential to receive indirect contaminants washed from Keir Burn and WF3.

9.6.28 Temporary topsoil storage areas would be located adjacent to the two southern areas identified for bridge fabrication near Keir Burn, and a third area for topsoil storage would be located to the west of the access control compound. Both topsoil storage areas identified for bridge fabrication are approximately 36 m and 20 m from Keir Burn respectively. The third temporary topsoil storage area however would be located 10 m from WF3. Without suitable mitigation, sediment laden run-off could occur.

Mitigations

9.6.29 The impact from sediment-runoff and chemical spillages to Keir Burn and WF3 during wash works would likely be temporary, and with the mitigation measures outlined in the GEMPs (**Appendix O GEMPs and SPPs**) a minor impact is predicted. Additionally, including Keir Burn and WF3 within a water quality monitoring programme would ensure any contaminants are identified and mitigated as soon as possible after the unlikely event of a pollution event.

9.6.30 The distance between Allan Water and Feddal Burn would allow for more dispersion and dissolution of contaminants reducing the overall impact. Additionally, using mitigation measures outlined in the GEMPs (**Appendix O GEMPs and SPPs**) is likely to result in a negligible impact to Allan Water and Feddal Burn.

9.6.31 Where the two topsoil storage areas associated with the bridge fabrication would be located there is a flood embankment along the Keir Burn. This would help impede any sediment-laden runoff from entering the water feature. Using additional mitigation measures outlined in the GEMPs (**Appendix O GEMPs and SPPs**), the impact to Keir Burn is likely to be minor and temporary.

9.6.32 There would also be a topsoil storage area located 10 m from WF3. This is in line with GEMP Soil Management (**Appendix O GEMPs and SPPs**), which suggests that soil storage areas should not be located within 10 m of a watercourse. In addition to this 10 m buffer, silt fences would be put in place to stop sediment from entering the water feature. Water quality monitoring is also recommended to be carried out downstream of the proposed topsoil storage area to ensure mitigation measures are effective during construction.

Site Water Resources and Foul Drainage

9.6.33 Any site welfare facilities would be appropriately managed, and all foul waste is to be tankered and disposed of by an appropriate contractor to a suitably licensed facility. Bottled water would be provided for the temporary compound, and water provided by a mains system is proposed for the control compound.

Changes to Groundwater Flow and Direction

9.6.34 There would only be the shallow excavation of solid material for the Proposed Development. Groundwater within the Dunblane and Strathearn Sand and Gravel WFD groundwater bodies in the Study Area is anticipated to be shallow and may be at similar elevations to Keir Burn around its banks and flood plain. Boreholes indicate groundwater levels between 1.90m bgl (NN80NW10064/TP2) and 16 mbgl (NN80NW8). The deepest excavation is at approximately NN 82874 09171 and will reach 2.84 mbgl.

9.6.35 Therefore, there is a risk that excavations would encounter the water table. This means dewatering would potentially be required temporarily during construction. If so, all

activities should follow the advice laid out by SEPA including The Water Environment (Controlled Activities) (Scotland) Regulations 2011. A Practical Guide v9.4[33]. All abstractions would require some level of authorisation whether it is carried out on a permanent or temporary basis. It is likely that if any dewatering is required it would be small and only temporary and thus low risk to the water environment. Therefore, it is considered there would be a negligible impact to the Dunblane and Strathearn Sand and Gravel WFD groundwater bodies.

Changes to Hydromorphology

9.6.36 The proposed haul track would cross WF3 at four different locations (NN 82606 09223, NN 82769 09179, NN 82964 09184 and NN 83138 09171). The new and upgraded proposed watercourse crossings built during the proposed construction phase have the potential to result in the loss of a short reach of the channel and prevent movement of coarse sediment, which could lead to excess accumulation upstream and starvation of supply downstream that could trigger localised erosion. New crossings are proposed on WF3 using piped crossings with headwalls for the construction phase. Many of these tributaries have small catchments above the proposed crossing locations and therefore it is not anticipated that there would be excess sediment accumulation or downstream erosion. Watercourses tend to be poorly defined, with a general lack of coarse bed material or bedrock. This means that there would be limited coarse, transportable material that can be eroded into the channel. Therefore, these proposed watercourse crossings would be unlikely to significantly impact sediment transport processes if sized appropriately.

9.6.37 A new temporary bridge crossing is proposed on Keir Burn. It is assumed that this bridge would completely span the watercourse with the abutments entirely out of the channel, although some loss of riparian habitat is unavoidable. This means that this new watercourse crossing would not have a direct physical impact on the channel and is unlikely to significantly impact sediment transport processes if designed appropriately. Therefore, negligible impacts are predicted.

9.6.38 There is no anticipated impact on the existing embankment shown in **Plate 9-5**.

Operational Phase

9.6.39 There are no further anticipated impacts during the operational phase from the Proposed Development on geology and soils, or to groundwater level or flow.

Impacts on Surface Watercourses and Groundwater Quality

9.6.40 During operation of the Proposed Development there is a low risk that small quantities of sediment-laden runoff, oil or fuel may be spilled from vehicles. Run-off could directly impact Keir Burn and WF3 and indirectly lead to contamination of Allan Water and Feddal Burn.

9.6.41 As described within **Section 9.5** surface water from the Proposed Development would runoff into filter drains along the haul track which would discharge to swales at the toe of the haul track embankments. The swale would treat any contaminants within the runoff before being discharged into WF3 and Bullie Burn. The discharge rates would be restricted to greenfield runoff rate in line with PKC requirements. Therefore, there would

[33] SEPA, 2024. *The Water Environment (Controlled Activities) (Scotland) Regulation. A Practical Guide v9.4* [online] [Accessed June 2025]. Available at: car-a-practical-guide.docx

be negligible impacts to the surface water and groundwater receptors as a result of the operation of the Proposed Development.

Changes to Hydromorphology

9.6.42 It is assumed that all crossings apart from the bridge on Keir Burn (WF2) would be retained as permanent routes, therefore the permanent impact on the hydromorphology of the crossed watercourses has already been assessed. The crossing at WF2 would be removed following construction of the proposed Cambushinnie 400 kV substation, but prior to operation, once all other components of the Proposed Development would be complete. Therefore, there would be no impact to WF2 from watercourse crossing during operation.

9.7 Cumulative Effects

9.7.1 A cumulative appraisal was conducted taking into account the 'scoped in' planning applications as detailed in **Section 13.1.2** and **Table 13-1**, these are listed below;

- 21/00756/FLM: 49.9 MW BESS facility; and
- 22/02231/FLM: 49.9 MW BESS facility compound.

9.7.2 The two BESS developments (50.0 MW and 49.9 MW) would be located approximately 2.8 km and 2.9 km north of the Proposed Development. The construction and decommissioning impacts of the battery storage facilities are at a significant distance from the Proposed Development. It is unlikely they would cause any cumulative effects to human health, water environment, built environment, geology and soils receptors associated with the Proposed Development.

9.7.3 It is not considered that the combined effects of construction and operation would be greater than the predicted effects for each project in isolation.

9.8 Recommendations and Mitigation

9.8.1 A summary of the mitigation measures would be provided to the Principal Contractor, who would ensure such measures are implemented. The implementation of the mitigation measures would be managed by a suitably qualified and experienced Environmental Clerk of Works (ECoW).

9.8.2 Protection measures for watercourses, soils, geology and groundwater would be set out in the CEMP, which would be prepared in consultation with PKC and SEPA and submitted prior to the commencement of construction activities. These measures would be in accordance with SSEN Transmission's Watercourse Crossings GEMP; Working In or Near Water GEMP; Private Water Supplies GEMP; Soil Management GEMP; Contaminated Land GEMP; Working with Concrete GEMP; Oil Storage and Refuelling GEMP; Waste Management GEMP; Working in Sensitive Habitats GEMP; Dust Management GEMP; Restoration GEMP; Forestry GEMP; and Bad Weather GEMP(**Appendix O GEMPs and SPPs**). All of which would be incorporated into a Water Protection Plan (WPP) and Contamination Strategy, which are explained further in **Table 9-8**.

9.8.3 Water Quality monitoring would be required upstream and downstream of the works on the Keir Burn and WF3. This would be started 6 to 12 months before construction and continue during and for 6 to 12 months after construction is completed. After pre-construction monitoring has taken place trigger levels for water quality would be set and

agreed with SEPA. The post-construction dialogue with SEPA may also provide the opportunity to shorten the monitoring, if the data is not showing anything unusual.

9.8.4 The Principal Contractor would be required to be aware of nearby sources of contamination and would follow the WPP, Contamination Strategy and CEMP. If contamination is identified at any point during construction work, then contact would be made with a suitably competent environmental consultant for further risk assessment to be undertaken.

9.8.5 Any compound areas used during the works would be kept to a high level of housekeeping and would be operated in line with the CEMP produced prior to pre commencement of works.

9.8.6 The appraisal has identified the requirement for additional mitigation measures, as listed in **Table 9-8** below.

Table 9-8 Recommended Additional Mitigation Measures

Reference	Title	Description
HG1	SEPA Regulation	A Construction Site SEPA CAR licence would be required based on the Site area[34].
HG2	Watercourse Quality Monitoring	Water quality to be monitored monthly pre-construction, during construction and post-construction on Keir Burn and WF3. Specifically upstream and downstream of construction works (see **Section 9.8.3**). Trigger levels for quality to be set after pre-construction monitoring and agreed with SEPA.
HG3	Zetica UXO	The key recommendation from the detailed desk study and risk assessment was that a UXO awareness briefing is provided to staff involved in excavations and peat probing.
HG4	WPP	The WPP will incorporate potential contamination sources to watercourses, protection measures and mitigations for watercourses (including CEMPs). The Principal Contractor would follow the WPP.
HG5	Contamination Strategy	Principal Contractor would be aware of nearby sources of contamination and would follow the Contamination Strategy. This will assess potential sources of contamination, risks associated with these, and mitigation strategies (including CEMPs). If contamination is identified at any point during construction work, then contact would be made with a competent environmental consultant for further risk assessment to be undertaken.

[34] SEPA, 2024. *Water run-off from construction sites* [online]. [Accessed 14 April 2025]. Available from: https://www.sepa.org.uk/regulations/water/pollution-control/water-run-off-from-construction-sites/

10. TRAFFIC AND TRANSPORT

10.1 Introduction

10.1.1 This chapter considers the potential for traffic and movement environmental effects resulting from the Proposed Development. It considers traffic and transport effects in accordance with Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement[1].

10.1.2 The traffic and movement assessment only considers the construction phase of the Proposed Development. The operational phase of the Proposed Development would provide construction traffic access for the proposed Cambushinnie 400 kV substation and Cambushinnie OHL and UGC. As such, the operational effects of the Proposed Development are considered in the respective substation, OHL and UGC EAs. The decommissioning phase of the Proposed Development has also been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity as outlined in **Section 1.1.7**.

10.2 Information Sources

10.2.1 The report draws on the following technical figures and appendices (see **Appendix A Figures**):

- **Figure 10-1 Traffic Survey Locations**;
- **Figure 10-2 Roads for Environmental Assessment**;
- **Figure 10-3 Construction Traffic Forecast;**
- **Figure 10-4 Haul Track Construction Traffic Access Points**; and
- **Appendix K Transport Statement.**

10.2.2 A traffic baseline is derived from 2024 survey data. Traffic surveys were conducted on public roads serving the Site during April 2024 during normal road conditions out-with school holidays. Eleven traffic surveys (eight automatic traffic counters and three junction counts) were undertaken to provide robust data from which a baseline position was established. The location of the traffic surveys is shown in **Figure 10-1, Appendix A Figures**.

10.2.3 Department for Transport (DfT) recorded injury accident data was obtained from Crashmap[2].

10.2.4 Forecast construction traffic data for the Proposed Development was obtained from data provided by SSEN Transmission. The Proposed Development construction programme is 48 weeks.

10.3 Assessment Methodology

10.3.1 The assessment methodology follows the IEMA Guidelines 2023. Rule 1 and Rule 2 from the IEMA Guidelines[1] are used to identify roads to be included in the environmental assessment:

- Rule 1. Include highway links where traffic flows would increase by more than 30% (or the number of heavy goods vehicles would increase by more than 30%); and

[1] IEMA, 2023. *IEMA Guidelines: Environmental Assessment of Traffic and Movement* [online]. [Accessed 01 March 2025]. Available from: https://www.iema.net/resources/reading-room/2023/07/12/new-iema-guidance-environmental-assessment-of-traffic-and-movement

[2] Crashmap, 2024. *Crashmap* [online]. [Accessed 01 March 2025]. Available from: https://www.crashmap.co.uk/

- Rule 2. Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

10.3.2 The IEMA Guidelines[1] 30% threshold is based on research and experience of the environmental effects of traffic, with less than a 30% increase in traffic generally resulting in imperceptible changes in environmental effects apart from within specifically sensitive areas. The IEMA Guidelines[1] consider that forecast changes in traffic of less than 10% in specifically sensitive areas creates no discernible environmental effect, hence the second threshold set out in Rule 2.

10.3.3 For magnitude of change, the IEMA Guidelines[1] describe those changes in traffic of 30%, 60% and 90% should be considered as 'slight', 'moderate' and 'substantial' respectively[1].

10.3.4 **Table 10-1** reflects the IEMA Guidelines[1] to quantify the magnitude of change for Proposed Development traffic.

Table 10-1 Magnitude of Change

Magnitude of Change	Change in Traffic – Annual Average Weekday Traffic (AAWT)	Description
High	90%+	Alteration to baseline conditions such that post development character or composition of baseline condition fundamentally changed.
Medium	60% - 90%	Alteration to baseline conditions such that post development character or composition of baseline condition materially changed.
Low	30% - 60%	Minor shift from baseline conditions such that post development character or composition of baseline condition remains similar to baseline and not materially changed.
Negligible	0% - 30%	Very little change from baseline conditions. Change is barely distinguishable approximating to no-change situation.

10.3.5 Receptors are locations or land uses categorised by sensitivity or environmental value. **Table 10-2** describes the receptor sensitivity adopted for the assessment of Proposed Development traffic.

Table 10-2 Sensitivity of Receptors

Receptor Sensitivity	Description
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of international importance.

Receptor Sensitivity	Description
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

10.3.6 For the purposes of assessment, receptors are identified as follows in accordance with IEMA Guidelines[1].

- People at home;
- People at work;
- Sensitive and / or vulnerable groups (including young age; older age; income; health status; social disadvantage; and access and geographic factors);
- Locations with concentrations of vulnerable users (e.g. hospitals, places of worship, schools);
- Retail areas;
- Recreational areas;
- Tourist attractions;
- Collision clusters and routes with road safety concerns; and
- Junctions and highway links at (or over capacity).

10.3.7 **Table 10-3** summarises the sensitivity of study area roads as environmental receptors. The assessment of sensitivity of receptors is considered in more detail in **Appendix K Transport Statement**.

Table 10-3 Study Area Roads Sensitivity of Receptors

Road	Description	Sensitivity
A822 North of Braco	Single carriageway with 30mph speed limit within Braco, national speed limit of 60mph beyond Braco. Some frontage within Braco. Footways within Braco, signed walking routes and Roman Fort nearby.	Medium
A822 Braco	Single carriageway with 30mph speed limit. Significant frontage including residences and shops. Footways on both sides of carriageway.	High
B8033 Braco	Single carriageway with 30mph speed limit. Speed limit is reduced to 20mph in vicinity of Braco Primary School when lights are flashing. Significant frontage including residences and primary school. Footways on both sides of carriageway.	High
A822 Haul Track	Single carriageway with national speed limit of 60mph. No direct frontage. Footway on east side of carriageway.	Low
A9 Slip Roads (A822)	Single carriageway with a speed limit of 40mph within Greenloaning. Limited direct frontage but some	Low

Road	Description	Sensitivity
	residential access taken from route. Footways along route through Greenloaning.	
Millhill Road	Single carriageway with speed limit of 40mph. No direct frontage. Footways on north side of carriageway.	Medium
B8033 Bridge of Keir	Single carriageway with a national speed limit of 60mph. No direct frontage, largely rural in character. No footways.	Medium
B8033 Glassick	Single carriageway with a national speed limit of 60mph. No direct frontage, largely rural in character. No footways.	Low
A9 South (DfT Counter 724)	Dual carriageway trunk road with speed limit of 70mph.	Negligible
A9 North (DfT Counter 20730)	Dual carriageway trunk road with speed limit of 70mph.	Negligible

10.3.8 For traffic generated by the Proposed Development the significance of environmental effect is derived from a combination of the Magnitude of Change and the Sensitivity of Receptor. **Table 10-4** summarises the approach to deriving the significance of effects. (Note: Table shading indicates likely significant effect subject to assessor's professional judgment).

Table 10-4 Significance of Effects

Magnitude of Change	Sensitivity of Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

10.3.9 The reporting of significance of environmental effects will also include.

- Temporary – where the effect occurs for a limited period of time and the change at a defined receptor can be reversed;
- Permanent – where the effect represents a long-lasting change at a defined receptor which is not reversable;
- Short Term / Medium Term / Long Term;
- Direct – where the effect is a direct result (or primary effect) of the Proposed Development;
- Indirect – a secondary effect which occurs within or between environmental components. This may include effects on the environment which are not a direct

result of the Proposed Development, often occurring away from the Proposed Development as a result of a complex interactions with other environmental factors;

- Secondary – an induced effect arising from the actions or presence of a project, such as changes to the pattern of future land use or improvements to local road networks;
- Beneficial – an effect beneficial to one or more environmental receptors; and
- Adverse – a detrimental, or negative, effect on one or more environmental receptors.

10.3.10 The potential environmental effects of traffic, transport and access considered in this assessment of the Proposed Development are:

- Severance of communities – the perceived division that can occur when it becomes separated by a major traffic route (existing or proposed);
- Fear and Intimidation on and by road users – the effect on the perceived vulnerability of pedestrian traffic relating to changes in traffic flows and or speed;
- Road user and pedestrian safety – the potential for effects on rate and severity of accidents relating to changes in traffic flows;
- Non-motorised Amenity – broadly defined as the relative pleasantness of a pedestrian or cycle journey. The potential for effects relates to changes in traffic flows;
- Non-motorised User Delay – the effect on travel time. The potential for effects relates to changes in traffic flow;
- Road vehicle driver and passenger delay - the effect on travel time. The potential for effects relates to changes in traffic flow, noting that road and junction vehicle capacity assessments are not part of this assessment; and
- Hazardous / Large Loads.

10.3.11 Of the categories included in IEMA Guidelines[1], it is proposed only Hazardous Loads / Large Loads are scoped out. No hazardous loads (Class 1-9), other than fuel for construction plant, is forecast to be transported to the Site. Bridge fabrication areas will be provided on site, so bridge construction will not generate large loads to the Site.

10.4 Traffic and Movement Baseline

10.4.1 Vehicle access to the Proposed Development would be via the existing public road network. Study area roads would include the A9, B8033 and A822 and local roads in the immediate environs of the Proposed Development.

10.4.2 The A9 forms part of the trunk road network in Scotland, connecting Stirling, Perth and Inverness. In the vicinity of Greenloaning, the A9 is a national speed limit dual carriageway. Northbound traffic exits the A9 at Greenloaning via a slip road which connects to the A822. Southbound traffic exits the A9 at Greenloaning via a right turn filter lane which connects to Millhill Road.

