

Watchman Energy Park

Environmental Impact Assessment Report

Volume 2: Main Report

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Glossary of Terms and Abbreviations

Glossary of Terms

Term	Definition
Abnormal Indivisible Load	Loads / vehicles which exceed the maximum vehicle weight, axle weight or dimensions which are set out in the Road Vehicles (Construction and Use) Regulations 1986 as amended.
Aeronautical radio navigation aids	Ground-based radio beacons that are used to assist aircraft to navigate.
Amplitude Modulation	A variation in noise level over time; for example, observers may describe a 'whoosh whoosh' sound, which can be heard close to a turbine as the blades sweep past.
Annual Average Daily Traffic (AADT)	The average over a full year of the number of vehicles passing a point in the road network each day.
Automatic Traffic Counter	Equipment which is laid across a road and measures traffic characteristics such as the number of vehicles passing over it, speed and classification.
Background Noise	The noise level rarely fallen below in any given location over any given time period, often classed according to Daytime, Evening or Nighttime periods. The LA90 indices (see below) is often used to represent the background noise level.
Balance of Plant	Infrastructural components of a windfarm, except the turbine and its elements.
Baseline Conditions	Environment as it appears (or would appear) immediately prior to the implementation of the project together with any known or foreseeable future changes that will take place before completion of the project.
Bastle House	A fortified farmhouse, sometimes called a 'vertical long house', characteristic of the defensible agricultural residences occupied during the Anglo-Scottish border raids of 16th and 17th centuries.
Biodiversity Enhancement and Management Plan (BEMP)	Plan of habitat enhancement and management measures to be included as part of the Proposed Development.
Bird Disturbance Management Plan (BDMP)	Document produced prior to construction commencing (during the discharge of conditions) to ensure the safeguarding of wild birds.
Burnt Mound	Prehistoric mounds of stone that have been heated in fires, variously interpreted as evidence for food production, funerary traditions, and water heating.
Collision Risk Analysis Area (CRAA)	Buffer used to create the analysis area for collision modelling (ornithology).
Construction Phase	Period during which the building or assembling of a proposed development and its infrastructure is undertaken.
Construction Traffic Management Plan	Document which outlines traffic management measures to mitigate adverse impacts associated with construction related traffic.

Term	Definition
Consultation	Process by which those organisations or individuals with an interest in the area associated with the proposed scheme are identified and engaged as part of the EIA process.
Consultation Bodies	Organisations that the competent authority is required to consult by virtue of the EIA Regulations.
Controlled Airspace	A category of airspace in which aircraft must have a clearance from the controlling agency and must obey air traffic control instructions when flying within the airspace.
Cumulative Impact/Effect	Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. A cumulative impact may arise as the result of (a) the combined impact of a number of different environmental topic-specific impacts from a single environmental impact assessment project on a single receptor/ resource or (b) the combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor/resource.
Cumulative landscape effects	The additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together.
Cumulative visual effects	Effects that can be caused by combined visibility, which occurs where the observer is able to see two or more developments from a location and/or sequential effects which occur when the observer has to move to another viewpoint to see different developments
Decommissioning	Period during which a development and its associated infrastructure are removed from active operation.
Department for Transport	The UK ministerial department responsible for the English transport network and specific transport matters in Scotland, Wales, and Northern Ireland.
Design Manual for Roads and Bridges (DMRB)	Details design criteria relating to roads and bridges in the UK and Northern Ireland for the trunk road network.
Direct effects	Effects directly attributable to the Proposed Development.
Effect	Term used to express the consequence of an impact (expressed as the 'significance of effect'), which is determined by correlating the magnitude of the impact with the importance (or sensitivity) of the receptor or resource in accordance with defined significance criteria.
Electronic Service Delivery for Abnormal Loads	Outlines who needs to be notified about a proposed abnormal load delivery route.
Energy Consents Unit	Scottish Government agency that deals with certain energy related planning applications.
Environmental Impact Assessment (EIA)	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development.

Term	Definition
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Environmental Impact Assessment Report (EIAR)	Document produced in accordance with the EIA directive (as transposed into UK law by the EIA regulations) that reports the outcomes of the EIA process.
Habitats Regulations Assessment	Assessment of the impacts of implementing a plan or policy on a European site, the purpose being to consider the impacts of a project against conservation objectives of the site and to ascertain whether it would adversely affect the integrity of the site.
Heavy Goods Vehicle (HGV)	All goods vehicles > 3.5 tonnes gross maximum weight.
Indirect effects	Effects resulting indirectly from the Proposed Development as a consequence of the direct effects. Indirect effects often occur away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects.
Institute of Sustainability and Environmental Professionals (ISEP)	Formally known as Institute of Environmental Management and Assessment (IEMA) – ISEP is the leading global professional body for individuals working in environmental management and sustainability.
Instrument Flight Procedures	A series of written and graphical instructions to pilots to enable them to depart from and arrive at airports safely when flying in cloud or poor visibility.
King George V Docks	Located in Glasgow, KGV is the port from which the AIL components will be delivered.
L90	Index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background noise level. The LA90,10min is the A-weighted background noise level over a ten-minute measurement sample
Landscape character	The distinct and recognisable pattern of elements that occur consistently in a particular type of landscape that makes one landscape different from another, rather than better or worse.
Landscape receptors	Aspects of the landscape resource that have the potential to be affected by the Proposed Development.
Landscape value	The relative value or importance attached to different landscapes by society. A landscape may be valued by different stakeholders for a variety of reasons (often as a basis for designation or recognition), because of its quality, special features (including perceptual aspects such as scenic beauty), tranquillity or wildness, cultural associations, or other conservation issues.
Leq	Is the equivalent continuous sound level and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. The LAeq,T is the A-weighted equivalent continuous sound level over a given time period (T).