10.4.3 The A822 routes through Braco north-south between the A9 and Crieff. It is a single carriageway road which is predominantly rural in nature. National speed limits apply to the A822 outside of the urban environs on its route, and a 30mph speed limit applies within Braco and a 40mph limit applies within Greenloaning. The A822 would be the route used by construction traffic between the A9 trunk road and the rural roads in the vicinity of the Site access.

10.4.4 The B8033 routes north to south between Braco village and Dunblane. National speed limits apply to the route outside of urban environments on the route, which is largely rural in nature. The B8033 would be used by construction traffic between Braco village and the Site.

10.4.5 Current traffic conditions on study area roads were established by surveys undertaken in April 2024. The location, type and results of the traffic surveys are provided in **Appendix K Transport Statement**. In summary, the following traffic surveys were undertaken:

- A822 – Four Automatic Traffic Counter surveys and 1 junction turning count survey;
- Feddal Road / B8033 – Three Automatic Traffic Counter surveys; and
- Millhill Road – One Automatic Traffic Counter survey and two junction turning count surveys.

10.4.6 The 2024 traffic survey data provides information on current vehicle flows as well as speeds and this is used to inform the baseline traffic position for the environmental assessment of traffic and movement. The 2024 traffic data has been factored to match the forecast construction year of 2026. This provides a robust assessment in terms of applying IEMA Guidelines Rule 1 and Rule 2[1] to determine which roads should be included in the environmental assessment.

10.4.7 **Table 10-5** shows the 2024 baseline traffic data collected for study area roads.

Table 10-5 2024 Traffic Survey Data

Road	Daily Weekday Traffic (Two-Way)		
	Car & Light Goods Vehicle (LGV)	HGV	Total
A822 North of Braco	3,846	98	3,944
A822 Braco	4,111	118	4,229
B8033 Braco	779	17	796
A822 Haul Track	4,303	77	4,380
A9 Slip Roads (A822)	4,192	85	4,277
Millhill Road	522	12	534
B8033 Bridge of Keir	387	15	402
B8033 Glassick	257	9	266
A9 South (DfT Counter 724)	27,235	2,877	30,112
A9 North (DfT Counter 20730)	23,029	3,362	26,391

10.4.8 Department for Transport (DfT) accident data has been sourced (via Crashmap[2]) for the 5-year period 2018-2022. On study area roads this data shows 0 fatal, 0 serious, and one slight injury accidents were reported. The accident occurred in 2021 at the A822 / Millhill Road junction and involved two vehicles, resulting in one casualty. This data is proposed

to be taken as the baseline position on injury accidents for the environmental assessment of traffic and movement.

10.4.9 Vehicle traffic generated by the construction of the Proposed Development may potentially affect other public road traffic as follows: non-motorised traffic including pedestrians, cyclists and core path users and other vehicular traffic including freight, public transport and emergency service vehicles.

10.5 Proposed Development Traffic

10.5.1 Forecast construction traffic for the Proposed Development was obtained from information provided by SSEN Transmission. The full construction traffic programme is included within **Appendix K Transport Statemen**t. The peak month of construction of the haul track is forecast to take place in July 2026.

10.5.2 It is forecast that the proposed haul track would generate 72 HGV daily movements during July 2026 and 64 daily LGV movements. The proposed construction programme will require some of this construction traffic to route through Braco village.

10.5.3 Construction traffic would route to and from the Site from the A9 via the A822 and B8033. The construction programme includes four access points for Proposed Development construction traffic. The first access point would be from the A822, opposite Braco New Cemetery. The remaining three access points would require construction traffic to route through Braco on the A822 before joining the B8033. The second and third access points are on the B8033, in the environs of Loaning View. The fourth access point would be on the existing access track, approximately 60 m north of Gamekeepers Cottage.

10.5.4 **Figure 10-4, Appendix A Figures** shows the assignment (routing) of Proposed Development construction traffic between the A9 and site access points.

10.6 Traffic and Movement Appraisal

10.6.1 The Traffic and Movement Appraisal considers the construction of the Proposed Development only. It does not consider traffic using the haul track once completed to access the associated developments of the proposed Cambushinnie 400 kV substation, OHL tie-ins and UGC which are considered in their respective separate EAs. For a robust assessment it is assumed all construction materials would be transported to the Site by road. For assessment purposes, no materials, such as aggregate from borrow pits or concrete, are assumed to originate from within the Site. This assumption presents a worst-case scenario for the assessment of environmental effects.

10.6.2 **Table 10-6** compares forecast Proposed Development construction traffic against baseline traffic to determine which roads must be included in the environmental assessment in accordance with IEMA Guidelines Rule 1 and Rule 2[1]. Roads to be included in the environmental assessment are marked Yes or No and are illustrated in **Figure 10-2, Appendix A Figures**.

Table 10-6 IEMA Guidelines Roads to be Included in Environmental Assessment

Road	Baseline		Proposed Development		% Increase		Environmental Assessment
	HGV	All Vehs	HGV	All Vehs	HGV	All Vehs	
A822 North of Braco	100	4,043	0	0	0%	0%	No
A822 Braco	121	4,335	72	120	60%	3%	Yes
B8033 Braco	17	816	72	120	413%	15%	Yes
A822 Haul Track	79	4,490	72	136	91%	3%	Yes
A9 Slip Roads (A822)	87	4,384	72	136	83%	3%	Yes
Millhill Road	12	547	72	136	585%	25%	Yes
B8033 Bridge of Keir	15	412	72	120	468%	29%	Yes
B8033 Glassick	9	273	24	42	260%	15%	Yes
A9 South (DfT Counter 724)	2,949	30,865	72	136	2%	0%	No
A9 North (DfT Counter 20730)	3,446	27,051	72	136	2%	1%	No

10.6.3 **Table 10-6** shows that seven roads require environmental assessment. These roads encompass the A822 and B8033 between the A9 and the site access points.

10.6.4 It should be noted that IEMA Guidelines[1] states caution needs to be observed when dealing with very low baseline flows as roads are unlikely to experience impacts / environmental effects even with high percentage changes in traffic. On many of the minor and unclassified study area roads there are very low baseline flows, and weight should be given to the IEMA caution that environmental effects may not materialise in practice despite the high percentage increases in HGV traffic forecast.

Severance of Communities

10.6.5 **Table 10-7** presents the significance of effect on the severance of communities as a result of Proposed Development construction traffic. The significance of effects for severance of communities are based on an assessment of all traffic in accordance with the IEMA Guidelines[1] 2023.

Table 10-7 Severance of Communities Significance of Effect

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	15%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	25%	Negligible	Medium	Negligible
B8033 Bridge of Keir	29%	Negligible	Medium	Negligible
B8033 Glassick	15%	Negligible	Low	Negligible

10.6.6 Classifying the significance of effects: prior to mitigation, the likely effect of construction traffic on severance of communities is a direct, temporary, **Minor (Not Significant)** effect.

10.6.7 For severance of communities the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor according to IEMA Guidelines. Nevertheless, there will be a material increase in HGV traffic on these roads through Braco. During the busiest period of construction activity, 72 additional HGV movements per day will be present on these roads. This traffic programmed across a 12-hour working day will be result in six HGV movements per hour on average. This corresponds to a ten-minute headway between HGV construction traffic movements on these roads. The remaining roads assessed are forecast to experience a negligible significance of effect.

Fear and Intimidation on and by Road Users

10.6.8 **Table 10-8** presents the significance of effect on Fear and Intimidation on and by Road Users as a result of Proposed Development construction traffic. Using IEMA Guidelines methodology for fear and intimidation magnitude of change, there is no step change in traffic flows from baseline conditions. The significance of effects for fear and intimidation

on and by road users are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1]. The full results of the assessment are included in **Appendix K Transport Assessment**.

Table 10-8 Fear and Intimidation on and by Road Users Significance of Effect

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	Negligible	High	Minor
B8033 Braco	Negligible	High	Minor
A822 Haul Track	Negligible	Low	Negligible
A9 Slip Roads (A822)	Negligible	Low	Negligible
Millhill Road	Negligible	Medium	Negligible
B8033 Bridge of Keir	Negligible	Medium	Negligible
B8033 Glassick	Negligible	Low	Negligible

10.6.9 Classifying the significance of effects: prior to mitigation, the likely effect of construction traffic for Fear and Intimidation on and by Road Users is a direct, temporary, **Minor (Not Significant)** effect.

10.6.10 For fear and intimidation on and by road users the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Road User and Pedestrian Safety

10.6.11 **Table 10-9** presents the significance of effect on Road User and Pedestrian Safety as a result of Proposed Development construction traffic. A forecast increase in accidents resulting from the presence of construction traffic on study area roads is used to establish a magnitude of change. **Appendix K Transport Statement** contains the construction traffic accident forecast. The significance of effects for road user and pedestrian safety are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-9 Road User and Pedestrian Safety Significance of Effect

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	Negligible	High	Minor
B8033 Braco	Negligible	High	Minor
A822 Haul Track	Negligible	Low	Negligible
A9 Slip Roads (A822)	Negligible	Low	Negligible
Millhill Road	Negligible	Medium	Negligible

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
B8033 Bridge of Keir	Negligible	Medium	Negligible
B8033 Glassick	Negligible	Low	Negligible

10.6.12 Classifying the significance of effects: prior to mitigation, the likely effect of construction traffic on Road User and Pedestrian Safety is a direct, temporary, **Minor (Not Significant)** effect.

10.6.13 For road user and pedestrian safety the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Non-Motorised User Amenity and Non-Motorised User Delay

10.6.14 **Table 10-10** presents the significance of effect on non-motorised user amenity and delay as a result of Proposed Development construction traffic. The magnitude of change for these environmental effects is based on the same 30%, 60% and 90% changes in traffic flow used for severance of communities. The significance of effects for non-motorised user amenity and non-motorised user delay are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-10 Non-Motorised User Amenity and Delay

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	15%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	25%	Negligible	Medium	Negligible
B8033 Bridge of Keir	29%	Negligible	Medium	Negligible
B8033 Glassick	15%	Negligible	Low	Negligible

10.6.15 Classifying the significance of effects: prior to mitigation, the likely effect of construction traffic is a direct, temporary, **Minor (Not Significant)** effect.

10.6.16 For non-motorised user amenity and delay, the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Road Vehicle and Passenger Delay.

10.6.17 **Table 10-11** presents the significance of effect on road vehicle and passenger delay as a result of Proposed Development construction traffic. The magnitude of change for these

environmental effects is based on the same 30%, 60% and 90% changes in traffic flow used for severance of communities. The significance of effects for severance are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-11 Road User and Passenger Delay

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	15%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	25%	Negligible	Medium	Negligible
B8033 Bridge of Keir	29%	Negligible	Medium	Negligible
B8033 Glassick	15%	Negligible	Low	Negligible
A822 Braco	3%	Negligible	High	Minor

10.6.18 Classifying the significance of effects: prior to mitigation, the likely effect of construction traffic is a direct, temporary, **Minor (Not Significant)** effect.

10.6.19 For road vehicle and passenger delay the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect

10.7 Mitigation

10.7.1 Potential mitigation options on the B8033 within Braco village, as this is considered to have the highest sensitivity of receptors of roads expected to carry construction traffic, that could be considered and would be subject to agreement with PKC include:

- Lollipop person located at the Village Hall crossing during school hours. The presence of a lollipop person could serve to reduce any magnitude of change on road user and pedestrian safety by ensuring children crossing the road are supervised by a trained adult wearing appropriate high visibility clothing while construction traffic is using the route.
- Installation of guardrail on B8033 footways in the vicinity of the Primary School and Village Hall. This could reduce magnitude of change of road safety by ensuring pedestrians are guided to appropriate locations to cross the B8033. It will discourage crossing at informal locations where drivers of construction vehicles may not be expecting them. Guardrails would also be beneficial in terms of reducing adverse effects of fear and intimidation.
- Options for management of pedestrian crossing traffic on B8033. This could consider the operation of the current zebra crossing, and whether any appropriate upgrades could be implemented for the benefit of pedestrians. These could encompass enhancements to the existing zebra crossing such as re-marking the carriageway, introducing a table-top for the crossing, or a contribution to providing

a signal-controlled upgrade to the crossing. These would provide benefits for severance and fear and intimidation.

- Installation of temporary traffic management on the Bridge of Keir. The Bridge of Keir is a narrow road bridge on the west side of Braco which is on the route for construction traffic. Two vehicles are unable to safely pass one another on the bridge and therefore the introduction of temporary traffic management could control traffic flows on it. This would reduce the magnitude of change of Driver Delay and Road User and Pedestrian Safety on the route by ensuring two vehicles do not meet on the narrow bridge.
- Review and maintenance of the passing places on the B8033. This would mitigate any potential effects of HGV construction traffic on the B8033, these will be maintained to ensure they are in good condition for construction traffic and general traffic. This will serve to reduce magnitude of change on road user amenity and driver delay.

10.7.2 A Construction Traffic Management Plan (CTMP) would be prepared and would operate throughout the construction programme. **Appendix K Transport Statement** contains a Framework CTMP. A detailed CTMP including the following is expected to be required by way of a planning condition and provided once a Principal Contractor is appointed:

- The Site entry / exit arrangements from public roads;
- Traffic routeing plans – defining the routes to be taken by HGVs to the Site avoiding sensitive locations, and routes to be taken by Car / LGV construction personnel traffic;
- Construction traffic hours and delivery times;
- Strategy for traffic management and measures for informing construction traffic of local access routes, road restrictions (statutory limits: width, height, axle loading and gross weight), timing restrictions (if applicable) and where access is prohibited;
- Measures to protect the public highway (e.g. wheel wash facilities);
- Measures for the monitoring of the CTMP to ensure compliance from construction drivers and appropriate actions in the event of non-compliance; and
- Mechanism for responding to traffic management issues arising during the works (including concerns raised from the public) including a joint consultation approach with relevant road authorities.

10.8 Summary

10.8.1 Construction traffic forecasts for the Proposed Development presented in this chapter provide a robust basis for the assessment of environmental effects. The route of construction traffic includes the A9, A822 and B8033.

10.8.2 Prior to mitigation temporary **Minor (Not Significant)** environmental effects are forecast for severance, fear and intimidation, pedestrian safety, non-motorised user amenity, non-motorised user delay and road vehicle and passenger delay. Mitigation in the form of a CTMP would be delivered most likely by way of planning condition, and subsequently approved by relevant planning, roads and emergency authorities.

10.8.3 Post-mitigation residual environmental effects associated with Proposed Development construction traffic are forecast to be direct, temporary **Negligible (Not Significant)**. **Table 10-12** provides a summary of the potential effects identified in this chapter.

Table 10-12 Summary of Environmental Effects

Effect	Receptor	Significance of Effect (Prior to Mitigation)	Mitigation	Residual Effect
Severance	Pedestrian Traffic	Minor	CTMP	Negligible
Fear and Intimidation	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Road User and Pedestrian Safety	All Traffic	Minor	CTMP	Negligible
Non-Motorised User Amenity	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Non-Motorised User Delay	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Road Vehicle & Passenger Delay	Vehicle Traffic	Minor	CTMP	Negligible

10.9 Cumulative Assessment

10.9.1 A cumulative appraisal was conducted taking into account the 'scoped in' planning applications as detailed in **Section 13.1.2** and **Table 13-1**, these are listed below;

- 21/00756/FLM: 49.9 MW BESS; and
- 22/02231/FLM: 49.9 MW BESS facility compound.

10.9.2 Both developments are BESS which from published information are forecast to generate four daily Car / LGV movements and four daily HGV movements each. For the purpose of this assessment, it has been assumed that construction traffic for these developments would route between the A9 and their sites via the A822 and B8033 through Braco village.

10.9.3 It should be noted that the proposed Cambushinnie 400 kV substation and OHL are not considered in this cumulative assessment as their construction will not begin until construction of the Proposed Development is completed. The respective construction phases of the haul track and proposed Cambushinnie 400 kV substation / OHL will not overlap.

10.9.4 **Table 10-13** shows that seven roads require environmental assessment. These are the A822 Braco, A822 Haul Track, A9 Slip Roads (A822), B8033 Braco, Millhill Road, B8033 Bridge of Keir and B8033 Glassick.

Table 10-13 IEMA Guidelines Roads to be Included in Environmental Assessment

Road	Baseline		Cumulative Development		% Increase		Environmental Assessment
	HGV	All Vehs	HGV	All Vehs	HGV	All Vehs	
A822 North of Braco	100	4,043	0	0	0%	0%	No
A822 Braco	121	4,335	80	136	66%	3%	Yes
B8033 Braco	17	816	80	136	459%	17%	Yes
A822 Haul Track	79	4,490	80	152	101%	3%	Yes
A9 Slip Roads (A822)	87	4,384	80	152	92%	3%	Yes
Millhill Road	12	547	80	152	650%	28%	Yes
B8033 Bridge of Keir	15	412	80	136	520%	33%	Yes
B8033 Glassick	9	273	32	58	347%	21%	Yes
A9 South (DfT Counter 724)	2,949	30,865	80	152	3%	0%	No
A9 North (DfT Counter 20730)	3,446	27,051	80	152	2%	1%	No

Severance of Communities

10.9.5 **Table 10-14** presents the significance of effect on the severance of communities as a result of Cumulative Development construction traffic. The significance of effects for severance of communities are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-14 Severance of Communities Significance of Effect

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	17%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	28%	Negligible	Medium	Negligible
B8033 Bridge of Keir	33%	Low	Medium	Negligible
B8033 Glassick	21%	Negligible	Low	Negligible

10.9.6 Classifying the significance of effects: prior to mitigation, the likely effect of Cumulative Development traffic on severance of communities is a direct, temporary, **Minor (Not Significant)** effect.

10.9.7 For severance of communities the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Fear and Intimidation on and by Road Users

10.9.8 **Table 10-15** presents the significance of effect on Fear and Intimidation on and by Road Users as a result of Cumulative Development construction traffic. Using IEMA Guidelines methodology for fear and intimidation magnitude of change, there is no step change in traffic flows from baseline conditions. The significance of effects for fear and intimidation are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1]. The full results of the assessment are included in **Appendix K Transport Assessment**.

Table 10-15 Fear and Intimidation on and by Road Users Significance of Effect

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	Negligible	High	Minor
B8033 Braco	Negligible	High	Minor
A822 Haul Track	Negligible	Low	Negligible
A9 Slip Roads (A822)	Negligible	Low	Negligible
Millhill Road	Negligible	Medium	Negligible

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
B8033 Bridge of Keir	Negligible	Medium	Negligible
B8033 Glassick	Negligible	Low	Negligible

10.9.9 Classifying the significance of effects: prior to mitigation, the likely effect of Cumulative Development traffic for Fear and Intimidation on and by Road Users is a direct, temporary, **Minor (Not Significant)** effect.

10.9.10 For fear and intimidation on and by road users the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Road User and Pedestrian Safety

10.9.11 **Table 10-16** presents the significance of effect on Road User and Pedestrian Safety as a result of Cumulative Development construction traffic. A forecast increase in accidents resulting from the presence of construction traffic on study area roads is used to establish a magnitude of change. **Appendix K Transport Assessment** contains the construction traffic accident forecast. The significance of effects for road user and pedestrian safety are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-16 Road User and Pedestrian Safety Significance of Effect

Road	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	Negligible	High	Minor
B8033 Braco	Negligible	High	Minor
A822 Haul Track	Negligible	Low	Negligible
A9 Slip Roads (A822)	Negligible	Low	Negligible
Millhill Road	Negligible	Medium	Negligible
B8033 Bridge of Keir	Negligible	Medium	Negligible
B8033 Glassick	Negligible	Low	Negligible

10.9.12 Classifying the significance of effects: prior to mitigation, the likely effect of Cumulative Development traffic on Road User and Pedestrian Safety is a direct, temporary, **Minor (Not Significant)** effect.