Term	Definition
Light Goods Vehicles (LGV)	All commercial vehicles < 3.5 tonnes gross maximum weight
Low Frequency Noise	Typically in the frequency range 20 to 200 Hz.
Magnitude (of change)	The combination of judgements about the size and scale of the predicted effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Mitigation	Measures intended to avoid, reduce and compensate adverse environmental effects. These can be embedded in the design, of standard/best practice or specific (additional) mitigation identified through the assessment.
Monitoring	Continuing assessment of the performance of the project, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
National Cycle Route	Designated National Cycle Routes within the UK.
National Planning Framework 4	National spatial planning strategy for Scotland.
Natural Heritage Zone (NHZ)	Defined regional areas used for bird species populations in Scotland
National Road Traffic Forecast	Factors used to apply future year growth to traffic flows
Nighttime Hours	ETSU-R-97 defines the nighttime hours as 23.00 to 07.00 every day.
Noise emission	The noise energy emitted by a source (e.g. a turbine).
Noise immission	The sound pressure level received at a given location (e.g. the nearest dwelling).
Ordnance Survey	Great Britain's national mapping agency.
Outdoor Access Management Plan	Document which provides information on and management measures for outdoor access during the constriction period.
Personal Injury Accident	Traffic accident which is recorded to have resulted in an injury.
Photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs.
Port of Entry (PoE)	Port from which AILs are to be delivered.
Primary Surveillance Radar	A device which transmits pulses of radio energy into the air and records reflections of those pulses from objects in the sky such as aircraft.
Proposed Development	Watchman Energy Park; the project that the Applicant or promoter seeks to implement.
Quiet Daytime Hours	ETSU-R-97 defines the quiet daytime hours as 18.00 to 23.00 Monday to Friday, 13.00 to 23.00 on Saturdays and 07.00 to 23.00 on Sundays.
Receptor	Defined individual environmental feature usually associated with population, fauna and flora with the potential to be affected by a project.
Residential Visual Amenity Threshold	The threshold at which the visual amenity of a residential property is changed and adversely affected to the extent that it may become a

Term	Definition
	matter of Residential Amenity and which, if such is the case, competent, appropriately experienced planners will weigh this effect in their planning balance.
Residual effects	Effects attributable to the Proposed Development following assessment of any proposed design mitigation/ enhancements.
Scenarios	Combinations of wind farm developments at different stages in the planning system, used in the cumulative assessment
Scoping Opinion	Opinion provided by a competent authority that indicates the issues an environmental impact assessment of a proposed development should consider.
Scoping Report	Describes the Project, methodology and proposed approach to assessment and identifies the key issues to be scoped in and out of the assessment. It ensures that the assessment focuses on the important issues and avoids those that are considered not significant.
Secondary Surveillance Radar	A form of radar that sends out a query signal which is received by equipment in aircraft, which then respond with a coded reply that identifies that particular aircraft to the radar operator.
Sensitivity	A specific receptors' vulnerability to change. Sensitivity is assessed by combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Shadow Flicker	A flickering effect caused when rotating wind turbine blades periodically cast shadows over neighbouring properties as they turn, through constrained openings such as windows.
Significance of effect	Measure of the importance or gravity of the environmental effect, defined by either generic significance criteria or criteria specific to the environmental topic.
Site	The area within the Site Boundary within which the Proposed Development lies.
Sites of Special Scientific Interest (SSSI)	SSSI is a statutory designation made by NatureScot under the Nature Conservation (Scotland) Act 2004. They include those areas of land and water that are considered to best represent natural heritage in relation to flora, fauna, geology and geomorphology.
Special Area of Conservation (SAC)	Sites designated under EU Directive (82/43/ECC) for the conservation of natural habitats and wild fauna and flora.
Special Protection Area (SPA)	Sites designated under EU Directive (79/409/EEC) for the conservation of wild birds.
Standardised Wind Speed	A wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m using a roughness length of 0.05 for standardisation purpose (in accordance with the IEC 61400-11 standard).
Study Area	Spatial area within which environmental effects are assessed (i.e. extending a distance from the project footprint in which significant

Term	Definition
	environmental effects are anticipated to occur). This may vary between the topic areas.
Survey Area	Spatial area within which environmental surveys are undertaken.
Transport Scotland	National transport agency for Scotland, delivering the Scottish Government's vision for transport.
Travel Plan Coordinator	Personal responsible for updating, promoting and implementing the Travel Plan
Trunk Road	Strategic road managed by Transport Scotland on behalf of Scottish Ministers.
Uncontrolled airspace	A category of airspace in which any aircraft can fly without clearance from or contact with any air traffic control agency.
Vantage Point	Defined location used for targeted flight activity surveys.
Visual amenity	The overall pleasantness of views enjoyed by people of their surroundings or to the visual setting or backdrop to the activities they enjoy whilst: living; working; recreating; visiting or travelling through an area.
Visual receptor	Individuals and/ or groups of people who have the potential to be affected by the Proposed Development.
Wind Shear	The change in the relationship between wind speed at different heights.
Wireline	A 2D visualisation which lays a grid over the 3D terrain model to illustrate landform
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which a development is theoretically visible

Abbreviations

Abbreviation	Expanded Term
AADT	Annual Average Daily Traffic
ACIfA	Associate of Chartered Institute for Archaeologists
ACoW	Archaeological Clerk of Works
ADT	Average Daily Traffic
agl	Above ground level
AIL	Abnormal Indivisible Load
AIP	Aeronautical Information Publication
AM	Amplitude Modulation
Amsl	Above mean sea level
ANO	Air Navigation Order
AOD	Above Ordnance Datum
AP	Annual Probability
APDO	Approved Procedure Design Organisation
asl	Above sea level
APEP	Aviation Population Estimates Panel
ATC	Automatic Traffic Count
ATCSMAC	Air Traffic Control Surveillance Minimum Altitude Chart
AWI	Ancient Woodland Inventory
BAC	Biodiversity Advisory Committee
BDMP	Bird Disturbance Management Plan
BEMP	Biodiversity Enhancement Management Plan
BESS	Battery Energy Storage System
bgl	Below ground level
BGS	British Geological Society
BHS	British Horse Society
BoCC	Birds of Conservation Concern
BoP	Balance of Plant
BP	Borrow Pit
BS	British Standard
BTO	British Trust for Ornithology
CA	Conservation Area
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication

Abbreviation	Expanded Term
cd	Candela
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute of Archaeologists
CIRIA	The Construction Industry Research and Information Association
CLVIA	Cumulative Landscape and Visual Impact Assessment
CNAL	Construction Noise Assessment Location
CRAA	Collision Risk Analysis Area
CRF	Clyde River Foundation
CRM	Collision Risk Modelling
CTMP	Construction Traffic Management Plan
CVWI	Clyde Valley Breeding Wader Initiative
D&G	Dumfries and Galloway
dB	Decibel
DBW	daytime bat walkover
DEMP	Decommissioning Environmental Management Plan
DfT	Department for Transport
DGCAS	Dumfries and Galloway Council Archaeological Service
DGRSG	Dumfries and Galloway Raptor Study Group
DIA	Drainage Impact Assessment
DME	Distance Measuring Equipment
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
DWPA	Drinking Water Protected Area
EASR	Environmental Authorisations (Scotland) Regulations
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
ECU	Energy Consents Unit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ESDAL	Electronic Service Delivery for Abnormal Loads
FAR	Further Assessment Required

Abbreviation	Expanded Term
FI	Financial Involvement
FLI	Fellow of the Landscape Institute
Ft	feet
FWPM	Freshwater pearl mussel
GCN	Great Crested Newt
GDL	Inventory Garden and Designated Landscape
GET	Golden Eagle Topographical
GIS	Geographic Information System
GLTA	Ground-level tree assessment
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition.
GPG	Good Practice Guidance
GPP	Guidance for Pollution Prevention
GWDTE	Groundwater Dependent Terrestrial Ecosystems
ha	hectares
HER	Historic Environment Records
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicle
HMU	Habitat Management Unit
HRA	Habitat Regulations Appraisal
IAF	Initial Approach Fix
ICAO	International Civil Aviation Organisation
ICF	Institute of Chartered Foresters
IDW	Inversive Distance Weighted
IEFs	Important Ecological Features
IES	Institute of Environmental Science
IFPs	Instrument Flight Procedures
IFR	Instrument Flight Rules
IMEA	Institute of Environmental Management and Assessment
INNS	Invasive non-native species
IOA	Institute of Acoustics
IOF	Important Ornithological Feature
ISEP	Institute of Sustainability and Environmental Professionals
JNCC	Joint Nature Conservation Committee

Abbreviation	Expanded Term
KGV	King George V Docks
km	Kilometre
LB	Listed Building
LCT	Landscape Character Type
LDP	Local Development Plan
LFA	Low Flying Area
LFN	Low Frequency Noise
LGV / Lights	Light Goods Vehicles
LI	Landscape Institute
LNCS	Local Nature Conservation Sites
LOS	Line of Sight
LVIA	Landscape and Visual Impact Assessment
m	metre
MIC	Maximum Instantaneous Charge
MoD	Ministry of Defence
Mph	Miles Per Hour
MSA	Minimum Sector Altitude
MSD	Minimum Separation Distance
MSS	Marine Scotland Science
MW	Megawatt
NAL	Noise Assessment Location
NAM	Normal Amplitude Modulation
NATS	formerly National Air Traffic Services
NBN	National Biodiversity Network
NCI	Nature Conservation Importance
NCR	National Cycle Route
NCV	National Conservation Value
ND3	National Development 3
NDB	Non-Directional Beacon
NERL	NATS En Route plc
NGR	National Grid References
NHZ	Natural Heritage Zone
nm	nautical mile
NML	Noise Monitoring Location

Abbreviation	Expanded Term
NPF4	National Planning Framework 4
NRHE	National Record of the Historic Environment
NSA	National Scenic Area
NSR	Noise Sensitive Receptor
NRTF	National Road Traffic Forecasts
NTS	Non-Technical Summary
NVC	National Vegetation Classification
OAM	Other Amplitude Modulation
OAMP	Outdoor Access Management Plan
OBEMP	Outline Biodiversity Enhancement Management Plan
OCEMP	Outline Construction Environmental Management Plan
OPMP	Outline Peat Management Plan
OS	Ordnance Survey
OWPS	Onshore Wind Policy Statement 2022
PAC	Pre-Application Consultation
PAN	Planning Advice Note
PCA	Peatland Condition Assessment
PCS	Power Conversion Systems
PIA	Personal Injury Accident
PLHRA	Peat Landslide Hazard Risk Assessment
PMP	Peat Management Plan
PoE	Port of Entry
PPP	Pollution Prevention Plan
PRA	Preliminary bat roost assessments
PRFs	Potential Roost Features
PSR	Primary Surveillance Radar
PVA	Population Visibility Analysis
PWS	Private Water Supply
RNP	Required Navigation Performance
RSPB	Royal Society for the Protection of Birds
RSR	Route Survey Report
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SEPA	Scottish Environment Protection Agency

Abbreviation	Expanded Term
SHT	Scottish Hill Tracks
SID	Standard Instrument Departure
SIL	Seismic Impact Limit
SLA	Special Landscape Area
SLC	South Lanarkshire Council
SM	Scheduled Monument
SNH	Scottish Natural Heritage (now NatureScot)
SPA	Special Protection Area
SPEN	Scottish Power Energy Networks
SPP	Species Protection Plan
SRMS	Scottish Raptor Monitoring Scheme
SSGEP	South of Scotland Golden Eagle Project
SSR	Secondary Surveillance Radar
SSRS	Saving Scotland's Red Squirrels
SSRSG	South Strathclyde Raptor Study Group
SSSI	Site of Special Scientific Interest
STAR	Standard Arrival Route
SuDS	Sustainable Drainage Systems
SUP	Southern Upland Partnership
SUW	Southern Upland Way
TAA	Terminal Arrival Altitude
TCC	Temporary Construction Compound
TMA	Terminal Control Area
TNL	Total ETSU-R-97 Noise Limit
TPC	Travel Plan Coordinator
TS	Transport Scotland
UKBAP	United Kingdom Biodiversity Action Plan
VHF	Very High Frequency
VP (LVIA)	Viewpoint
VP (Ornithology)	Vantage Point
WeBS	Wetland Bird Survey
WFD	Water Framework Directive
WLA	Wild Land Area
WoSAS	West of Scotland Archaeological Service
WQFMP	Water Quality and Fish Monitoring Plan