10.9.13 For road user and pedestrian safety the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Non-Motorised User Amenity and Non-Motorised User Delay

10.9.14 **Table 10-17** presents the significance of effect on non-motorised user amenity and delay as a result of Cumulative Development construction traffic. The magnitude of change for these environmental effects is based on the same 30%, 60% and 90% changes in traffic

flow used for severance of communities. The significance of effects for non-motorised user amenity and non-motorised user delay are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023.

Table 10-17 Non-Motorised User Amenity and Delay

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	17%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	28%	Negligible	Medium	Negligible
B8033 Bridge of Keir	33%	Low	Medium	Negligible
B8033 Glassick	21%	Negligible	Low	Negligible

10.9.15 Classifying the significance of effects: prior to mitigation, the likely effect of Cumulative Development traffic is a direct, temporary, **Minor (Not Significant)** effect.

10.9.16 For non-motorised user amenity and delay, the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

Road Vehicle and Passenger Delay

10.9.17 **Table 10-18** presents the significance of effect on road vehicle and passenger delay as a result of Cumulative Development construction traffic. The magnitude of change for these environmental effects is based on the same 30%, 60% and 90% changes in traffic flow used for severance of communities. The significance of effects for road vehicle and passenger delay are based on an assessment of all traffic in accordance with the IEMA Guidelines 2023[1].

Table 10-18 Road User and Passenger Delay

Road	% Increase in Total Traffic	Magnitude of Change	Sensitivity of Receptor	Significance of Effect
A822 Braco	3%	Negligible	High	Minor
B8033 Braco	17%	Negligible	High	Minor
A822 Haul Track	3%	Negligible	Low	Negligible
A9 Slip Roads (A822)	3%	Negligible	Low	Negligible
Millhill Road	28%	Negligible	Medium	Negligible
B8033 Bridge of Keir	33%	Low	Medium	Negligible
B8033 Glassick	21%	Negligible	Low	Negligible

10.9.18 Classifying the significance of effects: prior to mitigation, the likely effect of Cumulative Development traffic is a direct, temporary, **Negligible (Not Significant)** effect.

10.9.19 For road vehicle and passenger delay the significance of effects for the A822 Braco and B8033 Braco are forecast to be minor. The remaining roads assessed are forecast to experience a negligible significance of effect.

10.10 Summary of Cumulative Development Effects

10.10.1 Construction traffic forecasts for cumulative development presented in this chapter provide a robust basis for the assessment of environmental effects. For the purpose of this assessment, it has been assumed that construction traffic for these developments would follow the same routing for Car / LGV and HGV traffic as the Proposed Development.

10.10.2 Prior to mitigation, temporary **Minor (Not Significant)** environmental effects are forecast for severance, non-motorised user amenity, non-motorised user delay and road vehicle and passenger delay. Mitigation in the form of a Construction Traffic Management Plan (CTMP) could be conditioned as part of a planning permission (see **Section 10.6**), and subsequently approved by relevant planning, roads, and emergency authorities.

10.10.3 Post-mitigation residual environmental effects associated with cumulative development construction traffic are forecast to be direct, temporary **Negligible (Not Significant)**. **19** provides a summary of the potential effects identified in this chapter.

Table 10-19 Summary of Environmental Effects (Cumulative Development)

Effect	Receptor	Significance of Effect (Prior to Mitigation)	Mitigation	Residual Effect
Severance	Pedestrian Traffic	Minor	CTMP	Negligible
Fear and Intimidation	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Road User and Pedestrian Safety	All Traffic	Minor	CTMP	Negligible
Non-Motorised User Amenity	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Non-Motorised User Delay	Pedestrian & Cycle Traffic	Minor	CTMP	Negligible
Road Vehicle & Passenger Delay	Vehicle Traffic	Minor	CTMP	Negligible

11. NOISE AND VIBRATION

11.1 Introduction

11.1.1 This chapter considers the potential noise impacts that could arise as a result of the construction and operation of the Proposed Development at the nearest noise sensitive receptors (NSRs).

11.1.2 This chapter describes:

- The assessment methodology;
- The baseline conditions at the nearest NSR to the Proposed Development;
- Any embedded mitigation adopted for the purposes of the assessment;
- A summary of the likely environmental risks taking into account national legislation;
- The further mitigation measures required to prevent, reduce or offset any environmental risks; and
- The likely residual effects after these measures have been employed.

11.1.3 This chapter is accompanied by the following figures and appendices:

- **Appendix A Figures**:
  - **Figure 11-1 Baseline Measurement Position and Noise Sensitive Receptors**;
  - **Figure 11-2 Proposed Construction Phase Temporary Barriers**; and
  - **Figure 11-3, Construction of Traffic Noise Assessment Routes.**
- **Appendix L Glossary of Acoustic Terms**;
- **Appendix M Baseline Noise Survey Details**; and
- **Appendix N Indicative Plant for use during the Construction Phase**.

11.1.4 An assessment of the potential noise impacts that could arise as a result of the construction and operation of the proposed Cambushinnie 400 kV substation is considered in Chapter 12 of the Cambushinnie 400 kV Substation Environmental Appraisal (April 2025). The decommissioning phase of the Proposed Development has been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity as outlined in **Section 1.1.7** of this EA.

11.2 Information Sources

11.2.1 The assessment has been informed by the following guidelines / policies:

- Planning Advice Note (PAN) 1/2011 - Planning and Noise[1];
- Technical Advice Note (TAN): Assessment of noise 2011[2];
- BS 5228-1: 2009+A1: 2014[3];
- BS 5228-2: 2009+A1: 2014[4];

[1] Scottish Government, 2011. *Planning Advice Note 1/2011: planning and noise, 3 Mar 2011* [online] [Accessed 19 June 2025]. Available from: https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/documents/

[2] Scottish Government, 2011. *Technical Advice Note: Assessment of noise* [online]. [Accessed 19 June 2025]. Available from: https://www.gov.scot/publications/technical-advice-note-assessment-noise/pages/1/

[3] BSI Standards Publication, BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, December 2008.

[4] British Standards Institute, 2014. *BS 5228: Code of Practice for noise and vibration control on construction and open sites. Part 2: Vibration*. London. BSI

- BS 7445 part 1:2003, part 2:1991, part 3:1991[5];
- DMRB LA 111 Noise and vibration Revision 2[6];
- Calculation of Road Traffic Noise (CRTN)[7];
- BS 8233:2014[8]; and
- World Health Organisation (WHO) Guidelines for Community Noise[9].

11.2.2 The noise assessment has been based on the following information sources:

- Ordnance Survey (OS) aerial mapping, 2 m LIDAR topography of the assessment study area (as set out in **Section 11.3** of this chapter);
- A detailed baseline noise survey undertaken to determine the prevailing ambient and background noise levels at locations considered representative of the nearest NSRs to the Proposed Development (as set out in **Section 11.4** of this chapter);
- Details of the construction activities and associated plant as set out in **Section 11.3** of this chapter. The measured sound pressure level data for the construction plant has been based on the database of information for similar plant contained in BS 5228-1 and plant manufacturer data; and
- Baseline and construction traffic data movements on the surrounding local highways provided by the Transport Consultant for the Project.

11.3 Methodology

11.3.1 The Proposed Development requires construction of a new haul track between the A822 and the B8033 to connect with existing tracks currently used for access to the existing Braco West Substation, which are also to be upgraded. The assessment has followed the principles in PAN 1/2011. This document provides advice on the role of the planning system in helping to prevent and limit adverse effects related to noise. The PAN contains details of the legislation, technical standards and codes of practice for specific noise issues.

11.3.2 The potential noise impacts that have been scoped-in the assessment are detailed below:

- Construction noise arising from the Proposed Development have been assessed at selected NSRs within a study area of approximately 300 m from the haul track. This falls within the distance for which the BS 5228-1 prediction methodology is valid and is considered sufficient to ensure that all potentially significant noise effects will be identified.
- Construction vibration arising from the Proposed Development has been assessed at selected NSRs within a study area of approximately 100 m from the haul track. This falls within the distance for which the BS 5228 prediction methodology is valid. Furthermore, DMRB LA111 states; "*A study area of 100m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors*."

[5] British Standards Institute Multi-part document *BS 7445: Description and measurement of environmental noise*. London. BSI.
[6] Design manual for roads and bridges, LA111 Noise and vibration Revision 2, May 2020
[7] Calculation of Road Traffic Noise, 1988
[8] British Standards Institute, 2014. *BS 8233: Guidance on sound insulation and noise reduction for buildings* London. BSI
[9] World Health Organisation (WHO), 1999. Guidelines for Community Noise.

- Changes in road traffic noise due to development generated traffic has been assessed for construction traffic routes in the vicinity of the Proposed Development.

Consultation

11.3.3 On 19 April 2024, consultation was undertaken with the Environmental Health Department of PKC regarding the proposed scope of the baseline noise survey and assessment methodology. On 25 April 2025, the Environmental Health Department of PKC confirmed agreement to the proposed assessment methodology.

11.3.4 The consultation confirmed that a construction noise assessment for the Proposed Development would be carried out in accordance with the guidance set out in BS 5228. For thoroughness, a construction vibration assessment for receptors within 100 m of any potential vibratory works has been included.

Construction noise

11.3.5 An assessment has been undertaken to determine the likely noise impacts arising from the construction phase of the Proposed Development upon residential NSRs near the construction phase activities. This assessment follows guidance in BS 5228-1 described below. Distance to receptors and construction plant scenarios have been considered to carry out noise level predictions.

11.3.6 BS 5228-1 provides guidance on appropriate methods for minimising noise from construction activities. Techniques for predicting the likely noise effects from construction works are given; these are based on detailed information on the type and number of plant items being used, their location and the length of time they are in operation. Noise prediction methods are used to establish likely noise levels in terms of the $L_{Aeq,T}$ over the core working day. A database of information is also provided, including measured sound pressure level data for a variety of different construction plant undertaking various common activities, which can be used to estimate levels of noise generated by typical construction works.

11.3.7 The assessment criteria for construction noise have been determined based on the ABC method outlined in Table E1 included in Annex E of BS 5228-1. The ABC method provides threshold noise levels which indicate a potential adverse effect from site specific construction noise on residential properties. The threshold values are derived based on the existing ambient noise levels at the receptor, L_{Aeq} (dB), during the periods when construction is expected to occur (day, evening, night), and are shown in **Table 11-1**.

Table 11-1 BS 5228-1 ABC method threshold of potential significant effects at dwellings

Period	Threshold value in dB $L_{Aeq,T}$		
	Category A[A]	Category B[B]	Category C[C]
Night-time (23:00-07:00)	45	50	55
Evening and weekends [D]	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75

[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

[B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

[C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

[D] 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

11.3.8 A series of construction noise level predictions have been undertaken in accordance with BS 5228-1, with the results compared against criteria also derived from BS 5228-1. These predictions have been undertaken to establish the potential noise levels applicable to the proposed construction stage activities at the NSRs.

11.3.9 Following the BS 5228-1 ABC Method (set out in **Table 11-1**) and given the baseline noise environmental at the nearest NSRs (see Section 11.3.74), it is considered appropriate that the predicted construction noise levels are assessed against the Category A noise threshold criteria, i.e. 65dB $L_{Aeq,T}$ (façade level) during the weekday daytime period.

Proposed Construction Works

11.3.10 Details related to the typical construction activities works associated with the proposed construction phase are provided in **Chapter 2 Description of Proposed Development**. The key noise-generating activities are presented below:

- Mobilisation;
- Haul track construction including the temporary bridge over the Keir Burn;
- Haul track kerbing with the junction to the A822;
- Haul track surfacing; and
- Use of the haul track during the construction of the proposed Cambushinnie 400 kV substation.

11.3.11 The proposed construction activities would in general be undertaken during daytime periods. Working hours proposed are 07:00 to 19:00 Monday to Friday, 08:00 to 13:00 Saturday and no working on Sunday or bank holidays unless in exceptional circumstances and under agreement with PKC. Working hours would be agreed with PKC.

Proposed Plant, Noise Levels and Programme

11.3.12 To predict the sound levels from the construction works, an acoustic model of the Site and Proposed Development was created in DataKusttik GmbH CadnaA 2024 MR1 (64-bit). The following assumptions have been made with respect to the construction noise predictions:

- Construction noise modelled using BS5228-1 module within CadnaA (in terms of the $L_{Aeq,12hr}$ metric at the nearest sensitive receptors);
- The alignment of the Proposed Development has been based on the civil 3D model dated 20 November 2024;
- A detailed breakdown comprising the specific plant items for each of the key activities is included in Appendix N Indicative Plant Used for Construction. Construction noise source data from BS 5228-1 database has been used unless otherwise stated;
- The sound power levels for each item of plant have been adjusted based on the assumed percentage on-time. Where plant is not operational 100% of the time, the reduced sound power level has been calculated;
- Noise from each key construction activities have been modelled as an area source with all activities combined logarithmically, at likely closest location to noise sensitive receptors, with a height of 1 m above ground;
- For the mobilisation and haul track construction activities, there would be works on both sections of the haul track situated to the east and west of the B8033 simultaneously. For each section, the works would begin in the eastern and western areas of the haul track and progress to meet in the centre of the section of haul track. There would be up to four areas of works operating simultaneously;
- For the haul track construction activities, it is assumed that the works immediately to the west of the B8033 would not commence until works to the east of the B8033 are approximately 35 m from the B8033, i.e. the works to the east and west of the B8033 would never be within 35m of each other;
- For haul track surfacing activities, it is assumed that works would not be simultaneously undertaken on both sides of the B8033;
- 2 m and 3 m high barriers have been included in the model for the key construction activities of mobilisation, haul track construction, kerbing and surfacing. The location of the temporary barriers are shown in **Figure 11-2, Appendix A Figures**;
- The haul track has been modelled as a line source with a with a height of 1 m above ground;
- 76 Heavy Goods Vehicle (HGV) movements on the haul track have been assumed over a 12 hour working day travelling at an average speed of 24 km/h, i.e. 6 HGV movements per hour;
- 118 Light Goods Vehicle (LGV) movements on the haul track have been assumed over a 12-hour working day travelling at an average speed of 24km/hr, i.e. 10 LGV movements per hour. It is assumed that the LGV movements would not result in an increase in the noise levels generated by HGV movements on the haul track and therefore have not been included in the model;
- It is understood that the Proposed Development would be used over an approximate 4 year period;

- Globally, ground absorption was set to G = 1 (100% acoustically absorptive ground) to reflect the predominance of agricultural land surrounding the Proposed Development;
- Existing buildings were incorporated based on Ordnance Survey (OS) mapping and aerial photography;
- Building facades are set to be acoustically reflective and the model includes first order reflections from solid structures; and
- Noise levels calculated for NSRs at ground floor (1.5 m).

Construction vibration

11.3.13 Vibration from construction activities may impact on adjacent buildings. The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and receptor and the activities being undertaken. BS 5228-2 provides data on measured levels of vibration for various construction works. Impacts are considered for both damage to buildings and annoyance to occupiers.

11.3.14 Likely levels of vibration at given distances can be predicted using empirical methods and existing vibration data. Due to the distances involved between the Site and NSR locations, vibration from construction activities is unlikely to be subjectively noticeable and would not approach the threshold limits where structural damage to buildings may occur.

11.3.15 **Table 11-2** details Peak Particle Velocity (PPV) vibration levels and provides a semantic scale for the description of construction vibration effects on human receptors, based on guidance contained in BS 5228-2.

Table 11-2 Construction vibration criteria for human receptors (annoyance)

Peak Particle Velocity Level, millimetres per second (mm/s)	Description
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.
1.0	It is likely that vibration of this level in residential environments would cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
0.3	Vibration might be just perceptible in residential environments.
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.

11.3.16 In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels within buildings are controlled to those relating to annoyance (i.e. 1.0 mm/s), then it is highly unlikely that buildings would be damaged by construction vibration.

11.3.17 BS 7385 establishes the basic principles for carrying out vibration measurements and processing the data with regard to evaluating vibration impacts on buildings. **Table 11-3**

provides recommended PPV vibration limits for transient excitation for different types of buildings (as set out in BS 7385: Part 2, 1993). The PPV values in **Table 11-3** are given in two ranges as very low frequency vibration (between 4 Hz to 15 Hz) is potentially more damaging to light framed building structures, and therefore has a lower threshold.

Table 11-3 Peak Particle Velocity (PPV) Limits for Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings (1)	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Un-reinforced or light framed structures. Residential or light commercial type buildings (2)	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
(1) Values referred to are at the base of the buildings (2) At frequencies below 4 Hz a maximum displacement of 0.6 mm (zero to peak should not be exceeded)		

11.3.18 Construction vibration arising from the Proposed Development works has been assessed at selected vibration sensitive receptors within a study area of approximately 100 m of the Site.

Construction traffic noise

11.3.19 The Proposed Development has the potential to impact road traffic noise levels along construction traffic routes. To inform the assessment of development generated traffic, a series of Basic Noise Level (BNL) calculations have been carried out drawing on the traffic data provided by the appointed Traffic Consultant. The methodology adopted for the prediction of road traffic noise generally follows that set out in CRTN. Calculations have been undertaken for 'with' and 'without' the Proposed Development scenarios, to allow determination of the noise level change associated with the addition traffic movements during the construct phase.

11.3.20 The significance of the identified noise level changes has then been determined and assessed in general accordance with the criteria from TAN to PAN1/2011. The criteria are presented in **Table 11-4**.

Table 11-4 Criteria for the assessment of Construction Traffic Noise at NSRs

Impact Magnitude	Increase in BNL of closest public road used for construction traffic (dB)
Major	≥ 5.0
Moderate	3.0 - 4.9
Minor	1.0 - 2.9

Negligible	< 1.0

11.3.21 The significance of effect depends upon a number of factors, including the magnitude of change, the sensitivity of the receptor, the absolute noise level and the acoustic context.

11.4 Baseline Environment

11.4.1 The NSRs to the Proposed Development include isolated dwellings to the south of the Site and residential properties of the village of Braco to the north of the Site. The details of the nearest NSRs relevant to this assessment are summarised in **Table 11-5.**

Table 11-5 Nearby sensitive receptors

NSR	ID	X	Y	Approximate nearest distance to haul track (m)
Loaning View	NSR1	283244	709077	35
Gamekeepers Cottage	NSR2	282492	709164	50
1, 3, 5, 7 and 16 Commanders Grove, Braco	NSR3	283493	709232	170
Keirallan House, Keirallan	NSR4	283427	708862	215

Baseline Noise Survey

11.4.2 A noise survey to define the acoustic character of the area was carried out by an experienced WSP acoustician. A noise logger was left unattended at a location representative of the nearest NSR as indicated in **Table 11-6** and set out below:

- Free-field continuous measurements were carried out between 12:00 on Wednesday 5 June 2024 until 12:00 on Monday 17 June 2024 at Measurement Position (MP) 1. The measurement position was located within the land adjacent to the external amenity area of Loaning View (i.e. NSR1) and was deemed representative of the typical prevailing environment in the area. The meter was installed on a tripod 1.5 m in height from the ground and positioned in free field conditions.
- A weather station was also installed at Tamano Farm for the duration of the survey period.

11.4.3 Noise levels at Position MP1 were dominated by wildlife and nature sounds. Adverse weather was also noted via weather monitoring during the survey period; therefore, periods of any adverse weather have been excluded from the data analysis.

11.4.4 In addition to the unmanned position, shortened CRTN measurements were carried out between 18 June and 19 June 2024 at Positions CRTN1 and CRTN2.

- Position CRTN 1 was located at the junction of Millhill Road and the A822, approximately 8 m from the edge of the carriage way. The survey was carried out

between 10:00 – 13:00 hrs on Thursday 18 June 2024. The dominant noise at Position CRTN 1 was road traffic noise from the A822 with occasional car passings on Mill Hill Road. Distant farm machinery sounds were also audible at times from the surrounding farmland, occasional train movements on the Dunblane to Glenagles railway line to the north of the measurement location were also audible.

- Position CRTN 2 was located at the junction of the access road to Tamano Farm and the B8033, approximately 4 m from the edge of the carriage way. The survey was carried out between 10:00 – 13:00 hrs on Friday 19 June 2024. The dominant noise source at Position CRTN 2 was wildlife/nature sounds with occasional traffic on the B8033. Road traffic noise from the A9 was also audible but not dominant. Other occasional noise sources included, propeller plane fly overs, cyclists on the B8033 and distant train passbys. Nature sounds were the dominant source at Position CRTN 2 in line with the rural character of the site, occasional farm associated noises are the secondary contributor to the overall makeup of the soundscape.

11.4.5 The location of the unattended and CRTN measurements are shown on **Figure 11-1, Appendix A Figures**.

11.4.6 **Table 11-6** presents the noise survey results measured at the noise monitoring positions.

Table 11-6 Noise survey results

Position	Measured sound pressure levels (dBA)				
	$L_{Aeq,12h}$ daytime	**$L_{Aeq,4h}$ evening**	**$L_{Aeq,8h}$ night-time**	**Typical daytime background $L_{A90,day}$**	**Typical night-time background $L_{A90,night}$**
MP1	50	45	41*	32	30
CRTN1	65 $L_{10\ (18hr)}$				
CRTN2	50 $L_{10\ (18hr)}$				
* Elevated noise levels between 3am -6am due to dawn chorus/wildlife					

Meteorological Conditions

11.4.7 An Outpost COBRA2 Series 3G Weather Station was installed within the land adjacent to the external amenity area of Tamano Farm located to the southwest of the haul track (Grid reference 280324, 708414) for the duration of the survey at MP1. The weather conditions were measured for the duration of the survey and are deemed representative of the weather conditions observed at MP1.

11.4.8 The weather conditions over the full measurement period were varied. Noise measurements recorded during dry conditions with wind speeds lower than or equal to 5 m/s were included for analysis and all other data was omitted. Temperature during the measurement period ranged between a high of 25˚C to a low of 3˚C.

Future Baseline

11.4.9 Given the rural nature of the Site, it is not anticipated that existing noise levels within the vicinity of the Proposed Development would be subject to significant changes. Therefore, existing and future baseline noise levels have been assumed to be the same and are hereafter referred to as “the baseline”.

11.5 Embedded Mitigation

11.5.1 Several safeguards exist to minimise the effects of construction noise, these include:

- EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- Guidance set out in BS 5228-1 which covers noise control on construction sites; and
- The powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control noise from construction sites.

11.5.2 It is expected that the Principal Contractor and its sub-contractors would at all times apply the principle of Best Practicable Means (BPM), as defined in Section 72 of the Control of Pollution Act 1974, which is usually the most effective means of controlling noise from construction sites. Such measures, where appropriate, may include the following (NV1):

- Any compressors brought onto the Site to be silenced or sound reduced models fitted with acoustic enclosures;
- All pneumatic tools to be fitted with silencers or mufflers;
- Care to be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities to be instructed on the importance of minimising noise;
- Deliveries to be programmed to arrive during normal working hours only;
- Care to be taken when unloading vehicles to minimise noise;
- Delivery vehicles to be routed so as to minimise disturbance to local residents;
- Delivery vehicles to be prohibited from waiting within or in the vicinity of the Site with their engines running;
- All plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
- Electrically powered plant should be preferred, where practicable, to mechanically powered alternatives. All mechanically powered plant should also be fitted with suitable silencers, as appropriate; and
- All plant to be sited so that the effect of noise at nearby noise sensitive properties is minimised.

11.5.3 Problems concerning noise from construction works can often be avoided by taking a considerate and neighbourly approach to relations with the local residents. A mechanism for interaction with local residents should be devised and implemented.

11.5.4 A CEMP would be prepared pre commencement of works with recommendations related to noise and vibration for the construction phase of the Proposed Development. The Principal Contractor would apply BPM and adhere to the CEMP and any of the Applicant's General Environmental Management Plans (GEMPs).

11.5.5 In addition to the CEMP, it is recommended that temporary noise barriers are used to screen plant and reduce the construction noise when activities are being carried out in close proximity of NSR1 and NSR2 and as shown in **Figure 11-2, Appendix A Figures** and summarised below:

- Barrier A: A 2 m high barrier approximately 70 m in length situated to the south of construction works between the junction with the existing track to the Braco Substation and the junction with the existing track to Whistlebrae;

- Barrier B: A 2 m high barrier approximately 65 m in length situated to the south of the construction works and to the east of the junction with the existing track to Whistlebrae;
- Barrier C: A 3 m high barrier approximately 80 m in length situated along the field boundary immediately adjacent to the B8033; and
- Barrier D: A 3 m high barrier approximately 65 m in length situated to the south of the construction works and to the east of the junction with the B8033.

11.5.6 Temporary noise barriers are lightweight and can be moved between locations relatively easily. It is assumed that the temporary noise barriers would meet the following requirements:

- Minimum surface mass of 7 kg/m^2 (as recommended in BS 5228-1);
- No gaps at the joints; and
- Line of sight to NSR is blocked where possible.

11.6 Appraisal

Construction noise

11.6.1 Construction activity can lead to some degree of noise disturbance at locations in close proximity. It is, however, a temporary source of noise. Noise levels at any one location vary as different combinations of plant machinery are used. Noise levels also vary throughout the construction period of the Proposed Development as the construction activities and phases change.

11.6.2 **Table 11-7** presents the predicted façade noise levels associated with each of the typical construction activities at the nearest NSRs during the weekday daytime periods. The predicted façade noise levels for the mobilisation, haul track construction and haul track surfacing activities are presented as a range, summarising the typical and worst-case noise levels when the works are located at an average and nearest distance from each NSR respectively.

Table 11-7 Predicted construction noise levels, Facade, $L_{Aeq,T}$

Phase of construction	Predicted sound pressure level at NSR dB L_{Aeq}			
	NSR1	NSR2	NSR3	NSR4
Mobilisation	62- 65	56 -64	60-62	58-60
Haul track Construction	63-65	56-65	62-65	61-64
Haul track Kerbing with the junction to the A822	53	42	63	60
Haul track Surfacing	53 – 65	46 -50	54 - 61	46-58
Haul track Movements	59	55	53	50

11.6.3 As seen in **Table 11-7**, the predicted noise levels at NSR1 to NSR4 meet or fall below the Category A threshold of 65 dB for weekday daytime hours for the key noise-generating construction activities.

Construction site vibration

11.6.4 **Table 11-8** presents the distances at which vibration levels are predicted to meet the criteria thresholds set out in **Table 11-2**, based on a specified confidence limit (where applicable). It should be noted that the data presented in **Table 11-8** are general in nature and are not site specific.

Table 11-8 Predicted ground borne vibration levels

Vibration generating activity	Confidence Limit	PPV (mm/s)	Minimum distance between receptor and works (m) before PPV (mm/s) exceeded.
Vibratory Rollers - start & end(1)	95	0.3	80
	95	1.0	30
	95	10	4
Vibratory Rollers - Steady State(1)	95	0.3	60
	95	1.0	25
	95	10	5
HGV Movement(2)	N/A	0.3	7
	N/A	1.0	2
	N/A	10	N/A
Excavation	N/A	0.3	9
	N/A	1.0	3
	N/A	10	N/A
(1) Assumes 2 rollers, 0.5 mm amplitude, drum width of 1.3 m, e.g. heavy-duty ride on roller.			
(2) Assumes PPV of 1 mm/s at 2 m, referenced within TRL Report 53.			

11.6.5 Taking into account the distances between construction activities associated with the Proposed Development and the nearest vibration sensitive receptors within the study area, i.e. the NRSs in **Table 11-5** ranging between 35 m and 100 m from the works, **Table 11-8** indicates the predicted vibration levels are well below limits at which cosmetic building damage becomes likely (15 mm/s) and, at worst, at which construction vibration is likely to be perceptible in residential environments (0.3 mm/s). This indicates the vibration generated by the construction activities associated with the Proposed Development are unlikely to impact the nearest NSRs.

Construction traffic noise

11.6.6 The results of the Transport Assessment have been used as the basis for determining the change in noise levels arising on public roads as a result of construction traffic. Road traffic noise calculations have been carried out in accordance with CRTN, being undertaken for a notional receptor location 10 m from the edge of the carriageway of each

road considered. A notional receptor has been used because the change in traffic noise level adjacent to any given road would be the same at all distances where noise from that route is dominant. Traffic noise calculations have been undertaken to establish the change in the daytime $L_{A10,18hr}$ noise level.

11.6.7 Predictions have been undertaken for the following scenarios:

- Scenario 1: 2026 Baseline forecast;
- Scenario 2: 2026 Baseline + Proposed Development Construction; and
- Scenario 3: 2026 Baseline + Committed Developments + Proposed Development Construction.

11.6.8 Further predictions once the Proposed Development has been constructed, i.e. during the construction phase of the proposed Cambushinnie Substation, underground cable and overhead line are presented in paragraphs 12.6.19 to 12.6.24 in Chapter 12 of the Cambushinnie 400 kV Substation Environmental Appraisal (April 2025).

11.6.9 The changes in road traffic noise levels have been determined by subtracting the noise level predictions determined for Scenario 1, from that determined for Scenario 2 and Scenario 3 respectively. The resulting change is therefore that associated with the additional construction traffic movements.

11.6.10 In undertaking these calculations, traffic speeds have been set to the applicable speed limit for each route considered. The predicted road traffic noise levels are shown in **Table 11-9** for each considered link. The changes in road traffic noise due to construction traffic are shown in **Table 11-10** for each considered route. The location of the routes can be seen in **Figure 11-3**.

Table 11-9 Predicted road traffic noise levels from construction traffic $L_{A10, 18hr}$ (dB)

Route	Noise Level $L_{A10,18hr}$ (dB)		
	Scenario 1: 2026 Baseline	Scenario 2: 2026 Baseline + Proposed Development Construction	Scenario 3: 2026 Baseline + Committed Developments + Proposed Development Construction
	Sc 1	Sc 2	Sc 3
Link A: A822 North of A822 / Feddal Road Junction	62.8	62.8	62.8
Link B: A822 South of A822 / Feddal Road Junction	62.7	63.4	63.4
LinkC: Feddal Road West of A822 / Feddal Road Junction	48.3	52.5	52.9
Link D: A822 North of A822 / Braco Cemetery Junction	62.5	63.3	63.3

Route	Noise Level $L_{A10,18hr}$ (dB)		
	Scenario 1: 2026 Baseline	Scenario 2: 2026 Baseline + Proposed Development Construction	Scenario 3: 2026 Baseline + Committed Developments + Proposed Development Construction
	Sc 1	Sc 2	Sc 3
Link E: A822 A9 Slips	63.4	64.1	64.2
Link F: Millhill Road West of A9 / Millhill Road Junction	49.6	54.3	54.7
Link G: B8033 Bridge of Keir	49.1	54.5	54.8
Link H: A9 S DfT Counter 724	74.1	74.2	74.2
Link I: A9 N DfT Counter 20730	74.2	74.2	74.3
Link J: B8033 Glassick	47.0	50.3	51.2

Table 11-10 Changes in road traffic noise levels resulting from construction traffic (dB)

Route	Noise Level Change (dB)	
	Proposed Development vs Baseline	Committed Developments + Proposed Development vs Baseline
	2 vs 1	3 vs 1
Link A: A822 North of A822 / Feddal Road Junction	0.0	0.0
Link B: A822 South of A822 / Feddal Road Junction	0.7	0.8
Link C: Feddal Road West of A822 / Feddal Road Junction	4.2	4.6
Link D: A822 North of A822 / Braco Cemetery Junction	0.8	0.8
Link E: A822 A9 Slips	0.7	0.8

Route	Noise Level Change (dB)	
	Proposed Development vs Baseline	Committed Developments + Proposed Development vs Baseline
	2 vs 1	3 vs 1
Link F: Millhill Road West of A9 / Millhill Road Junction	4.8	5.1
Link G: B8033 Bridge of Keir	5.4	5.8
Link H: A9 S DfT Counter 724	0.0	0.1
Link I: A9 N DfT Counter 20730	0.1	0.1
Link J: B8033 Glassick	3.4	4.3

11.6.11 As can be seen from **Table 11-10**, the links subject to the highest noise level changes are Feddal Road (West of A822 / Feddall Road Junction), Millhill Road (West of A9 / Millhill Road Junction), the B8033 Bridge of Keir and the B8033 Glassick. Assessed in accordance with the criteria in **Table 11-4**, the magnitude of impact on Feddal Road and B8033 Glassick would be moderate, and the magnitude of impact on Millhill Road (at worst) and the B8033 Bridge of Keir would be major.

11.6.12 In addition to the change in road traffic noise as a result of the development generated traffic, it is necessary to consider the sensitivity of the receptor, the absolute noise level and the acoustic context. It should also be noted that the change in road traffic noise levels would be temporary, i.e. only during the 24-week construction programme for the Proposed Development. Once the Proposed Development is constructed traffic movements associated with the construction of the substation, underground cable and overhead line would no longer travel through the village of Braco.

11.6.13 There are a number of residential properties within 10 m of Millhill Road. The noise levels at these receptors are dominated by road traffic noise from the A9 and likely to be in the region of 65dB $L_{A10,18hr}$, furthermore, a level of 65dB $L_{A10,18hr}$ was observed during the noise survey at Position CRTN 1 indicating any changes in traffic flow along Millhill Road due to construction traffic would be imperceptible as the predicted noise levels for all scenarios are below 55dB. Therefore, it is considered that the magnitude of this temporary impact would be negligible.

11.6.14 There are a number of isolated properties along B8033 Bridge of Keir and B8033 Glassick. The predicted level of road traffic noise on the B8033 Bridge of Keir (i.e. once out of the village of Braco) and B8033 Glassick during the construction phase are up to 55 dB $L_{A10,18hr}$ which would equate to 53 dB $L_{Aeq,16hr}$. A level of 50dB $L_{A10,18hr}$ was observed at Position CRTN 2 which was located on the B8033. BS 8233:2014 adopts a guideline external noise values provided in WHO Guidelines for external amenity areas such as

gardens and patios. The Standard states that it is “desirable” that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$. Although the temporary increase in road traffic noise may be perceptible at those properties along the B8033 during the construction of the Proposed Development, the absolute noise levels due to development generated traffic are likely to be below 55 dB $L_{Aeq,T}$ and therefore it is considered that the magnitude of this temporary impact would be minor.

11.6.15 There are properties in the village of Braco which are located within close proximity to Feddal Road, i.e. within 10 m from the edge of the carriageway. The predicted level of road traffic noise on the Feddal Road during the construction phase are up to 53dB $L_{A10,18hr}$ which would equate to 51dB $L_{Aeq,16hr}$. Although the temporary increase in road traffic noise may be perceptible at those properties along Feddal Road, the absolute noise levels due to development generated traffic in the primary external amenity areas are likely to be below 55 dB $L_{Aeq,T}$ and therefore it is considered that the magnitude of this temporary impact would be minor.

11.6.16 The residential property comprising Keir Cottage and Helenslea is located within approximately 2 m of the edge of the carriageway of Feddal Road. Braco primary School is also located within approximately 3 m of the edge of the carriageway of Feddal Road. Taking into the account perceptible change and absolute noise levels at these building facades due to development generated traffic, it is considered that the magnitude of this temporary impact would remain moderate. However, based on street-scene photography it is noted that these buildings are fitted with window-mounted trickle vents, which in turn provide background ventilation without having to rely on an open window. It is therefore considered that the internal daytime criteria would continue to be met in habitable rooms and classrooms during the construction phase of the Proposed Development.

11.6.17 In summary, taking into account acoustic context of the noise levels changes, the magnitude of this temporary impact would be minor on Feddal Road (West of A822/Feddall Road Junction) and the B8033 (Bridge of Keir and Glassick) and negligible on Millhill Road (West of A9/ Millhill Road Junction).

11.6.18 For all remaining routes noise level changes range from 0.0dB to +0.8dB and the magnitude of this temporary impact would, at worst, be negligible.

11.7 Recommendations and Mitigation

Construction Phase

11.7.1 Mitigation measures have been embedded into the Proposed Development. A CEMP would be prepared prior to the commencement of works with recommendations related to noise and vibration for the construction phase of the Proposed Development. The Principal Contractor would apply BPM and adhere to the Applicant’s CEMP and any GEMPs.

11.7.2 In addition to the CEMP, it is recommended that temporary barriers are used when activities are being carried out in close proximity of NSR1 and NSR2 and as shown in **Figure 11-2, Appendix A Figures.**

11.7.3 Mitigation measures included to reduce the potential impacts associated with development generated traffic on the public highway are included in **Chapter 10 Traffic and Transport**.

11.8 Cumulative Appraisal

11.8.1 There is the potential for cumulative effects to occur as a result of the Proposed Development and cumulative schemes identified in the surrounding area. Cumulative effects may arise during both the construction phases and the operational phase.

11.8.2 A review of the cumulative schemes identified in **Table 13-1** has been undertaken to determine the potential for cumulative effects to arise. **Table 11-11** below presents the cumulative appraisal of cumulative effects and, where necessary, the control or mitigation measures which would be employed to manage potential cumulative effects.

Table 11-11 Cumulative Effects

Planning Reference and Development	Description	Potential Cumulative Effects
21/00756/FLM: 49.9 MW energy storage facility	Overlaps the western extent of the Site at the existing access track. Comprised of 50 battery storage container units, control building, ancillary equipment, parking, access track, boundary treatments, landscaping, and associated works. Status: Application approved. Not currently in operation.	Taking into consideration the distance between common receptors for the Proposed Development and the Energy Storage Facility, no construction phase cumulative effects are expected. **Section 11.6** presents the assessment of noise levels changes as a result in development generated traffic on the local road network. Scenario 3 of the assessment includes committed developments, including the Energy Storage Facility. In summary, when taking into account acoustic context of the noise levels changes, the magnitude of this temporary impact would, at worst, be minor.
22/02231/FLM: 49.9 MW energy storage facility	Overlaps the western extent of the Site at the existing access track. Formation of a 49.99 MW battery energy storage compound. Status: Application approved.	Taking into consideration the distance between common receptors for the Proposed Development and the Energy Storage Facility, no construction phase cumulative effects are expected.

12. CLIMATE CHANGE AND CARBON

12.1 Introduction

12.1.1 This chapter sets out the methodology, baseline conditions, assessment of effects, and mitigation considerations for the Proposed Development in relation to climate change.