Abbreviation	Expanded Term
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Introduction

- 1.1.1 This Environmental Impact Assessment (EIA) Report (EIAR) has been prepared by Ramboll UK Limited (Ramboll) on behalf of Watchman Energy Park Limited ('the Applicant') in support of a Section 36 application for consent¹ to construct and operate a wind farm and associated infrastructure with a generation capacity of greater than (>) 50 MW.
- 1.1.2 The project is known as the Watchman Energy Park ('hereafter the Proposed Development'). The Proposed Development would comprise up to 13 turbines with maximum blade tip height of 240 m above ground level (agl) and a battery energy storage system (BESS) with an output of approximately 50 MW on a 1,089 hectare (ha) Site ('the Site') located approximately 10 km south of Crawford, 7 km south of Elvanfoot, and 12 km west of Moffat, in South Lanarkshire. The Site location is shown in **Figure 1.1 (EIAR Volume 3a)**.
- 1.1.3 The EIAR comprises five main volumes:
- Volume 1: Non-Technical Summary (NTS);
 - Volume 2: Main Report;
 - Volume 3a: Figures;
 - Volume 3b: Visualisations;
 - Volume 4: Technical Appendices; and
 - Volume 5: Confidential Appendices.
- 1.1.4 This Chapter of the EIAR makes reference to the following figures and technical appendices:
- Figures (EIAR Volume 3a):
 - **Figure 1.1: Site Location**
 - **Figure 1.2: Site Boundary and Land within Applicant's Control**
 - Technical Appendices (EIAR Volume 4)
 - **Technical Appendix 1.1: Planning Policy and Legislative Framework;**
 - **Technical Appendix 1.2: Consultation Register;**
 - **Technical Appendix 1.3: Technical Team;**
 - **Technical Appendix 1.4: Scoping Report;**
 - **Technical Appendix 1.5: Scoping Opinion;**
 - **Technical Appendix 1.6: Telecommunications Assessment;** and
 - **Technical Appendix 1.7: Eskdalemuir Seismic Impact Study.**

1.2 Purpose and Scope of the EIAR

- 1.2.1 The EIAR has been prepared to accompany the application to Scottish Ministers under Section 36 of the Electricity Act 1989². The EIAR has been prepared in accordance with The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (herein referred to as the 'EIA Regulations'). The EIAR has been prepared to meet the requirements of Schedule 4 of the EIA Regulations and the Institute of Sustainability & Environmental

¹ An application for consent for the Proposed Development will be made to the Scottish Ministers under section 36 of the Electricity Act 1989, along with a request for a direction that planning permission be deemed to be granted under section 57(2) of the Town and Country Planning (Scotland) Act 1997.

² Electricity generation projects of 50 MW and below are authorised under the Town and Country Planning (Scotland) Act, 1997. Those > 50 MW are authorised under section 36 of the Electricity Act 1989.

Professionals (ISEP)³ Quality Mark Criteria⁴. **Technical Appendix 1.1 (EIAR Volume 4)** provides further information about the legislative and policy background relevant to the Proposed Development.

- 1.2.2 The Proposed Development for which the Applicant is seeking consent is as follows:

"The erection and 40-year operation of a Renewable Energy Park comprising up to 13 wind turbines, each with a maximum overall height to vertical blade tip of 240 m, a battery energy storage system (BESS) with approximate capacity of 50 MW, together with ancillary development including transformers and related switchgear at each turbine; associated turbine foundations and hardstanding areas; a network of new and upgraded access tracks with associated water crossings, passing places and turning heads; borrow pits; substation compound; BESS compound, temporary site construction compounds and laydown areas; network of electrical cables; concrete batching plant; temporary meteorological masts during construction, and new/improved vehicular/Abnormal Indivisible Load (AIL) access to the Site from the A702 and the Daer Water road."

- 1.2.3 The Proposed Development has a grid connection offer for 2036 for a 132 kV transmission grid connection, connecting to Elvanfoot substation, located approximately 8.5 km north of the Site. Under ongoing grid reforms there is potential that the date and location of the connection will differ from that currently contracted. Given the responsibility of Scottish Power Energy Networks (SPEN) to provide the grid connection, including any necessary consents, the grid connection is not within the scope of the EIAR.

1.3 Other Planning Documents

- 1.3.1 The Section 36 application is accompanied by the following documents, which do not form part of the EIAR:

- Planning Statement;
- Design Statement;
- Pre-Application Consultation Report;
- Community Benefit Statement; and
- Maximising Socio-Economic Benefits Report.

1.4 The Site

- 1.4.1 **Figure 1.2 (EIAR Volume 3a)** shows the extent of the land within the Applicants control (blue line boundary) and the area of land proposed to contain all elements of the Proposed Development for the purposes of the Section 36 application (red line boundary - referred to hereafter as 'the Site' or 'Site Boundary' as applicable).
- 1.4.2 The Site covers an area of approximately 1,089 hectares (ha). The Site is located approximately 10 km south of Crawford, 7 km south of Elvanfoot and 12 km to the west of Moffat and between the valley of the Daer Water and commercial forestry to the north, Daer Reservoir and commercial forestry to the east, open moorland of the Southern Uplands to the south, and further open moorland with the A702 road beyond to the west. The Site is within the administrative boundary of South Lanarkshire Council (SLC).

³ ISEP previously known as the Institute of Environmental Management and Assessment (IEMA).