12.1.2 The climate assessment has been carried out in accordance with the Institute of Environmental Management and Assessment (IEMA), 'Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their significance' and 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation'. Consideration is given to the following aspects of climate change assessment, as detailed in **Table 12-1**.

Table 12-1 Definitions of climate change assessment elements

Assessment Type	Definition
Lifecycle Greenhouse Gas (GHG) Impact Assessment	Impact of GHG emissions arising from the Proposed Development on the climate, including how it would affect the UK and Scotland meeting its national carbon budgets.
Climate Change Risk 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 Impact (ICCI) Assessment	The combined impact of the Proposed Development and potential climate change on receptors in the receiving environment.

12.1.3 The assessment of cumulative effects does not apply to the Greenhouse Gas (GHG) assessment as the assessment is inherently cumulative. The Climate Change Risk Assessment (CCRA) also focuses on the Proposed Development itself, so cumulative effects do not apply.

12.1.4 This chapter should be read in conjunction with the description of the Proposed Development in **Chapter 2 Description of Proposed Development**. Other relevant topic chapters may include:

- **Chapter 5 Ecology and Nature Conservation;**
- **Chapter 9 Hydrology, Hydrogeology, Geology and Soils;** and
- **Chapter 10 Traffic and Transport**.

12.2 Legislation, Policy and Guidance

Legislation

12.2.1 Relevant legislation to the assessment of effects on the climate and the assessment of climate change impacts is presented in **Table 12-2**.

Table 12-2 Relevant Climate Change Legislation

Legislation	Legislation details
United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement	The Paris Agreement[1] is a legally binding agreement within the UNFCCC dealing with GHG emissions mitigation, adaptation and finance starting in the year 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.
Climate Change Act 2008 and Climate Change Act (2050 Target Amendment) Order 2019	In June 2019, the Climate Change Act[2] 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.
Carbon Budgets Order 2011 Carbon Budget Order 2016 Carbon Budget Order 2021	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. 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 Sixth Carbon Budget[3], the first to align with the amended carbon reduction target, was published by the Climate Change Committee for consideration by the Government in December 2020. In April 2021, the Government accepted the Climate Change Committee's 965 million Tonnes of carbon dioxide equivalent ($MTCO_2e$) recommendation and laid the Carbon Budget Order 2021 before parliament. The CCC released their 7th Carbon Budget in February 2025 and advised the UK Carbon Budget to be set at 535 $MtCO_2e$, however this carbon budget total is not expected to be formally accepted by government or ratified by parliament until later in 2025.
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[4] 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.

[1] UNFCC, 2015. *Paris Agreement* [online]. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf [Accessed 5 March 2025].

[2] UK Government, 2021. *Climate Change Act 2008* [online]. UK Government. [Accessed 5 March 2025]. Available at: https://www.legislation.gov.uk/ukpga/2008/27/contents

[3] UK Government, 2021. *The Carbon Budget Order 2021* [online]. UK Government. [Accessed 5 March 2025]. Available at: https://www.gov.uk/guidance/carbon-budgets#setting-of-the-first-to-third-carbon-budget

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

Legislation	Legislation details
Climate Change (Emissions Reduction Targets) (Scotland) Act 2024[5]	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.

Policy

12.2.2 Policy relating to Climate Change and the assessment of potential effects of the Proposed Development is presented in **Table 12-3**.

Table 12-3 Relevant Climate Change Policy

Policy	Policy details
National Policy Statement (NPS) for Energy	The NPS sets out the national policy for energy infrastructure. This is considered the large-scale infrastructure that will be required to ensure the UK can provide a secure, reliable, and affordable supply of energy. While planning matters are devolved to the Scottish Government, energy policy is reserved to the UK Government. Therefore, the NPS may be a relevant consideration in planning decisions in Scotland. NPS EN-1[6] is the overarching Statement for Energy and covers the UK's goals for net zero emissions and their relevance to energy infrastructure, climate impacts and adaptation, adverse effects and benefits and climate change projections, flood risk and the importance of relevant mitigation.
NPS for Electricity Networks Infrastructure (NPS EN-5)[7]	The NPS for Electricity Networks Infrastructure covers the importance of climate change adaptation 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 2019[8] 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.

[5] The Scottish Government, 2024. Climate Change (Emissions Reduction Targets) (Scotland) Act 2024 [online]. [Accessed 15 January 2025]. Available from: https://www.legislation.gov.uk/asp/2024/15/enacted

[6] Department of Energy Security and Net Zero (DESNZ), 2023. *National Policy Statement for Energy* [online]. [Accessed 17 May 2024]. Available from: https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf

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

[8] UK Government, 2018. *A Green Future: Our 25 Year Plan to Improve the Environment* [online]. [Accessed 19 March 2025]. 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

Policy	Policy details
Transport Decarbonisation Plan, Decarbonising Transport: a better, greener Britain	Transport Decarbonisation Plan, Decarbonising Transport: a better, greener Britain[9]. 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.
National Planning Framework 4 (NPF4)[10]	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. Policy 11 encourages and promotes all forms of renewable energy development including energy transition, storage, new and replacement transmission and distribution infrastructure and emerging low carbon and zero emissions technologies.
Update to the Climate Change Plan 2018–2032: Securing a Green Recovery on a Path to Net Zero: climate change plan 2018-2032 (Scottish Government, 2020b)[11]	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.
Climate Ready Scotland: climate change adaptation programme 2019 – 2024 (Scottish Government, 2019)[12]	The Scottish Government's five-year programme to prepare Scotland for continual climate change challenges identifies key outcomes for the country in its preparations for a net zero transition and future. Relevant outcomes include Outcome 3: our inclusive and sustainable economy is flexible, adaptable, and responsive to the changing climate, Outcome 4: our society's supporting systems are resilient to climate change, and Outcome 5: our natural environment is valued, enjoyed, protected, and enhanced and has increased resilience to climate change.
Draft Energy Strategy and Just Transition Plan (Scottish Government, 2023)[13]	At present, the Scottish Government is consulting on a route map to deliver a national net zero energy system. The draft highlights the need for safe and secure energy as the basis for a just transition towards net zero by 2045. It covers the Government's ambitions for Scotland's energy future for example, increasing contributions from renewable sources, phasing out new petrol and diesel cars, and increasing employment in Scotland's energy production sector against a decline in North Sea production. Central to achieving these ambitions as set out in the Plan will be significant investment in net zero energy, policy and legislation that supports a net zero energy system, and route maps for energy supply and demand.

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

[10] Scottish Government, 2023. *National Planning Framework 4* [online]. [Accessed 18 October 2024] Available at: https://www.gov.scot/publications/national-planning-framework-4/

[11] Scottish Government, 2020. *Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update* [online]. [Accessed 18 April 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

[12] Scottish Government, 2019. *Climate Ready Scotland: climate change adaptation programme 2019 – 2024* [online]. [Accessed 17 May 2024]. Available at: https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/8/

[13] Scottish Government, 2023. *Draft Energy Strategy and Just Transition Plan* [online]. [Accessed 17 May 2024]. Available at: https://www.gov.scot/publications/draft-energy-strategy-transition-plan/documents/

Policy	Policy details
Scottish National Adaptation Plan 3[14]	The Scottish National Adaptation Plan 2024-2029 outlines Scotland's strategy to prepare for and adapt to the impacts of climate change. It focuses on building resilience across key sectors, including infrastructure, ecosystems, and communities, to mitigate risks from climate change-related events such as flooding and heatwaves. This plan is relevant to the CCRA, as it provides a framework for identifying vulnerabilities and implementing adaptation measures to enhance the resilience of developments like the Proposed Development.

Guidance

12.2.3 Relevant guidance for the assessment of climate change effects is presented in **Table 12-4**.

Table 12-4 Relevant Climate Change Guidance

Guidance	Guidance Detail
IEMA: Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance[15]	The approach to evaluating the significance of GHG emissions from the Proposed Development has been undertaken in accordance with this guidance.
IEMA: Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation[16]	The approach for assessing the significance of climate change risks on the Proposed Development has been undertaken in accordance with this guidance.
The GHG Protocol[17]	The GHG Protocol is a widely used standard for measuring and managing GHG emissions. The protocol provides guidance on identifying, measuring, reporting and verifying GHG emissions from various sources, such as energy use, transportation, and waste.
Publicly Available Specification (PAS) 2080:2023 Carbon Management in Buildings and Infrastructure[18]	PAS 2080 provides guidance on how to manage carbon emissions and promote sustainability in infrastructure projects. The PAS outlines a framework for the management of GHG emissions throughout the project lifecycle, from planning and design to construction and operation.
The British Standards Institution (BSI) BS EN ISO 14064-1:2019[19] and 14064-	The British Standards Institution (BSI) BS EN ISO 14064-1:2019 and 14064-2:2019 (2019a and b, respectively) provides specifications for organisational-level and project-level guidance for the quantification and reporting of GHG emissions and removals.

[14] Scottish Government, 2024. Scottish National Adaptation Plan 2024-2029 [online]. [Accessed 17 October 2024]. Available at: https://www.gov.scot/publications/scottish-national-adaptation-plan-2024-2029-2/

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

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

[17] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD), 2004. *The GHG Protocol', A Corporate Accounting and Reporting Standard*.

[18] BSI Group, 2023. *Carbon Management in Infrastructure and Built Environment – PAS 2080* [online]. [Accessed 20 May 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/

[19] The British Standards Institution (BSI), 2019a. BS EN ISO 14064-1:2019. Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals. London: BSI.

Guidance	Guidance Detail
2:2019 (2019a and b, respectively)[20]	
SSEN Transmission Carbon Asset Database (CAT)	A working group has been set up between the three Great British Transmission Operators to develop a master Carbon Asset (CAT) Database, which contains greenhouse gas intensity factors for specific assets to allow for more accurate reporting on embodied carbon emissions.
Department for Energy Security and Net Zero Standards (DESNZ) Emissions Factors[21]	The DESNZ's Emissions Factors are a set of factors developed by the UK Government's DESNZ to calculate GHG emissions from various sources, such as electricity and fuel consumption. The factors take into account the emissions associated with the production and distribution of energy, as well as the emissions associated with combustion or use of the energy source.
Inventory of Carbon and Energy[22]	The Inventory of Carbon and Energy (ICE) provides embodied energy and carbon dioxide (CO_2) emissions data for a wide range of materials and building components. The ICE database enables calculation of the embodied energy and CO_2 emissions associated with a building or construction project, taking into account the materials used, manufacturing processes, and transportation.
Think Hazard[23]	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, earthquakes, and landslides.
Technical Guidance on Climate Proofing of Infrastructure in the Period 2021-2027[24]	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.
Royal Institute of Chartered Surveyors (RICS) Professional Statement Whole Life Carbon Assessment[25]	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).

[20] The British Standards Institution (BSI), 2019b. BS EN ISO 14064-2:2019. Greenhouse gases. Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements. London: BSI

[21] Department for Energy Security and Net Zero, 2023. *Greenhouse gas reporting: conversion factors 2023* [online]. [Accessed 20 May 2024]. Available from: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

[22] Circular Ecology, 2014. *Inventory of Carbon and Energy V4.0 (ICE)* [online]. [Accessed 5 March 2025]. Available at: https://circularecology.com/embodied-carbon-footprint-database.html

[23] Think Hazard, 2023. *Scotland. Think Hazard* [online]. [Accessed 18 April 2024]. Available at: https://www.thinkhazard.org/en/report/3184-united-kingdom-scotland

[24] 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

[25] 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

12.3 Assessment Methodology and Significance Criteria

12.3.1 This section provides a summary of the assessment methodology for the Lifecycle GHG Assessment and CCRA.

Extent of the Study Area

GHG Assessment

12.3.2 The Study Area for the GHG assessment includes:

- Direct GHG emissions arising from site clearance, construction, maintenance, operational activities within the boundary of the Site, as shown on **Figure 2-2** and **2-3, Appendix A Figures**; and
- Indirect GHG emissions occurring offsite that are significantly related to the Proposed Development, such as embodied carbon in materials, transportation, waste processing and waste disposal.

CCRA

12.3.3 The CCRA Study Area encompasses the works that make up the Site as shown on **Figure 2-2** and **Figure 2-3**, **Appendix A Figures**.

Method of Baseline Data Collation

Lifecycle GHG Assessment

12.3.4 For the purposes of the GHG assessment, the baseline conditions were a 'Business as Usual' scenario where the Proposed Development does not go ahead.

12.3.5 The baseline comprised of existing carbon stocks and sources of GHGs within the boundary of the Proposed Development. The methodology for calculating GHG emissions and removals was consistently used across the construction and operation of the Proposed Development.

CCRA

12.3.6 The current baseline for the CCRA was based on historical climate data obtained from the Met Office[26] recorded by the closest meteorological station to the Proposed Development (Stirling), located approximately 20 km southeast of the Site for the period 1981-2010. As part of the CCRA, this was compared to the future baseline throughout the life of the Proposed Development.

12.3.7 The future baseline for the CCRA was based on future UK Climate Projections 2018[26] (UKCP18). This projection data provides probabilistic indications of how global climate change is likely to affect areas of the UK using pre-defined climate variables and time periods.

12.3.8 For the purpose of the assessment, UKCP18 probabilistic projections for pre-defined 30-year periods for the following average climate variables have been obtained and are further analysed:

- Mean annual temperature;
- Mean summer temperature;
- Mean winter temperature;

[26] Met Office, 2019. *UK Climate Projections 2018* [online]. [Accessed 18 October 2024]. Available from https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

- Maximum summer temperature;
- Minimum winter temperature;
- Mean annual precipitation;
- Mean summer precipitation; and
- Mean winter precipitation.

12.3.9 UKCP18 probabilistic projections have been analysed for the 25 km grid square within which the Proposed Development would be located. These figures are expressed as temperature/precipitation anomalies in relation to the 1981-2010 baseline. This baseline was selected as it provides projections for 30-year time periods (e.g. 2020-2049) for the parameters analysed within the assessment compared to the 30-year land-based projections that would be generated from the 1981-2010 baseline.

12.3.10 UKCP18 uses a range of possible scenarios, classified as Representative Concentration Pathways (RCPs)[27], to inform differing future emission trends. These RCPs specify the concentrations of greenhouse gases that will result in total radiative forcing increasing by a target amount by 2100, relative to preindustrial levels'. RCP8.5 is considered to be the worst-case global scenario with the greatest concentration of GHGs in the atmosphere and has been used for the purposes of this assessment as a worst-case scenario.

12.3.11 As part of this assessment, the increased frequency and severity of extreme weather events (such as heavy and / or prolonged precipitation, storm events, wildfires and heatwaves) was also assessed.

Assessment Modelling Methodology

12.3.12 This section sets out the scope and methodology for the assessment of the impacts of the Proposed Development on climate change.

Lifecycle GHG Assessment

12.3.13 To identify the magnitude of GHG impact over the lifecycle of the Proposed Development, GHG emissions were calculated in line with the PAS 2080:2023 Guidance[28] and the principles set out in the GHG Protocol[29]. GHG emissions from construction activities, embodied carbon in materials, and the operation of the Proposed Development have been quantified in this EA using a calculation-based methodology in line with the GHG Protocol:

Activity data x GHG emissions factor = GHG emissions values

12.3.14 Activity data is a quantifiable measure of activity, such as operating hours or volumes of fuels used. Emission factors convert the activity data into GHG emissions. Activity data was sourced from data provided by SSEN Transmission. Where specific data was not available, a mix of assumptions and industry benchmarks have been used to fill data gaps. Where this was not possible, then a qualitative approach to assessing the GHG impacts was followed, in line with the IEMA GHG Guidance.

[27] Met Office, 2018. *UKCP18 Guidance: Representative Concentration Pathways* [online]. [Accessed 18 October 2024]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf

[28] British Standards Institution (BSI), 2023. *PAS 2080 - Carbon management in infrastructure and built environment* [online]. [Accessed 4 November 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/ Date

[29] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD), (2004) The GHG Protocol, A Corporate Accounting and Reporting Standard [online]. [Accessed 4 November 2024]. Available at: https://ghgprotocol.org/corporate-standard

12.3.15 Emission factors were sourced from the DESNZ 2024 emission factor database[21], and the Bath University Inventory of Carbon and Energy database[30], both publicly available sources.

12.3.16 Appropriate assumptions were sourced from the RICS Guidance for whole life GHG assessments[25].

12.3.17 In line with the GHG Protocol guidelines[31], the GHG assessment is reported as tonnes of carbon dioxide equivalent (tCO2e) and has considered the seven Kyoto Protocol gases:

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF_3).

12.3.18 These gases are broadly referred to in this EA under an encompassing definition of 'GHGs', with the unit of tCO2e (tonnes CO2 equivalent) or MtCO2e (mega tonnes of CO2 equivalent).

12.3.19 **Table 12-5** summarises the key anticipated GHG emissions sources to the Proposed Development by lifecycle stage, in line with PAS 2080:2023 Guidance[32]. Additionally, the RICS Guidance for whole life GHG assessments[25] have been integrated to inform the scope and reporting framework of the GHG assessment.

Table 12-5 Potential GHG emissions arising from the Proposed Development

Life cycle stage	PAS 2080:2023 Module	Activity	Primary emission sources
Product stage	A1-A3	Raw material extraction and manufacturing of products are required to build the equipment for the Proposed Development. Transportation of materials for such processes/ manufacturing (where available).	Embodied GHG emissions from energy use in the extraction of materials and manufacture of components and equipment. GHG emissions from the transportation of products and materials during their processing and manufacture. Due to the nature of the equipment, this could require shipment of certain aspects over significant distances.

[30] The University of Bath, 2024. *The ICE Database Version 4.0.*

[31] World Resources Institute (WRI) & World Business Council for Sustainable Development (WBCSD), 2004. *The GHG Protocol, A Corporate Accounting and Reporting Standard* [online]. [Accessed 4 November 2024]. Available at: https://ghgprotocol.org/corporate-standard

[32] British Standards Institution (BSI) (2023) PAS 2080 - Carbon management in infrastructure and built environment [online]. [Accessed 4 November 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/ Date

Life cycle stage	PAS 2080:2023 Module	Activity	Primary emission sources
Construction process stage	A4	Transportation of construction materials to the Proposed Development. Due to the nature of the equipment required, this could require shipment of certain aspects over significant distances.	Transport of construction materials is included under the construction process stage, where these are not included in embodied GHG emissions.
	A5	On-site construction activity. Transport of construction workers. Disposal of any waste generated during the construction processes. Land Clearance. 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.
Operation stage	B1-B8	Energy use from the operation of the Proposed Development. Maintenance activities. Replacement emissions.	GHG emissions from grid electricity use and transmission and distribution losses. GHG emissions associated with maintenance activities (e.g. replacement components and fuel use). GHG emissions associated to the replacement of assets.

12.3.20 To account for data quality uncertainties in the project whole life carbon results of the Proposed Development, uplifts have been applied in line with RICS guidance[33]. Uncertainty factor uplifts have been applied to each of the lifecycle stages in line with contingency factors, carbon data uncertainty and quantities uncertainty. **Table 12-4** defines the percentage uplifts applied for each uncertainty factor to give a 18% overall uplift to the estimated emissions.

[33] 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

Table 12-4 RICS Guidance Uncertainty in Whole Life Carbon Analysis (WLCAs)

RICS Uncertainty category	% uplift applied
Contingency factor – early design	15%
Carbon data uncertainty factor	2%
Quantities uncertainty factor	1%
Total	18%

Determining the magnitude of change

12.3.21 In line with IEMA GHG guidance, the Proposed Development estimated GHG emissions were compared against existing carbon budgets for the UK and Scotland. The Proposed Development's impact on GHG emissions was assessed by comparing it to net-zero trajectories and evaluating its alignment with UK and Scottish decarbonisation policies.

12.3.22 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 **Section 12.8**. 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 MtCO2e, which will later be agreed in Parliament and set into law. However, this depends on agreement with the UK Government and is therefore subject to change. Additionally, the CCC's feedback may also evolve based on input from the UK Government.

12.3.23 This GHG assessment, therefore, uses the IEMA GHG guidance[34] 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 12-5** and **Table 12-6**.

Table 12-5 UK Carbon budgets and indicative budgets based upon 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)		53535	
8th (2043-2047)		-	195

[34] IEMA, 2022. *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – second Edition* [online]. [Accessed 18 April 2024]. Available from: https://www.iema.net/preview-document/assessing-greenhouse-gas-emissions-and-evaluating-their-significance

[35] The 7th Carbon Budget was formally advised to be set at 535 $MtCO_2e$ in February 2025, which will later be agreed in Parliament and set into law.

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 ($MtCO_2e$)
9th (2048-2050)		-	17

12.3.24 To illustrate the potential impact of the Proposed Development trajectory towards net-zero by 2050, it is recommended that the CCC's[36] balanced Net-Zero pathway is utilised post-2037, in the absence of any nationally legally binding carbon budgets after using the subsequent 6th Carbon Budget. Beyond 2050, the UK is expected to remain at net zero.

12.3.25 The CCC Balanced Net-Zero Pathway is recommended to be divided into five-year periods post-2037 to align with the existing UK national carbon budget 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°C trajectory.

12.3.26 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 toward the national net-zero trajectory.

12.3.27 Besides the UK Government's carbon budgets, the Scottish Government previously published annual GHG emission reduction interim targets that align with Scotland's legislated 2045 net-zero target[37], which are detailed in **Table 12-6**. These interim targets are derived from annual percentage reductions relative to Scotland's 1990 GHG emissions baseline.

Table 12-6 Scottish Government Interim Annual Targets

Year	Scotland Annual Target ($MtCO_2e$)	Year	Scotland Annual Target ($MtCO_2e$)
2024	33.5	2035	14.3
2025	31.4	2036	13.1
2026	29.2	2037	11.9
2027	27.1	2038	10.7
2028	24.8	2039	9.4
2029	22.7	2040	8.2
2030	20.5	2041	6.6
2031	19.3	2042	4.9
2032	18.0	2043	3.3
2033	16.8	2044	1.6

[36] CCC, 2020. *The Sixth Carbon Budget Dataset* [online]. [Accessed 15 April 2025]. Available at: https://www.theccc.org.uk/2021/02/01/the-numbers-behind-the-budget-six-ways-to-explore-the-sixth-carbon-budget-dataset/

[37] Scottish Government, 2019. *Climate Change (Emissions Reduction Targets (Scotland) Act 2019* [online]. [Accessed 4 November 2024]. Available at: https://www.legislation.gov.uk/asp/2019/15/enacted

Year	Scotland Annual Target ($MtCO_2e$)	Year	Scotland Annual Target ($MtCO_2e$)
2034	15.6	2045	0

12.3.28 The Scottish Government passed legislation and received royal assent in November 2024, to abandon the statutory annual targets (**Table 12-6**) 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 GHG emissions targets were used to quantitatively assess the magnitude of GHG emissions associated with the Proposed Development.

Significance of Effects

12.3.29 The IEMA guidance[34] states that there are currently no agreed methods to evaluate quantified levels of GHG significance and that professional judgment is required to contextualise a project's GHG emission impacts. **Table 12-9** states the significance criteria that would be applied to the Proposed Development.

12.3.30 IEMA guidance on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[34] states mitigation should be considered from the outset and throughout the project's lifetime whilst also helping to deliver a proportionate EA. Once the magnitude of emissions is determined, mitigation measures should be proposed.

12.3.31 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.

Table 12-9 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'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.

Significance Level	Effects	Description	Example in the guidance
	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'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'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	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

Significance Level	Effects	Description	Example in the guidance
		is playing a part in achieving the rate of transition required by nationally set policy commitments.	before 2050. A project with negligible effects provides GHG performance that is well 'ahead of 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

12.3.32 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[38.]

12.3.33 The CCRA considered the impact of future climate change on the Proposed Development. The assessment uses UKCP18 projections[26] and the Think Hazard tool[23] to identify potential climate hazards impacting the construction and operation of the Proposed Development from 2020 to 2099[39]. However, it is important to note that after construction, the haul track would be closed and left in place, while the temporary bridge would be removed. The haul track would remain intact to allow for potential future access to the proposed Cambushinnine 400 kV substation, for example, should the need arise to reinstate the bridge and access the proposed Cambushinnie 400 kV substation where the existing access arrangements cannot adequately facilitate, such as to replace a transformer.

12.3.34 Climate parameters considered in the CCRA include the following:

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

12.3.35 The following key terms and definitions relating to the CCRA will be used:

[38] European Commission, 2021. *EC Technical Guidance on Climate Proofing of Infrastructure* [online]. [Accessed 4 November 2024] Available from: https://ec.europa.eu/newsroom/cipr/items/722278/en

[39] As this represents the current maximum limit of the UKCP18 projections.

- 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.

12.3.36 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.

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

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

12.3.39 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 12-7** are applied to understand the likelihood of a climate impact occurring.

Table 12-7 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%

12.3.40 The consequences were assessed according to **Table 12-8** respectively. The categories and descriptions provided are based on the IEMA CCRA guidance and EU Technical Guidance on Climate Proofing Infrastructure[38].

Table 12-8 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

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Safety and Health	First aid case	Minor injury, medical treatment	Serious injury or lost work time	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
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 % Internal Rate of Return (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.

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
(**) 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

12.3.41 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 12-12** sets out how the significance was assessed. The assessment has considered confirmed design and adaptation measures.

Table 12-12 Significance of Effect Matrix for CCRA

Likelihood	Consequence					
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
	Rare	Low (Not Significant)	Low (Not Significant)	Medium (Not Significant)	High (Significant)	Extreme (Significant)
	Unlikely	Low (Not Significant)	Low (Not Significant)	Medium (Not Significant)	High (Significant)	Extreme (Significant)
	Moderate	Low (Not Significant)	Medium (Not Significant)	High (Significant)	Extreme (Significant)	Extreme (Significant)
	Likely	Medium (Not Significant)	High (Significant)	High (Significant)	Extreme (Significant)	Extreme (Significant)
	Almost certain	High (Significant)	High (Significant)	Extreme (Significant)	Extreme (Significant)	Extreme (Significant)

Lifecycle GHG Assessment

12.3.42 In cases where specific information about energy usage, materials, or the GHG emissions of important aspects of the assets is unavailable, assumptions are made. These assumptions are based on industry estimates, professional best practices, and estimates provided by SSEN Transmission.

12.3.43 Key assumptions applied in the GHG assessment are presented in **Table 12-13.** The life cycle modules are labelled in accordance with PAS 2080:2023 Guidance[28]. Key sources of assumptions include the RICS Guidance for whole life GHG assessments[25].

Table 12-13 Key assumptions applied in the GHG assessment

Life Cycle Module		Emission Source	Key Assumptions
A: Before Use Stage	A1-3 Product Stage	A1-3 Raw materials supply and manufacture	Embodied GHG emissions from the haul track were estimated using the construction data provided by SSEN Transmission. To account for material waste, an uplift was applied to the data

Life Cycle Module		Emission Source	Key Assumptions
			based on RICS waste assumptions.
	A4-5 Construction Process Stage	A4 Material transport	The RICS assumptions applied to material transport distances and transport modes. It was assumed that average-laden heavy goods vehicles (HGVs) were used to transport construction materials to the Site.
		A5.2 Construction activities	GHG emissions from construction plant were estimated based on a benchmark based on previous AECOM projects and the embodied carbon from the list of temporary equipment, using indicative fuel consumption assumptions.
		A5.3 Waste	RICS wastage rates and assumptions applied for end-of-life scenarios per material type.
		A5.4 Worker transport	Assume an average 100 km round trip commute. One employee per average-sized car (fuel type unknown). Based on similar types of projects.
B: Use Stage B1-8 Use Stage		B2 Maintenance	RICS assumptions applied to estimate maintenance GHG emissions. Maintenance GHG emissions are estimated as 1% of A1-A5 GHG emissions.
		B3 Repair	RICS assumptions applied to estimate repair GHG emissions. Repair GHG emissions are assumed to be equivalent to 25% of B2 GHG emissions and 10% of A1–A3 GHG emissions for electrical equipment.
		B4 Replacement	RICS assumptions applied to different asset types which have specific replacement cycles.

Climate Change Risk Assessment

12.3.44 Climate change projections, by their very nature, are associated with a range of assumptions and limitations. There are inherent uncertainties associated with climate projections. Climate projections are not predictions of the future but are rather projections based on the best available data and science.

12.3.45 To account for this uncertainty, a ‘high’ emissions scenario (RCP 8.5) has been used in this assessment, which is consistent with the precautionary principle.

12.4 Sensitive Receptors

GHG Assessment

12.4.1 The global climate was identified as the receptor for the purposes of the GHG assessment. The sensitivity of the climate to GHG emissions is 'high'. The rationale is as follows:

- GHG emission impacts could compromise the UK's Carbon Budget Delivery Plan[40] sector-specific electricity generation carbon budgets and Net-Zero Pathways and, therefore, the ability to meet its future carbon reduction trajectory;
- Any additional GHG impacts could compromise the UK's and Scotland's ability to reduce its GHG emissions and, therefore, the ability to meet its future legally binding carbon budgets;
- 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[41] and a Special Report on Global Warming of 1.5°C published by the Intergovernmental Panel on Climate Change (IPCC)[42] highlighted the importance of limiting global warming below 1.5°C; and
- Disruption to global climate already has diverse and wide-ranging impacts on the environment, society, economic 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.

Climate Change Risk Assessment

12.4.2 The receptor for the CCRA is the Proposed Development itself, including workers, infrastructure, and visitors.

12.5 Baseline Environment

Lifecycle GHG Assessment

Existing and Future Baseline

12.5.1 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 constructed, and the land remains as it is. The future baseline, therefore, consists of carbon emissions during the construction and operation phases of the Proposed Development.

12.5.2 The current land use within the Site and the local area consists predominantly of agricultural fields mainly under arable and fringed by some woodland (as illustrated in **Figure 2-2, Appendix A Figures**). The current land use has relatively low levels of sequestered GHG emissions in the context of the overall emissions in the wider area, as it is largely agricultural land. Baseline agricultural GHG emissions are dependent on the types of soil and vegetation present, fuel use for the operation of vehicles and machinery, and other inputs such as fertiliser and pesticide use. Agricultural emissions displaced

[40] Legislation.gov.uk, 2021. *The Carbon Budget Order 2021. S2021/750* [online]. [Accessed 4 November 2024]. Available at: https://www.legislation.gov.uk/ukdsi/2021/9780348222616

[41] UNFCC, 2015. *Paris Agreement* [online]. [Accessed 11 April 2024]. Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[42] IPCC, 2018. *Special Report on Global Warming of 1.5°C.* [online]. [Accessed 4 November 2024]. Available from: https://www.ipcc.ch/sr15/

from the Proposed Development are not considered, as it is assumed that these agricultural activities would continue in a new location, hence the absence of a reduction.

12.5.3 A baseline of zero emissions has been applied, representing a worst-case scenario as a precautionary measure.

12.5.4 The future baseline comprises existing carbon stock and sources of GHG emissions resulting from the existing activities within the Proposed Development. In line with the baseline scenario, zero emissions have also been used to represent a conservative scenario.

Climate Change Risk Assessment

Existing and Future Baseline

12.5.5 The CCRA of climate change risks to the Proposed Development was based on historical climate data from the closest weather station to the Proposed Development (Stirling, located approximately 20 km south of the Proposed Development) for the period 1981-2010, as summarised in **Table 12-9**.

Table 12-9 Historic Climate Data[26]

Climate parameter	Value
Mean Annual Max Temp (°C)	12.9
Mean Annual Min Temp (°C)	5.6
Mean summer maximum daily temp (°C)	19.0
Mean winter minimum daily temp (°C)	1.1
Warmest Month on Average (°C)	19.7
Warmest Month on Average (Month)	July
Coldest Month on Average (°C)	0.8
Coldest Month on Average (Month)	December
Frost days per annum	53
Mean Annual Rainfall Levels (mm)	1018.9
Mean summer rainfall (mm)	66.1
Mean winter rainfall (mm)	106.0
Wettest Month on Average (mm)	128.8
Wettest Month on Average (Month)	January
Driest Month on Average (mm)	49.2
Driest Month on Average (Month)	April

12.5.6 In addition to the historical climate data presented above. The following events are examples of extreme climatic conditions experienced across Scotland in the past:

- Highest recorded temperature was 34.8°C on the 19th July 2022[43];

[43] Met Office, 2023. *UK Climate Extremes* [online]. [Accessed 4 November 2024]. Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-extremes

- Lowest recorded temperature was -15.9°C on the 29th December 1995[43];
- Highest 24-hour rainfall total for a rainfall day was 238 mm and was recorded on 17th January 1974[43];
- The highest gust speed recorded was 142 mph and was recorded on 13th February 1989[43]; and
- Recent storm events in the west of Scotland, including Storms Eowyn[44], Babet[45], Jocelyn[46], and Kathleen[47], caused severe flooding, travel disruptions, and infrastructure damage.

12.5.7 The future baseline for the CCRA assessment is based on UK Climate Projection 2018 (UKCP18) data from the Met Office for the 25 km grid square in which the Proposed Development is located (Stirling, approximately 20 km to the south of the development)[26]. Baseline climate change projections are highlighted in **Table 12-10**.

12.5.8 Major climatic variables contributing to these risks include but are not limited to increased amount of extreme weather conditions (e.g., flooding and heatwaves) as well as increased temperatures due to climate change.

12.5.9 During the construction phase under the RCP8.5 scenario, there is likely to be an increase in daily temperatures. Furthermore, under the RCP8.5 it is likely that the summer rainfall is likely to decrease and lead to more drought risk in summer. However, the overall and winter rainfall is likely to increase which could cause greater risks of flooding.

[44] Met Office, 2025. *UK Storm Centre – Storm Eowyn* [online]. [Accessed 19 March 2025]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2025/2025_02_storm_eowyn.pdf

[45] Met Office, 2024. *UK Storm Centre – Strom Babet* [online]. [Accessed 7 August 2024]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2023/2023_08_storm_babet.pdf

[46] Met Office, 2024. *UK Storm Centre – Storm Isha and Jocelyn* [online]. [Accessed 4 November 2024]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2024/2024_02_storms_isha_jocelyn.pdf

[47] Met Office, 2024. *UK Storm Centre – Storm Kathleen* [online]. [Accessed 4 November 2024]. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2024/2024_04_storm_kathleen.pdf

Table 12-10 Climate Change Baseline and Projection Data

Climatic Variable	Baseline data 1981-2010	Projection (change) 2020 - 2049	2040 - 2069	2070-2099	Beyond 2100	Projected Trend	Climate projection source
Temperature							
Mean annual maximum daily temperature (°C)	12.9	+0.9°C +0.4°C to +1.5°C	+1.7°C +0.8°C to +2.6°C	+3.2°C +1.8°C to +4.8°C	No projection data available, trend towards increasing temperatures expected to continue	↑	UKCP18 RCP8.5
Mean summer maximum daily temperature (°C)	19.0	+0.9°C +0.1°C to +1.7°C	+1.8°C +0.5°C to +3.1°C	+3.7°C +1.5°C to +6.1°C		↑	UKCP18 RCP8.5
Mean winter minimum daily temperature (°C)	1.1	+0.8°C -0.1°C to +1.6°C	+1.3°C +0.2°C to +2.6°C	+2.3°C +0.4°C to +4.3°C		↑	UKCP18 RCP8.5
Number of days of air frost per annum	53					↓	Met Office
Highest temperature for baseline period (°C)	19.47 (July)	+0.9°C +0.1°C to +1.7°C	+1.8°C +0.5°C to +3.1°C	+3.7°C +1.5°C to +6.1°C	No projection data available, trend towards increasing temperatures expected to continue	↑	UKCP18 RCP8.5
Lowest temperature for baseline period (°C)	0.8 (December)	+0.8°C -0.1°C to +1.6°C	+1.3°C +0.2°C to +2.6°C	+2.3°C +0.4°C to +4.3°C		↑	UKCP18 RCP8.5
Rainfall							
Mean annual rainfall (mm)	1018.9	+2.9% -1.2% to +7.1%	+3.4% -2.4% to +9.6%	+4.1% -4.0% to +13.0%	No projection data available, potential for overall trend in increased rainfall to continue	↑	UKCP18 RCP8.5
Mean summer rainfall (mm)	66.1	-5.3% -19.0% to +8.6%	-14% -32% to +3.7%	-27% -51% to -0.3%	No projection data available, possible for decrease in summer rainfall trend to continue	↓	UKCP18 RCP8.5

Climatic Variable	Baseline data 1981-2010	Projection (change) 2020 - 2049	2040 - 2069	2070-2099	Beyond 2100	Projected Trend	Climate projection source
Mean winter rainfall (mm)	106	+9.6% -3.4% to +23.2%	13.6% -2.2% to +31.9%	+25.2% -1.1% to +54.2%	No projection data available, increase in winter rainfall possible	↑	UKCP18 RCP8.5
Wettest month on average (mm)	128.8 (January)	+9.6% -3.4% to +23.2%	13.6% -2.2% to +31.9%	+25.2% -1.1% to +54.2%	No projection data available	↑	UKCP18 RCP8.5
Driest month on average (mm)	49.2 (April)	-5.3% -19.0% to +8.6%	-14% -32% to +3.7%	-27% -51% to -0.3%	No projection data available	↓	UKCP18 RCP8.5
Other							
Storms	The UKCP18 model suggest a small contribution from storm surges, however it is unclear if the frequency and severity of future storm surges is going to change. Rising sea levels due to climate change are expected to worsen the impacts of storm surges.					↑↓	UKCP18 RCP8.5
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.					↑	UKCP18 RCP8.5
Wildfires	The wildfire hazard is classified as medium according to the information that is currently available to 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 poses some risk of life and property loss in any given year.					↑	Think Hazard

12.6 Issues Scoped out

12.6.1 A separate ICCI assessment has been excluded from the Climate Change assessment on the basis that this is a proportionate approach for an EA.

12.6.2 Sea level rise as an environmental risk has been scoped out of the assessment as the Proposed Development would be situated in an upland location.

12.6.3 The decommissioning stage of the Proposed Development has been scoped out of this assessment as the Proposed Development is expected to exist in perpetuity, as outlined in **Section 1.1.7**.

12.6.4 A0 lifecycle module is the preconstruction stage and represents the preliminary studies and works such as strategy and brief development, design efforts and cost planning. This has been scoped out of the lifecycle GHG assessment. Currently, 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 guidance, GHG emissions anticipated to be b elow 1% of the total project emissions can be excluded from the assessment. Therefore, emissions from A0 have been scoped out on this basis.

12.7 Embedded Mitigation

12.7.1 Mitigation should 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.

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

12.7.3 A CEMP would be developed for the Proposed Development and adopted by the Principal Contractor pre-commencement of works. This would provide information on the proposed infrastructure 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.