⁴ The EIA Quality Mark is a scheme operated by ISEP for organisations to make a commitment to excellence in their EIA activities and have this commitment independently reviewed. Available at: <https://www.isepglobal.org/corporate-programmes/eia-quality-mark/>

- 1.4.3 The landscape of the Site is one of undulating rounded hills and is characteristic of the Southern Uplands, covering a range of elevations rising from the floodplain of the Daer Water in the north, to the pronounced hills to the south including Comb Law, Hirstane Rig, Watchman's Brae, Rodger Law, and Ewe Gair.
- 1.4.4 The Site is predominately upland moorland used for livestock grazing with areas of commercial forestry in the northwest and smaller areas of broadleaf woodland in the northeast.
- 1.4.5 The Site is intersected by an approximate 2 km section of the Southern Upland Way (SUW).
- 1.4.6 The immediate vicinity of the Site is sparsely populated, with settlement largely confined to the valleys. There is one uninhabited residential property located within the Site, with a number of residential properties also located within approximately 2.5 km of the Site including properties along the A702 road, and the minor road (Daer Water road) leading to the Daer Reservoir.
- 1.4.7 Immediately to the south of the Site Boundary is the Shiel Dod Site of Special Scientific Interest (SSSI), which is designated for blanket bog; 282 ha of this SSSI overlap with the land within the Applicant's control (blue line boundary as shown on **Figure 1.2, EIAR Volume 3a**). Whilst no construction activities or development would occur within the SSSI, certain areas may be used for some measures as set out in the **Biodiversity Enhancement and Management Plan (Technical Appendix 6.7, EIAR Volume 4)**.
- 1.4.8 There is extensive wind energy development within this part of southern Scotland and there are several windfarms within the surrounding landscape of the Site including Clyde and Clyde Extension (operational) to the northeast, Daer and Rivox Wind Farms (both at application stage) to the east, and Harestanes and Minnygap (operational) to the southeast⁵.

1.5 The Applicant

- 1.5.1 Watchman Energy Park Limited is a wholly owned subsidiary of Renewco Power Limited. Renewco Power is a Scottish-based renewable energy developer focussed on developing utility-scale wind, solar and energy storage projects. The Glasgow based company is actively developing over 4 GW of renewable projects in three markets: the UK, Spain and Italy and employs over 40 people. The company's objective is that the development of these renewable energy projects in a responsible manner will accelerate the deployment of clean energy assets and enable countries to de-carbonise their power systems, while helping local communities to thrive. The company was formed by a highly experienced team of entrepreneurs and renewable sector specialists with significant development, technical, project structuring, construction, and financing expertise across all renewable technologies.
- 1.5.2 For further information about Renewco Power visit: <https://www.renewcopower.com/>.

1.6 EIA Process

- 1.6.1 EIA is a process that includes the identification, description and assessment of the potential significant environmental effects (both positive and negative) of a proposed development and proposes mitigation to avoid, reduce and offset any adverse environmental effects.
- 1.6.2 The Proposed Development is of a type listed in Schedule 2 of the EIA Regulations (paragraph (1) "a generating station"). On the basis that "the development is likely to have significant

⁵ The status of cumulative developments is as of the 18 December 2025.

effects on the environment by virtue of factors such as its nature, size or location” an EIA is required. In this case, the Applicant has volunteered to undertake an EIA rather than request a formal screening opinion.

- 1.6.3 The key stages in the EIA process adopted for the Proposed Development are summarised below.

Scoping and Consultation

- 1.6.4 The Applicant submitted a request for a Scoping Opinion to Scottish Ministers in November 2024. This request was accompanied by a Scoping Report (refer to **Technical Appendix 1.4, EIAR Volume 4**), prepared by the Applicant, which set out a summary of the proposals; identified the likely significant environmental effects; and summarised the proposed scope of the EIA.
- 1.6.5 A Scoping Opinion (refer to **Technical Appendix 1.5, EIAR Volume 4**) was received from ECU on 13 March 2025. The contents of this and other consultation responses received are summarised in **Technical Appendix 1.2 (EIAR Volume 4)**, along with a list of all bodies consulted during the scoping exercise.
- 1.6.6 In addition to seeking a Scoping Opinion, the Applicant conducted public exhibitions to seek the views of the local community. Two public exhibitions were held in Crawford on 3 December 2024, and one further consultation event was held in Crawford Hall, Crawford, ML12 6TW on the 12 May 2025.
- 1.6.7 A summary of the representations received during the public exhibitions and associated consultation periods is provided in the Pre-Application Consultation (PAC) Report, which accompanies the Section 36 application.

Topics Scoped Into EIAR

- 1.6.8 Following scoping and baseline characterisation, the EIAR provides an impact assessment Chapter for each of the following disciplines/factors/issues:
- Landscape and Visual Amenity;
 - Cultural Heritage;
 - Ecology;
 - Ornithology;
 - Hydrology, Hydrogeology, Geology and Soils;
 - Traffic and Transport;
 - Noise;
 - Aviation; and
 - Shadow Flicker.
- 1.6.9 The Scoping Report (refer to **Technical Appendix 1.4, EIAR Volume 4**) proposed to scope out shadow flicker from the EIAR, however, following further assessment of the layout of the Proposed Development in relation to the potential for significant effects from shadow flicker this has now been scoped into the assessment (refer to **Chapter 12: Shadow Flicker, EIAR Volume 2**).
- 1.6.10 The Scoping Report (refer to **Technical Appendix 1.4, EIAR Volume 4**) proposed to include an assessment of effects of the Proposed Development on Telecommunications. However, following further assessment of the layout of the Proposed Development in relation to potential for significant effects to telecommunications assets this has now been scoped out of detailed

assessment for the EIAR (further details on reasons for scoping out of telecommunications is provided below).

Topics Scoped Out of EIAR

- 1.6.11 During the scoping process several issues were identified as not being likely to cause significant effects on the environment as a result of the Proposed Development. These issues are described below.

AIR QUALITY

- 1.6.12 The Proposed Development is not considered likely to give rise to significant effects on air quality. Potential impacts are limited to construction activities, such as dust from soil stripping, earthworks, excavation, occasional blasting, and vehicle emissions.
- 1.6.13 Construction impacts would be localised, short-term, intermittent, and controllable through good practices. Limited fixed and mobile plant would operate briefly. Air quality management measures, including dust control, would be detailed in the outline Construction Environmental Management Plan (OCEMP) in the EIAR (refer to **Technical Appendix 2.1, EIAR Volume 4**).
- 1.6.14 Exhaust emissions from construction vehicles NO₂ and PM₁₀ would be minimal, well below UK Air Quality Strategy Objectives⁶. Operational emissions would be negligible, arising only from occasional maintenance vehicles.
- 1.6.15 Therefore, air quality is scoped out of the EIAR.