Lifecycle GHG Mitigation

12.7.4 The various mitigation measures embedded within the Proposed Development design align with the Scottish Government's targets to achieve net zero emissions by 2045 and remain so thereafter.

12.7.5 Science-based Target initiatives (SBTi) define and promote best practice in emissions (including Scope 1, 2 and 3) reductions and net zero targets in line with climate science. SSEN Transmission has committed to the following verified SBTi[48], which would be applied to the Proposed Development to help mitigate against adverse GHG impacts:

- Committing to reduce its combined Scope 1 and 2 emissions by 46% by Financial Year 2029/2030 from a 2018 base year;
- Commitment to reduce Scope 3 Transmission Losses GHG Emissions 50% per gCO_2e from losses/kWh by FY2029/2030 from a 2018 base year; and
- Committing to working closely with its supply chain so that 67% of its suppliers by spend will have a Science-based target (SBT) set by 2025.

[48] SSEN, 2020. *SSEN Transmission world first science-based target accreditation* [online]. [Accessed 11 April 2024]. Available at: https://www.ssen-transmission.co.uk/news/news--views/2020/8/ssen-transmission-world-first-science-based-target-accreditation/

12.7.6 The SSEN Transmission Sustainable Supplier Code[49] sets out its Sustainable Procurement Goals, aligned with the UN's Sustainable Development Goals. Implementation of these measures would ensure the Proposed Development mitigates GHG emissions and contributes towards Scotland's Net Zero targets. The following 2025 targets include (but are not limited to):

- 50% of its 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 carbon reduction policy and target in place; and
- 50% of the supply chain by spend will have a biodiversity policy. Regular inspections of equipment will be undertaken to identify deterioration of components and will be replaced where necessary to ensure maximum efficiency.

Climate Change Risk Assessment

12.7.7 Mitigation measures for the CCRA would be informed by the design team. These would focus on measures to increase the resilience of the Proposed Development and receptors in the surrounding environment to climate change impacts.

12.7.8 SSEN Transmission's Climate Resilience Strategy[50] provides a holistic overview of SSEN Transmission's actions for ensuring the future resilience of its business and providing benefits to customers. The strategy outlines SSEN Transmission's adaptation action including those relevant to overhead line conductors, underground cable systems, substations, transformers, and switchgears in relation to a number of extreme weather events.

12.7.9 A CEMP would be developed which would aid in avoiding, minimising, and controlling adverse environmental impacts from extreme weather events, such as storms, droughts, and increased temperatures, associated to the Proposed Development. Best practice approaches and specific actions to implement mitigation measures would be included.

12.7.10 Relevant GEMPs (**Appendix O GEMPs and SPPs**) have been outlined in **Chapter 9 Hydrology, Hydrogeology, Geology and Soils** and include a number of good practice measures in reducing pollution incidents and also reducing the magnitude of incidents due to good site environmental management procedures.

12.8 Appraisal

***Lifecycle* GHG Assessment**

Construction Phase

12.8.1 For the purpose of the climate assessment, the construction phase of the Proposed Development is assumed to start in 2026 and take approximately 11 months.

12.8.2 The GHG emissions associated with the construction phase of the Proposed Development have been calculated in line with the methodology, assumptions and

[49] SSEN, 2023. *Sustainable Supplier Code* [online]. [Accessed 11 April 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-distribution---scsc-supplier-code-4-pager-v5.pdf

[50] SSEN, 2023. *Climate Resilience Strategy* [online]. [Accessed 20 May 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-climate-resilience-strategy-progress-report-2023.pdf

limitations detailed in **Table 12-13**. The results are provided in **Table 12-11**. The life cycle modules are labelled in accordance with PAS2080:2023 guidelines[51].

Table 12-11 Construction phase GHG emissions

Life Cycle Module		Emission Source	GHG Emissions (tCO_2e)
A: Before Use Stage	A1-3 Product Stage	A1-3 Raw materials supply and manufacture	3,752
	A4-5 Construction Process Stage	A4 Material transport	1,940
		A5.2 Construction activities	1,130
		A5.3 Waste	37
		A5.4 Worker transport	1,407
Total tCO_2e over the Construction period			8,265

12.8.3 The total GHG emissions associated with the Proposed Development in the construction phase are 8,265 tCO_2e as detailed in **Table 12-11**. The majority of construction phase GHG emissions are attributed to the embodied GHG emissions in raw materials. The key contributors are the manufacture of aggregates and concrete. Additional GHG emission sources include material transport, worker transport and waste.

12.8.4 To contextualise this impact, these construction GHG emissions are compared to the UK carbon budgets which coincide with the construction phase. This comparison is presented in **Table 12-12**.

12.8.5 For additional context, the Proposed Development has also been contextualised against the Scottish GHG reduction targets and sector-specific electricity generation carbon budgets. These are presented in **Table 12-13** and **Table 12-14**.

12.8.6 The potential construction GHG emissions of the Proposed Development are estimated to contribute less than 0.2% of any carbon budget or GHG reduction target reported below. For this comparison, the construction GHG emissions are assumed to be distributed evenly across the years of the construction period.

Table 12-12 Comparison of construction phase GHG emissions with UK carbon budgets

UK Carbon Budget Period	UK Carbon Budget (tCO_2e)	Construction GHG Emissions (tCO_2e)	Construction GHG Emissions as a proportion of UK Carbon Budget
4th (2023 – 2027)	1,950,000,000	8,265	0.0004%

[51] BSI Group, 2023. *Carbon Management in Infrastructure and Built Environment – PAS 2080* [online]. [Accessed 20 May 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/

Table 12-13 Scottish GHG reduction targets relevant to the construction period

Scottish GHG Carbon Budget Period	Aggregated annual Scottish emissions target (tCO_2e)	Estimated total emission (tCO_2e) over carbon reduction period	% of GHG reduction period
2025-2026	57,200,000	8,265	0.01%

Table 12-14 Industry sector residual emissions across carbon budgets relevant to the construction period

UK Carbon Budget Period	Sectoral Residual Emissions (tCO_2e)	Estimated total emission (tCO_2e) over the carbon budget period	% of Residual Emissions for Power Sector
4th (2023 - 2027)	5,236,335	8,265	0.2%

Operational phase

12.8.7 For the purposes of the climate assessment, a reference operational period of 60 years was assumed, in accordance with RICS Guidance. It is however expected that the Proposed Development will remain in perpetuity.

12.8.8 GHG emissions associated with the operational phase of the Proposed Development have been calculated in line with the methodology, assumptions and limitations outlined in **Table 12-13**. The results are provided in **Table 12-15**. The lifecycle modules are labelled in accordance with PAS 2080:2023 Guidance[52].

Table 12-15 Operation phase GHG emissions

Life Cycle Module	Emission Source	GHG Emissions (tCO_2e)
B: Use Stage	B2 Maintenance	70
	B3 Repair	17
	B4 Replacement	3,226
Uncertainty uplift		**18%**
Total Module B (tCO_2e)		**3,314**
Total Operational emissions (tCO_2e)		**3,314**
Total annual average Operational phase emissions (tCO_2e)		**65**

12.8.9 The total GHG emissions associated with the Proposed Development over the course of the operational phase are 65 tCO_2e as detailed in **Table 12-15**.

12.8.10 To contextualise this impact, these operational GHG emissions are compared to the UK carbon budgets, which coincide with the operation phase. This comparison is presented in **Table 12-16**. For additional context, the Proposed Development has also been

[52] BSI Group, 2023. *Carbon Management in Infrastructure and Built Environment – PAS 2080* [online]. [Accessed 20 May 2024]. Available at: https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2080-carbon-management-in-infrastructure-and-built-environment/

contextualised against the relevant Scottish GHG reduction targets and sector-specific electricity generation carbon budgets. These are presented in **Table 12-17** and **Table 12-18**.

12.8.11 The potential operation GHG emissions of the Proposed Development are estimated to contribute less than 0.01% of any respective carbon budget or GHG reduction target reported below. For this comparison, the operational GHG emissions are assumed to be distributed evenly across the years of the operational period. The UK and Scotland are expected to remain net zero after 2050 and 2045, respectively.

Table 12-16 Comparison of operation phase GHG emissions with UK carbon budgets.

UK Carbon Budget Period	UK Carbon Budget (tCO_2e)	Operational GHG Emissions (tCO_2e)	Operation GHG Emissions as a proportion of the UK Carbon Budget
4th (2023 – 2027)	1,950,000,000	1,303	0.0001%
5th (2028 – 2032)	1,725,000,000	782	0.00004%
6th (2033 – 2037)	965,000,000	782	0.0001%
7th (2038 – 2042)	535,000,000	782	0.0001%
8th (2043 – 2047)	195,000,000	782	0.0004%
9th (2048 – 2050)	17,000,000	1,303	0.01%

Table 12-17 Scottish GHG reduction targets relevant to the operational period.

Scottish GHG Carbon Budget	Aggregated annual Scottish emissions target (tCO_2e)	Estimated total (tCO_2e) over carbon reduction period	% of GHG reduction period
2026 – 2030	122,600,000	782	0.001%
2031 – 2040	137,303,100	391	0.0003%
2041 – 2044[53]	16,394,400	782	0.005%

Table 12-18 Power sector residual emissions across carbon budgets relevant to the operational period.

Relevant UK Carbon Budget	Annulaised UK Carbon Budget (tCO2e)	Estimated total (tCO_2e) over the carbon budget period	% of Residual Emissions for Power Sector
4th (2023 – 2027)	143,000,000	1,303	0.001%
5th (2028 – 2032)	63,000,000	782	0.001%
6th (2033 – 2037)	42,000,000	7824	0.002%

[53] Excludes 2045 as no GHG emissions can be emitted from 2045 onwards.

Overall

Lifecycle GHG Assessment

12.8.12 The Proposed Development would facilitate the construction of the proposed Cambushinnie 400 kV substation and associated developments, which themselves 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.

12.8.13 As discussed in **Sections 12.8.4** and **12.8.7**, the Proposed Development's GHG impact during construction and operation has been quantitatively assessed against the relevant carbon budgets and net-zero targets. The Proposed Development would support infrastructure which is in line with the UK and Scotland's policies to decarbonise the electricity grid and transition to net zero by 2045 2050 and 2045, respectively. The Proposed Development's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. Therefore, in accordance with IEMA guidance[34], the GHG emissions associated with the Proposed Development's construction and operation are assessed as **Minor Adverse** and **Not Significant**. A project with 'not significant' effects is fully in line with measures necessary to achieve the UK and Scotland's trajectory towards net zero.

12.8.14 In addition, SSEN Transmission's commitment to the Science-Based Targets initiative (SBTi) provides effective management of minor residual GHG emissions, aligning with policy requirements and supporting the project's contribution to the net-zero transition. The Applicant's Net Zero Transition Plan[54] further aligns with the UK and Scotland's net-zero targets by setting clear goals to reduce the Applicant's GHG emissions in line with the 1.5°C target of the Paris Agreement[55]. This includes a commitment to engage with suppliers to adopt science-based targets (SBTs) by 2026, with 35% of suppliers expected to align with SBTs.

Climate Change Risk Assessment

12.8.15 The impacts of climate change are projected to become apparent over the coming decades. Therefore, effects of climate change are not anticipated to be experienced during the construction phase. However, it is pertinent to consider extreme weather events which may occur during the construction phase. These include periods of intense precipitation, which may affect construction activities, and periods of very hot weather, which may impact worker well-being. Strong winds and storms could also pose safety risks and delay construction works.

12.8.16 During construction, increased precipitation has been identified as a potential risk. This could lead to more surface water and groundwater flooding, potentially damaging the haul track and making it inaccessible to workers and visitors. Road stability and drainage infrastructure may be impacted, increasing health and safety risks such as landslides or rock falls, particularly in the haul track's unbound Type 1 materials section.

12.8.17 Another potential risk identified prior to mitigation is that storms and heavy precipitation may also affect the temporary bridge spanning the Keir Burn. Higher water levels and

[54] Scottish Government, 2019. *Climate Ready Scotland: climate change adaptation programme 2019 – 2024* [online]. [Accessed 17 May 2024]. Available at: https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/8/

[55] UNFCC, 2015. *Paris Agreement* [online]. [Accessed 11 April 2024]. Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

strong currents could weaken the ground around the abutments, affecting bridge stability, coupled with the risk of large debris colliding with the bridge.

12.8.18 These types of risks would be mitigated against through design of the Proposed Development, which has been developed in line with PKC and SEPA standards.

12.8.19 These types of risks would be considered within a CEMP, which would be developed for the Proposed Development and adopted by the Principal Contractor pre-commencement of works. The CEMP would detail measures to avoid, minimise, and control adverse environmental risks associated with the Proposed Development to ensure they are not realised. It would set out best practices and specific actions required to implement mitigation strategies effectively. These measures include proactive tracking of extreme weather events to inform site operations, ensuring that stockpiled soils are securely stored to prevent erosion or displacement during flooding, and establishing policies to safeguard workers and materials from the risks of extreme heat. Additionally, the CEMP would incorporate adaptive management approaches to respond to evolving environmental conditions, ensuring resilience and compliance with relevant regulations and sustainability goals.

12.8.20 Over the coming years there is expected to be an increased risk of extreme weather events such as storms, which could intensify the risks of heavy precipitation, while higher average temperatures and droughts may cause road surfaces to crack and degrade. These factors combined may accelerate road deterioration, potholes and other surfacing issues that could make the road inaccessible for future use, however there will be ongoing operational maintenance to ensure deterioration is avoided.

12.8.21 However, it is important to note that after construction of the proposed Cambushinnie 400 kV substation and associated developments, the haul track would be left in place but would not be used for regular ongoing access arrangements, while the temporary bridge deck would be removed. Operations and maintenance teams will regularly inspect and maintain the haul track to ensure it remains in a usable state regardless of its irregularity of use.

12.8.22 These types of impacts would be considered and addressed through regular inspections leading to appropriate maintenance activities being undertaken by operations and maintenance teams. Avoidance, minimisation and control of adverse environmental impacts of the Proposed Development will be managed by operation and maintenance teams.

12.8.23 An action plan to assess access risks may be required for the operational phase, considering potential road deterioration and the need for repairs before accessing the proposed Cambushinnie 400 kV substation site.

12.8.24 This assessment has found there are no significant residual climate change risks to the Proposed Development, assuming the embedded mitigation measures outlined in **Section 12.7** are successfully implemented into the design.

12.8.25 The effect of climate change risk on the Proposed Development during the construction and operation phase is therefore deemed to be **Not Significant**.

12.9 Cumulative Effects

12.9.1 The assessment of cumulative effects does not apply to the GHG assessment as the assessment is inherently cumulative. The CCRA also focuses on the Proposed Development itself, so cumulative effects do not apply. Further information is provided in **Table 13-2**.

12.10 Recommendations and Additional Mitigation

12.10.1 Overall, the GHG impact of the Proposed Development would be **Minor Adverse** and **Not Significant**. The Proposed Development would support the construction of the proposed Cambushinnie 400kV substation and associated developments which would bring long-term benefits to the UK by upgrading energy-related infrastructure. The substation and associated developments are 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 the UK and Scotland.

12.10.2 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.

13 CUMULATIVE EFFECTS

13.1 Introduction

13.1.1 This chapter sets out a summary of the potential cumulative environmental effects as a result of the Proposed Development, as set out in more detail as relevant within **Chapters 4 – 12**. The purpose of the assessment is to assess whether the combination of multiple effects upon a common receptor would result in an effect of greater significance than the individual effects.

13.1.2 The following developments, as outlined as 'scoped in' in **Table 13-1** have the potential for cumulative effects given the likelihood that they would be constructed concurrently with the Proposed Development. The location of these developments is shown in **Figure 13-1, Appendix A Figures.**

Table 13-1 Developments Considered in Cumulative Appraisal

Planning Application Reference / Name	Description	Location	Status	Construction Timeframe	Scoped in / out
23/02147/SCRN Proposed Cambushinnie 400 kV substation.	Formation of a 400 kV substation comprising erection of ancillary buildings, hardstand, plant and machinery access laydown/work compound areas.	Overlaps the western extent of the Site at the existing access track	Intended for planning	Anticipated four year construction period following the commissioning of the Proposed Development	Scoped out as the construction periods would not overlap.
24/00373/SCRN Proposed Cambushinnie OHL tie-in.	The OHL tie-in element would be subject to its own application for consent under section 37 of the 1989 Act. This development would comprise one permanent tower and two temporary towers to facilitate the OHL tie-in between the existing Beauly – Denny OHL and the proposed Cambushinnie 400 kV substation.	Shindour Feddal Hill Wood Braco. Approximately 2.9 km west of the Site	Intended for planning	Construction period following the commissioning of the Proposed Development	Scoped out as the construction periods would not overlap.
Implementation of an UGC between existing Braco West Substation and proposed Cambushinnie substation.	The development would comprise two 132 kV UGC circuits that would connect back to the existing Braco West Substation. These would connect the new 400kV AIS substation to the existing 275 kV substation. Each UGC would be approximately 500 m in length.	Shindour Feddal Hill Wood Braco. Approximately 3 km west of the Site	Permitted development	Construction period following the commissioning of the Proposed Development	Scoped out as the construction periods would not overlap.
15/01842/PN: Forestry related works, encompassing the Site.	Approximately 1.7 km of new forestry track to extend the existing forestry track to allow for continued forestry operations.	Shindour Feddal Hill Braco Approximately 2.4 km west of the Site	In operation	N/A	Scoped out as the development is currently in operation and construction periods would not overlap.

Planning Application Reference / Name	Description	Location	Status	Construction Timeframe	Scoped in / out
21/00756/FLM: 49.9 MW energy storage facility	BESS comprised of 50 battery storage container units, control building, ancillary equipment, parking, access track, boundary treatments, landscaping, and associated works.	Overlaps the western extent of the Site at the existing access track	Application approved	Unknown	Scoped in
22/02231/FLM: 49.99 MW battery energy storage compound	Formation of a 49.99 MW battery energy storage system compound.	Overlaps the western extent of the Site at the existing access track	Application approved	Unknown	Scoped in

13.2 Cumulative Appraisal

13.2.1 A cumulative effects appraisal was undertaken for the Proposed Development in combination with the developments summarised above (being the two consented 49.9 MW BESS developments). **Chapters 4 – 12** detail the potential cumulative effects and mitigation measures in relation to each of the topics, while the appraisal is summarised in **Table 13-2** below.

Table 13-2 Cumulative Assessment

Topic	Potential Cumulative Effects	Mitigation Measures
Landscape and Visual	It is considered that there is very little or no potential for cumulative effects resulting from the Proposed Development in addition to other similar existing, proposed or consented development. Cumulative effects are therefore not considered further in this appraisal.	None required as no significant cumulative effects are anticipated.
Ecology and Nature Conservation	No cumulative effects would give rise to significant adverse effects on ecological features.	None required as no significant cumulative effects are anticipated.
Ornithology	No cumulative effects would give rise to significant adverse effects on ornithological features.	None required as no significant cumulative effects are anticipated.
Cultural Heritage	No cumulative effects are anticipated as a result of the developments considered as part of the Cumulative Assessment.	None required as no significant cumulative effects are anticipated.
Forestry	Effects to trees within the highway estate and other small groups of trees do not constitute effects to forestry (but are addressed as an arboricultural impact assessment, see **Appendix H Arboricultural Impact Assessment**). No cumulative effects on forestry or aboriculture are anticipated.	None required as no significant cumulative effects are anticipated.
Hydrology, Hydrogeology, Geology and Soils	The BESS sites are at a significant distance from the Proposed Development. It is unlikely they would cause any cumulative effects to human health, water environment, built environment, geology and soils receptors associated with the Proposed Development. It is not considered that the combined effects of construction and operation would be greater than the predicted effects for each project in isolation.	None required as no significant cumulative effects are anticipated.
Traffic and Transport	Cumulative construction traffic would give rise to no significant adverse environmental effects.	None required beyond the CTMP as no significant cumulative effects are anticipated.
Noise and Vibration	Taking into consideration the distance between common receptors for the two BESS developments, no construction or operational cumulative effects are expected.	None required as no significant cumulative effects are anticipated.
Climate Change	As it is inherently cumulative, assessment of cumulative effects does not apply to the GHG assessment. As the CCRA is only concerned with the assets of the Proposed Development and a broader consideration of existing interdependent infrastructure, a cumulative assessment is not required.	None required as no significant cumulative effects are anticipated.