CLIMATE CHANGE

- 1.6.16 The Proposed Development would contribute positively to Scotland's and the UK's carbon reduction targets by producing low-carbon renewable energy, thereby replacing generating capacity typically provided by more carbon-intensive sources.
- 1.6.17 However, it is acknowledged that the Proposed Development would still give rise to carbon emissions associated with its construction. A transparent account of these emissions throughout the project's lifecycle is provided in a Carbon Balance Assessment which is included as a technical appendix to the EIAR (refer to **Technical Appendix 2.4, EIAR Volume 4**).
- 1.6.18 The Carbon Balance Assessment calculates the expected carbon savings over the Proposed Development's lifetime using the Scottish Government's latest Carbon Calculator Tool⁷. It follows the recommended methodology⁸ and presents emissions associated with construction materials and the wind turbines themselves, including ground conditions, access preparations, foundation excavations, materials use on-site, transportation of materials and components to Site, and any carbon losses due to peat degradation.
- 1.6.19 The vulnerability of the Proposed Development to climate change has been considered during the detailed design process, addressing potential impacts like increased flood risk and extreme weather conditions. Given the adoption of a climate-resilient design and the integration of key environmental risks associated with climate change (e.g., flood risk) within the scoped-in environmental topics, a separate assessment of climate resilience has been scoped out of the EIAR.

⁶ Refer to <https://uk-air.defra.gov.uk/air-pollution/uk-limits>

⁷ Available at: <https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/>

⁸ Nayak et. al., (2010) Calculating Carbon Savings from Wind Farms on Scottish Peatlands – A New Approach. Available at: <https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach>

POPULATION AND HUMAN HEALTH

- 1.6.20 The EIA assesses "human health" in terms of amenity impacts related to water supplies, air quality, noise, traffic, visual amenity, and shadow flicker. Low population density near the Proposed Development would minimise these amenity impacts. No other health impact pathways have been identified.
- 1.6.21 Potential significant effects on "population" are addressed in the Maximising Socio-Economic Benefits report which accompanies this EIAR.
- 1.6.22 Control measures for construction impacts on air, noise, and water quality are included in the outline CEMP appended to the EIAR (refer to **Technical Appendix 2.1, EIAR Volume 4**). A Decommissioning Environmental Management Plan (DEMP) would also be prepared which would include similar measures as the CEMP.
- 1.6.23 Thus, separate human health and population impact assessment chapters is scoped out of the EIAR.

SOCIO-ECONOMICS AND TOURISM

- 1.6.24 Socio-economic and tourism assessments of onshore windfarms over the last decade have found no significant adverse effects in terms of the EIA regulations and as such there is no reason to expect significant adverse effects for the Proposed Development.
- 1.6.25 Furthermore, tourism reports^{9,10} have concluded that there is no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at the local authority level nor in the areas immediately surrounding wind farms developments.
- 1.6.26 Consequently, socio-economics, recreation, and tourism are scoped out of the EIAR.
- 1.6.27 However, in recognition that socio-economic and tourism issues are of interest to stakeholders and local authorities a separate Maximising Socio-Economic Benefits Report accompanies the Section 36 application.

ICE THROW

- 1.6.28 Standard mitigation for the risk of ice throw comprises off-site monitoring to enable the deactivation of turbines on sensing ice accumulation, as well as physical and visual warnings for both site personnel and third parties. In line with current guidance, a permanent warning sign at the Site's entrances is proposed to alert the public to the possibility of ice throw under certain weather conditions.
- 1.6.29 Considering the above, no potential significant effects as a result of ice throw from the Proposed Development are anticipated and ice throw is scoped out of the EIAR.

RISK OF MAJOR ACCIDENTS AND/OR DISASTER

- 1.6.30 The EIA Regulations require the consideration of the potential risks to human health, cultural heritage or the environment associated with the vulnerability of the Proposed Development to major accidents and disasters. This requirement is interpreted as requiring the consideration of high consequence events (even if of low likelihood) which would result in serious harm or damage to environmental receptors.

⁹ BiGGAR Economics. (2021). Wind Farms and Tourism Trends in Scotland: Evidence from 44 Wind Farms

¹⁰ BiGGAR Economics. (2017). Wind Farms and Tourism Trends in Scotland: A Research Report.

- 1.6.31 Given the nature of the Proposed Development, the potential for effects related to vulnerability to risks of accidents and disasters is likely to be limited to those effects associated with extreme weather, mechanical failure or structural damage. Relevant types of major accident/disaster, given the predominantly rural context of the Proposed Development, include:
- severe weather events, including high winds, high rainfall leading to flooding, or extreme cold leading to heavy snow and ice loading;
 - fire;
 - traffic related accidents; and
 - mass movement associated with ground instability.
- 1.6.32 Severe weather resilience is a core component of wind farm design and includes consideration of flooding resilience and the ability to manage the site remotely in the event that it is inaccessible due to hazardous weather conditions. The wind farm design includes consideration of designing out health and safety risks associated with construction and operation (including accidents and disasters associated with fire and traffic movements) in accordance with the duties under The Construction (Design and Management) Regulations 2015.
- 1.6.33 Potential risks and hazard associated with mass movement (peat instability) have been assessed and presented in **Technical Appendix 8.6 (EIAR Volume 4)**.
- 1.6.34 No other potential significant effects on human health, cultural heritage or the environment associated with the vulnerability of the Proposed Development to major accidents and disasters have been identified and therefore no specific Major Accidents and Disasters assessment has been included in the EIAR.

TELECOMMUNICATIONS

- 1.6.35 There is one fixed microwave telecommunications link¹¹ within 1 km of any of the proposed wind turbine positions, and it has been confirmed by Mobile Broadband Network Ltd (MBNL) (operator of the link) that the Proposed Development will have no effects on this link. Further details of this assessment are included in **Technical Appendix 1.6 (EIAR Volume 4)**.
- 1.6.36 Considering the above, no significant effects are anticipated on telecommunications as a result of the Proposed Development.

ESKDALEMUIR SEISMIC ARRAY

- 1.6.37 The Site lies within the 50 km MoD Safeguarding zone for the Eskdalemuir Seismic Array. The detection capabilities of the Eskdalemuir Seismic Array are protected from seismic noise generated by wind turbines using a cumulative 0.336 nm noise budget for all turbines built within 50 km of the array. As the Site is approximately 30 km from the array, it is an extremely efficient use of any available vibration budget.
- 1.6.38 The Applicant contracted subject matter experts Xi Engineering Consultants to determine the impact of the Proposed Development on the Eskdalemuir Seismic array. **Technical Appendix 1.7 (EIAR Volume 4)** calculates the required Seismic Vibration budget for the Proposed Development and compares this to the available budget based on most up to date science.

¹¹ Link is operated by Mobile Broadband Network Ltd (MBNL) between Shiel Dod and Green Lowther. MBNL is a joint venture between EE and 3UK.

- 1.6.39 It is expected that the Proposed Development could be built without adversely affecting the Eskdalemuir array, remaining within the MoD's agreed 0.336 nm cumulative vibration budget. Please refer to **Technical Appendix 1.7 (EIAR Volume 4)** for further information.

Baseline Characterisation

- 1.6.40 Baseline characterisation is the process by which the environmental conditions now and in the future (assuming no development on the Site) are established. The process has included a combination of desk research, Site surveys, and empirical study and projection.
- 1.6.41 The environmental baseline adopted for the purposes of the EIA is stated in each of the technical chapters provided in the EIAR. The baseline is normally taken as the current character and condition of a site and surrounds, and the potential significant environmental effects of the Proposed Development are then assessed in the context of the current conditions. If applicable, consideration of the future baseline is included within the assessments.

Mitigation by Design and Consideration of Alternatives

- 1.6.42 Following the baseline characterisation, the information collected on environmental constraints was used to inform the consideration of design alternatives.
- 1.6.43 An iterative process was followed, with the aim of the design process to develop an optimal solution which seeks to maximise potential renewable energy generation, within the technical and environmental constraints. The main aim has been to avoid likely significant environmental effects through the design. The avoidance/reduction of environmental effects through the design process is referred to throughout the EIAR as 'embedded mitigation'.
- 1.6.44 Further details on the design process are set out within **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.

Standard/Best Practice Mitigation

- 1.6.45 Standard/best practice mitigation measures are considered to be an integral part of any development, with these mitigation measures having a high level of certainty in relation to their effectiveness. It is considered that there would be no consented scenario where these mitigation measures would not be implemented as part of the Proposed Development.
- 1.6.46 As such, the impact assessment of likely significant effects assumes that these standard/best practice mitigation measures are implemented. These measures are detailed in each technical chapter of the EIAR.

Impact Assessment

- 1.6.47 The next stage in the EIA process was to complete an impact assessment to address the likely significant effects remaining following the implementation of mitigation by design (embedded) and standard/best practice mitigation. An assessment chapter has been provided for each issue where it is considered that there are likely significant effects associated with the Proposed Development during construction, operation or decommissioning. Each assessment considers primary, secondary, direct, indirect and cumulative effects and defines the assessment methodology used and the criteria by which a significant effect is defined.

Specific Mitigation

- 1.6.48 The impact assessment is used to identify where specific mitigation is required to address likely significant effects, where it has not been possible to avoid the effect through design of

the turbine or infrastructure layout (embedded mitigation) or via the implementation of standard/best practice mitigation.

- 1.6.49 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect to a level not considered significant, as identified through the EIA. Where necessary and possible, offsetting and compensatory measures are considered.
- 1.6.50 **Chapter 13: Schedule of Environmental Commitments (EIAR Volume 2)** provides a summary of the mitigation measures provided in each of the technical chapters to avoid, reduce or offset impacts which would give rise to significant residual effects. Mitigation to further reduce environmental effects, which are not considered to give rise to likely significant effects with or without mitigation, is also detailed, where applicable.

Statement of Competence

- 1.6.51 In accordance with regulation 5(5) of the EIA Regulations, by appointing Ramboll UK Limited (Ramboll) the Applicant has ensured that the EIAR has been prepared by 'competent experts'.
- 1.6.52 The EIAR has been compiled and approved by professional EIAR practitioners at Ramboll, holding relevant undergraduate and post-graduate degrees, membership of ISEP and Chartered Environmentalist status with the Society for the Environment. The EIAR meets the requirements of the ISEP EIA Quality Mark Scheme⁴.
- 1.6.53 The project team comprises the companies presented in **Table 1.1**. Experience of the lead authors of the technical reports are included in **Technical Appendix 1.3 (EIAR, Volume 4)** and each of the assessment chapters provides details of the relevant professional memberships of the author, code of practice followed and assessment methodology used.

Table 1.1: Project Team	
Discipline	Discipline Organisation
Lead EIA Consultant	Ramboll
Carbon Balance	Ramboll
Planning and Policy	David Bell Planning
Landscape and Visual Amenity	MVGLA Ltd
Cultural Heritage	CFA Archaeology
Ecology and Ornithology	SLR Ltd (previously MacArthur Green) ¹²
Hydrology, Hydrogeology and Geology	Ramboll
Traffic and Transport	Pell Frischmann
Noise	TNEI Services Ltd
Aviation	Aviatica
Socio-Economics	Biggar Economics
Telecommunications	Aviatica
Shadow Flicker	Ramboll
Eskdalemuir Seismic Array	Xi Engineering Consultants

¹² Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

1.7 Copies of the EIAR

- 1.7.1 Paper copies of the EIAR will be made available to view at the following publicly accessible location: Crawford Hall, 100 Carlisle Road, Crawford, Biggar, Scotland, ML12 6TW.
- 1.7.2 Printed copies of the **Non-Technical Summary (EIAR Volume 1)** along with USB sticks containing the full EIAR will also be available at Crawford Hall to take away while stocks last.
- 1.7.3 The EIAR, including all figures, technical appendices and accompanying documents are available to view and download on the project website¹³ free of charge.
- 1.7.4 The application documents will also be available via the Scottish Government Energy Consents Unit (ECU) portal¹⁴ under application reference ECU00006030 and on South Lanarkshire planning portal¹⁵.
- 1.7.5 The Applicant will work closely with the Scottish Government's ECU to ensure all statutory consultees receive a physical copy of this EIAR upon request.
- 1.7.6 In the interests of sustainability and the drive towards Net Zero carbon emissions, reference to the paperless (project website/ECU and SLC online planning portals/USB) version is strongly recommended
- 1.7.7 For anyone who has difficulty accessing the documentation online, a USB copy will be made available free of charge by contacting the Project Team:
- Email: watchman@renewcopower.com
 - Telephone: 0141 3196144
 - Post: Watchman Energy Park, Renewco Power, 12 Alva Street, Edinburgh EH2 4QG.
- 1.7.8 Hardcopies of the EIAR can be printed for purchase on request from the Project Team (details above) at a charge of £2,000 for a hardcopy and £15 on USB storage device. Copies of a short Non-Technical Summary are available free of charge.