14 SUMMARY OF MITIGATION MEASURES

14.1.1 **Chapters 4 – 12** above highlight the potential environmental risks and present mitigation measures for managing these risks.

14.1.2 The embedded and additional mitigation proposed within this EA is listed below in **Table 14-1**.

Table 14-1 Schedule of Mitigation

Mitigation Reference	Title of Mitigation	Description
EM1	Lighting requirements	The Proposed Development would not be lit during normal operation. Lighting requirements for the Proposed Development may be required during the construction phase. The temporary construction compounds may be lit during working hours during winter periods. As far as possible, works should be carried out in daylight to minimise the risk of disturbing protected or notable nocturnal species. If any temporary artificial lighting is required for construction works, this should be strongly directional and directed only on to the works area, and be turned off when not required, to minimise light spill and adverse effects on nocturnal wildlife. Working hours are anticipated between approximately 07:00 – 19:00 Monday to Friday, 08:00 – 13:00 on Saturdays year-round. Working hour assumptions would be agreed with PKC. There would be no working on Sunday or bank holidays unless in exceptional circumstances and in agreement with PKC.
EM2	Delivery and sourcing of structures and materials	The A822 and B8033 would be the routes used by construction traffic between the A9 trunk road and the Proposed Development. Mobilisation works will gain access from the A822 and the construction of the haul track will commence from the A822 west towards the Keir Burn, and also from the B8033 east towards the Keir Burn. A third working party will commence construction of the haul track from Gamekeepers Cottage East towards the B8033. On completion of the haul track between the A822 and B8033 construction will commence north from the B8022 towards Gamekeepers Cottage. The Proposed Development would require the import of materials for construction, including tarmacadam, unbound type 1 material, concrete and wood. Site won materials would be prioritised over imported materials, should they be required, to reduce the impact on local roads and the environment.
EM3	Screening of Proposed Development	All landscape and visual mitigation measures are embedded and covered in detail in **Chapter 4 Landscape Character and Visual Amenity**, and **Appendix C Landscape and Habitat Management Plan**.

Mitigation Reference	Title of Mitigation	Description
		Woodland planting in proximity to the bridge over Keir Burn would reduce visual impact of the haul track and bridge to Braco residents and residents at Keirallan.
EM4	CEMP, GEMPs and Species Protection Plans (SPPs)	Mitigation measures would be implemented through the use of this Schedule of Mitigation and a CEMP. Mitigation measures included in the CEMP in relation to ecological mitigation are detailed in **Section 5.5.2** in **Chapter 5 Ecology and Nature Conservation**. The adoption of the applicable GEMPs and SPPs would reduce the probability of a pollution incident occurring and reduce the magnitude of any incident due to a combination of good site environmental management procedures, including minimising storage of soil volumes, soil management, staff training, availability of contingency equipment and emergency plans. The relevant GEMPs can be found in **Appendix O GEMPS and SPPs**.
EM5	CTMP	A CTMP would operate throughout the duration of the construction programme. **Appendix K Transport Statement** contains a draft CTMP. A detailed CTMP including the following, is expected to be conditioned and provided once a Principal Contractor is appointed: • Site entry / exit arrangements from public roads; • Traffic routeing plans – defining the routes to be taken by Heavy Good Vehicles (HGVs) to the Site avoiding sensitive locations; • Construction traffic hours and delivery times; • Strategy for traffic management and measures for informing construction traffic of local access routes, road restrictions (statutory limits: width, height, axle loading and gross weight), timing restrictions (if applicable) and where access is prohibited; • Measures to protect the public highway (e.g. wheel wash facilities); • Measures for the monitoring of the CTMP to ensure compliance from construction drivers and appropriate actions in the event of non-compliance; and • Mechanism for responding to traffic management issues arising during the works (including concerns raised from the public) including a joint consultation approach with relevant road authorities.
EM6	Biodiversity Net Gain Landscape and Habitat Management Plan	SSEN Transmission has undertaken a Biodiversity Net Gain assessment for the Proposed Development. A Biodiversity Net Gain Report (**Appendix D Biodiversity Net Gain Report**) and Landscape and Habitat Management Plan (**Appendix C Landscape and Habitat Management Plan**) will be prepared as part of the measures necessary to achieve SSEN Transmission's target BNG figures.

Mitigation Reference	Title of Mitigation	Description
		The LHMP details specific requirements for enhancement measures (e.g. seeding of embankments, hedgerow and supplementary woodland and specimen tree planting).
EM7	Ecological Features	Embedded mitigation measures in relation to sensitive ecological features are detailed in **Section 5.5.3** in **Chapter 5 Ecology and Nature Conservation**, these include mitigation concerning: • Soil stripping and storage; • Loss of woodland and native trees; • Otter refuges, bat roots, beaver lodges, water vole burrows, pine martin dens, red squirrel dreys (or other protected breeding / resting sites); • If works carried out directly affect trees that have been identified as having PRFs; and • Trees and woodland in relation to red squirrel dreys. • Specific measures in relation to identified trees and tree groups are included within **Appendix H Arboricultural Impact Assessment.**
EM8	Ornithological Features	Mitigation measures to protect sensitive ornithological features include: • Ideally, undertake all vegetation clearance outside of the breeding bird season, which is generally taken to be between March and August, inclusive; • Where vegetation clearance must take place during the breeding season, the area must first be checked by a suitably experienced ecologist. A works exclusion zone must be implemented around any active bird's nest; and • If breeding birds are present, the ECoW can provide advice on measures to minimise the risk of disturbance being caused.
EM9	Reinstatement	Following commissioning of the Proposed Development, all temporary construction areas would be reinstated. Reinstatement would form part of the contract obligations for the Principal Contractor and would include the removal of all temporary site works. The Proposed Development would be permanent, except for the proposed bridge deck over Keir Burn, which would be removed at the end of the associated proposed Cambushinnie 400 kV substation and associated development construction period, and would be reinstated, for example, in the instance of transformer replacement. Though the deck of the bridge over Keir Burn would be removed, the abutments would remain in place.
EM10	Noise	The Principal Contractor and its sub-contractors would at all times apply the principle of Best Practicable Means (BPM), as defined in Section 72 of the Control of Pollution Act 1974, which is usually the most effective means of controlling noise from construction sites.

Mitigation Reference	Title of Mitigation	Description
		Temporary noise barriers would be used when activities are being carried out in close proximity to noise sensitive receptor (NSR) 1 and NSR2 (see **Figure 11-1, Appendix A Figures**).
EM11	Science Based Targets initiatives	Science-based Target initiatives (SBTi) define and promote best practice in emissions (including Scope 1, 2 and 3) reductions and net zero targets in line with climate science. SSEN Transmission have committed to the following verified SBTi, which would be applied to the Proposed Development to help mitigate against adverse GHG impacts: Committing to reduce its combined Scope 1 and 2 emissions by 55% by 2033 from a 2020 baseline; and Committing to working closely with its supply chain so that 35% of its suppliers would have a Science-based target (SBT) set by 2026.
EM12	SSEN Transmission Sustainable Supplier Code[1]	SSEN Transmission Sustainable Supplier Code sets out its Sustainable Procurement Goals, aligned the UN's Sustainable Development Goals. Implementation of these measures would ensure the project mitigates GHG emissions and contribute towards Scotland's Net Zero targets. The following 2025 targets include (but not limited to): • 50% of its supply chain would have a strategy for reducing energy consumption by 2025; • 56% of the supply chain by spend would have a sustainable sourcing policy; • 60% of the supply chain by spend would have strategies in place to achieve zero waste to landfill; • 60% of the supply chain by spend would have strategies in place to reduce water consumption for SSEN Transmission projects; • 65% of the supply chain by spend must have their own carbon reduction policy and target in place; and • 50% of the supply chain by spend would have a biodiversity policy. Regular inspections of equipment would be undertaken to identify deterioration of components and would be replaced where necessary to ensure maximum efficiency.
EM13	Climate Change Risk Assessment	SSEN Transmission's Climate Resilience Strategy[2] provides a holistic overview of SSEN Transmission's actions for ensuring the future resilience of its business and providing benefits to customers. The strategy outlines SSEN Transmission's adaptation action in relation to a number of extreme weather events.

[1] SSEN, 2023. *Sustainable Supplier Code* [online]. [Accessed 11 April 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-distribution---scsc-supplier-code-4-pager-v5.pdf

[2] SSEN, 2023. *Climate Resilience Strategy* [online]. [Accessed 20 May 2024]. Available at: https://www.ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-climate-resilience-strategy-progress-report-2023.pdf

Mitigation Reference	Title of Mitigation	Description
EM14	Design of Watercourse Crossings	A temporary bridge spanning Keir Burn is proposed, which would be 4.1 m in height and 48 m in length (ground elevation in this area is approximately 109 AOD). The bridge would be clear span with permanent bridge abutments to support the bridge either side of the burn. There would be no in-channel works or piling associated with installation of the bridge abutments. Temporary culverts located adjacent to the eastern temporary construction compound, to the north and south of the Proposed Development, and adjacent to the access control compound where it runs alongside the haul track would be in place during construction. For all other permanent crossings along the Proposed Development, it is proposed that bottomless arched culverts or single spanning bridges would be used for new crossings, to minimise the impact of the Proposed Development. Where there are any requirements to replace or install culverts at any encountered crossings these would need to be designed to current standards and would be designed to accommodate the 1 in 200-year flow plus an allowance for climate change.
EM15	Drainage Design	Surface water from the haul track would be managed and treated by a new surface water drainage system. These would comprise of filter drains along the Proposed Development which would discharge to swales at the end of embankments. The proposed swales would also act as pre-earthworks drainage and would drain to water feature (WF) 2 and WF3, see **Figure 9-1, Appendix A Figures**. The discharge rates would be restricted to the greenfield runoff rate in line with PKC requirements.
ECO1	Woodland Habitats	If otter refuges, bat roosts, beaver lodges, water vole burrows, pine marten dens, red squirrel dreys (or other protected breeding / resting sites) are found that would be subject to disturbance or damage, there would be a constraint to the Proposed Development. If this becomes the case, an action would be required to obtain an appropriate license from NatureScot, which would require proportionate mitigation. If works would be carried out that directly affect trees or woodland, or would take place within disturbance distances (within 5 m of the Site works in the non-breeding season or 50 m of the Site works in the breeding season) of any trees or woodland, then carry out red squirrel pre-construction surveys, for red squirrel dreys in suitable woodland. It is advisable to carry out removal of trees with potential for red squirrel dreys or actual red squirrel dreys outside of the breeding season (February to September inclusive). If red squirrel dreys are present, licensing through NatureScot is more difficult in the breeding season, and it is not normally permitted to destroy likely breeding dreys in the breeding season.
ECO2	Designated Sites	The River Teith SAC, Kippenrait Glen SAC, Shelforkie Moss SAC, Upper Strathearn Oakwoods SAC, as European Sites, are subject to the HRA process. A Shadow ‘Appropriate

Mitigation Reference	Title of Mitigation	Description
		Assessment' report and will be submitted to PKC, setting out the potential impacts of the Proposed Development on European sites. PKC will need to confirm agreement or otherwise, as the competent authority for HRA matters. Non-statutory designated sites have been scoped out of the assessment (as none are present within the ZoI of the Site).
ECO3	Habitats	Habitats including species-poor coniferous plantation, mixed and broadleaved woodland, neutral grassland and non-native hedgerows would be impacted by the Proposed Development. Where felling / removal of these habitats is proposed, then the habitats must be replaced on a like-for-like (or better) basis as a minimum, as close to the location of impact as possible. Such measures should also be considered for enhancement, to go beyond like-for-like compensation by increasing local species diversity, for example by providing better foraging / communing habitat for bats and other mammals.
ECO4	GWDTE	To minimise potential impacts on GWDTE all works must seek to minimise direct disturbance, where possible. Mitigation must be employed for individual GWDTE (where required) to ensure that the hydrological connectivity from upstream groundwater supplies to the downstream GWDTE is maintained (to maintain existing hydrological regimes). To aid in the maintenance of the current hydrological regime, suitable GWDTE mitigation methods for the proposed haul track include the use of: • Permeable track (e.g. coarse aggregate base); and / or, • Culverts installed at regular intervals.
ECO5	Bats	Prior to felling of trees with potential to support bat roosts, PRFs must be inspected by a licenced bat worker (e.g. by tree climbing where possible and safe to do so). Felling of trees with PRFs must be conducted under the supervision of a licenced bat worker / suitably experienced ecologist. If bats are found during inspection, then advice must be sought from a licenced bat worker / suitably experienced ecologist.
ECO6	Fish	Fish would be safeguarded by minimising works in or beside all watercourses and open water, where possible. During construction, all site staff would adhere to strict pollution control measures to ensure waterbodies are protected from pollution (by adhering to SEPA Guidance on Pollution Prevention). The Keir Burn crossing would require the creation of permanent bridge abutments. The tributary to the Allan Water in the west of the Site would require culverting over some of its length. Water crossings and culverts must be constructed in accordance with authorisations and Method Statements granted / accepted by SEPA. Bridge works and culvert installations would result in an overall biodiversity net gain, by increasing the overall length and / or quality of aquatic linear habitats, see **Chapter 5 Ecology and Nature Conservation** for more information.
ECO7	Invasive Non-Native Species (INNS)	Appropriate actions (such as avoidance, specific treatment and / or standard best practice) should be integrated into any works which may affect invasive non-native plant species, to manage

Mitigation Reference	Title of Mitigation	Description
	Biosecurity Management Plan (BMP) or Method Statement	the risks and avoid potential breaches of legislation. Such actions would be compiled in a BMP or, at minimum, a Method Statement. These actions would include avoiding disturbance of invasive non-native plants as far as possible, cleaning of heavy plant, machinery and PPE used in the vicinity of these species, and careful management of any arisings (including potentially contaminated substrate) should they need to be removed. Note that it is best practice, more sustainable and more cost-effective, where feasible, for invasive non-native species arisings to be left within existing infested areas, or at least retained onsite, rather than removing material offsite – removal to landfill is the least sustainable and often the most expensive option. A BMP or Method Statement is likely to be required, as INNS are located within the footprint of the Proposed Development and would be disturbed by works. Production of a BMP would require clarification of the exact locations of species with the potential to become invasive, particularly giant hogweed and dogwood. Establishing this would require a specific walkover survey of localised parts of the Site and should be carried out as a pre-construction survey, during the growing season
ECO8	Additional Opportunities for Ecological Enhancement	Moderately species-rich neutral grassland creation on steep-sided slopes of the haul track batters through seeding of suitable wildflower seed mixes, of local provenance as possible to the Site would be undertaken. The following enhancement could also be considered that does not contribute towards the calculation of BNG, but can still deliver improvements for biodiversity that would also work towards achievement of 'biodiversity benefits' under NPF4: • Use of removed woody material to create log-piles in appropriate retained habitat, as advised by an ecologist, which would function as refuges for the benefit of amphibians and invertebrates; and • Installation of bird and bat boxes on suitably mature trees.
ORN1	Breeding Birds	Mitigation measures would be detailed in a BBPP. This document would be prepared and submitted for approval by PKC, in consultation with NatureScot where necessary, prior to commencement of construction. The BBPP would detail the mitigation measures proposed in this EA Report to safeguard breeding birds (including raptors). Further detail of the mitigation which would be included in the BBPP is included in **Chapter 6 Ornithology**.
HER1	Archaeological Trenching	A phase of archaeological evaluation trenching would be required to fully assess the archaeological potential of the Proposed Development. The results of this works would be used to agree the final mitigation which may include, but not be limited to, full archaeological excavation, recording, and publication, or monitoring during construction work (i.e. soil stripping) of the Proposed Development would be required.
HER2	Historic Features	All works would be agreed with the PKC Archaeologist and approved in a WSI.

Mitigation Reference	Title of Mitigation	Description
		The weir at Keir Burn (AECOM001) will be fenced off during construction to avoid any accidental damage. Works near to Historic features such as drystone walls, gate posts, and dykes should be avoided where possible, and fenced off to avoid accidental damage. If these features cannot be avoided mitigation would be required. This is likely to include reinstating any features that are removed. If sections of drystone wall cannot be reinstated due to the need for a permanent access, end sections of wall should be 'made-good' to avoid the risk of sections of wall collapsing.
HG1	SEPA Regulation	A Construction Site SEPA CAR licence would be required based on the site area.
HG2	Watercourse Quality Monitoring Plan	Water quality to be monitored pre-construction, during construction and post-construction on Keir Burn and post construction on Keir Burn and WF3. Trigger levels for quality to be set after pre-construction monitoring and agreed with SEPA.
HG3	Zetica UXO	The key recommendation from the detailed desk study and risk assessment was that a UXO awareness briefing is provided to staff involved in excavations and peat probing.
HG4	WPP	The WPP would incorporate potential contamination sources to watercourses, protection measures and mitigations for watercourses (including a CEMP). The Principal Contractor would follow the WPP.
HG5	Contamination Strategy	Principal Contractor would be aware of nearby sources of contamination and would follow the Contamination Strategy. This would assess potential sources of contamination, risks associated with these, and mitigation strategies (including CEMPs). If contamination is identified at any point during construction work, then contact would be made with a competent environmental consultant for further risk assessment to be undertaken.
TT1	Various potential mitigation measures on B8033 in additional to CTMP	Proposed Development to consider potential road mitigation options, subject to agreement with PKC, on the B8033 within Braco village, as this is considered to have the highest sensitivity of receptors of roads expected to carry construction traffic.
NSE1	Temporary Noise Barriers	It is recommended that four temporary barriers are used when activities are being carried out in close proximity of NSR1 and NSR2.

APPENDIX A FIGURES

APPENDIX B VISUALISATIONS

APPENDIX C LANDSCAPE HABITAT AND MANAGEMENT PLAN

APPENDIX D BIODIVERSITY NET GAIN REPORT

APPENDIX E BAT TECHNICAL APPENDIX

APPENDIX F GAZETEERS

APPENDIX G SITE PHOTOGRAPHS

APPENDIX H ARBORICULTURE IMPACT ASSESSMENT

APPENDIX I GEO-ENVIRONMENTAL DESK STUDY

APPENDIX J PRIVATE WATER SUPPLY ASSESSMENT

APPENDIX K TRANSPORT STATEMENT

APPENDIX L GLOSSARY OF ACOUSTIC TERMS

APPENDIX M BASELINE NOISE SURVEY DATA

APPENDIX N INDICATIVE PLANT USED IN CONSTRUCTION

APPENDIX O GEMPS AND SPPS