1.8 Commenting on the Application

- 1.8.1 When the application for the Proposed Development is lodged with Scottish Government, the Applicant will advertise the application in accordance with legislation as follows:
- Edinburgh Gazette;
 - A national newspaper for one week (The Herald);
 - The Carlisle & Lanark Gazette for two successive weeks;
 - The Carlisle and Lanark Advertiser for two successive weeks; and
 - On the Project website website¹³.
- 1.8.2 The advertisement will provide details of the date by when representations should be made. The Scottish Government will invite formal representations on the Proposed Development, which will be taken into account before any decision is reached on the application.
- 1.8.3 Any representations on the application may be submitted via www.energyconsents.scot, using the relevant Project Name and/or ECU reference number (ECU00006030). Please note that you must be in possession of a working email address to submit a representation virtually.

¹³ <https://www.renewcopower.com/portfolio/united-kingdom/uk-projects/watchman-energy-park/>

¹⁴ <https://www.energyconsents.scot/Default.aspx>

¹⁵ <https://publicaccess.southlanarkshire.gov.uk/online-applications/>

- 1.8.4 Representations can also be submitted by post to Scottish Government, Energy Consents Unit, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU, identifying the Proposed Development and specifying the grounds for representation. Written representations should be dated, clearly stating the name (in block capitals) and include a full return postal address of those making representations.

2 Description of Proposed Development

2.1 Introduction

2.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) provides a description of the Proposed Development for the purposes of identifying and assessing likely significant effects. Information is provided on the:

- Location of the Proposed Development;
- Physical characteristics of the development including the land-use requirements during the construction and operational phases;
- Main characteristics of the construction and operational phase of the development having regard to the type and quantity of expected residues and emissions; and
- Typical activities associated with the decommissioning of the Proposed Development.

2.1.2 This Chapter is supported by the following Figures and Technical Appendices:

- **Figures (EIAR Volume 3a):**
 - **Figure 2.1: Site Layout;**
 - **Figure 2.2: Typical Wind Turbine Elevations;**
 - **Figure 2.3: Typical Turbine Foundations and Crane Hardstanding Dimensions;**
 - **Figure 2.4: Typical Access Track Detail;**
 - **Figure 2.5: Typical Substation and Compound Layout;**
 - **Figure 2.6: Typical Cable Trench Section;**
 - **Figure 2.7: Typical Temporary Construction Compound Layout;**
 - **Figure 2.8: Typical Battery Storage Layout;**
 - **Figure 2.9: Typical Battery Storage Container Details;**
 - **Figure 2.10: Typical PCS Elevations; and**
 - **Figure 2.11: Core Path Diversion – Cross Sections.**
- **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 2.1: Outline Construction Environmental Management Plan (OCEMP);**
 - **Technical Appendix 2.2: Borrow Pit Assessment;**
 - **Technical Appendix 2.3: Forestry and Woodland Assessment; and**
 - **Technical Appendix 2.4: Carbon Balance Assessment.**

2.2 Site Context

2.2.1 **Figure 1.2 (EIAR Volume 3a)** show the extent of the land within the Applicants control (blue line boundary) and the area of land proposed to contain all elements of the Proposed Development for the purposes of the Section 36 application (red line boundary) (referred to hereafter as 'the Site' or 'Site Boundary' as applicable).

2.2.2 The Site covers an area of approximately 1,089 hectares (ha) and is located approximately 10 km south of Crawford, 7 km south of Elvanfoot and 12 km to the west of Moffat and between the valley of the Daer Water to the north, Daer Reservoir and commercial forestry to the east, open moorland of the Southern Uplands to the south, and further open moorland and commercial forestry with the A702 road beyond to the west. The Site is within the administrative boundary of South Lanarkshire Council (SLC).

- 2.2.3 The immediate vicinity of the Site is sparsely populated, with scattered dwellings within the valleys. There is one uninhabited residential property located within the Site, with a number of residential properties also located within approximately 2.5 km of the Site Boundary including properties along the A702 road, and the minor road (Daer Water road) leading to the Daer Reservoir.
- 2.2.4 There are two access routes into the Site: the Western Access, which would be taken from the A702 through Watermeetings Forest, and the Eastern Access, which would be taken from from the Daer Water road, entering the Site at Wintercleugh.
- 2.2.5 The landscape of the Site is typical of the wider location, undulating and includes a series of rounded hills characteristic of the Southern Uplands including Comb Hill, Watchman's Brae and Rodger Law.
- 2.2.6 The Site is currently used for livestock grazing with areas of commercial forestry in the northwest and smaller areas of broadleaf woodland in the northeast.
- 2.2.7 The main area of the Proposed Development where the turbines and associated infrastructure are to be located (hereafter referred to as the area of the 'wind turbine array' or the 'main development area of the Site' as appropriate) predominantly comprises upland moorland and is intersected by an approximately 2 km section of the Southern Upland Way (SUW).
- 2.2.8 There is one Scheduled Monument within the Site: Smithwood, Bastle House, with a further 34 Scheduled Monuments located within 10 km of the Site. There are 30 non-designated heritage assets located within the Site, and all of these are considered to be of local/regional importance.
- 2.2.9 A number of watercourses run through the Site. The south of the Site is within the catchment of Daer Water, upstream of Daer Reservoir which is located a short distance east of the Site. The central area of the Site drains to Kirkhope Cleuch which in turn flows to Daer Reservoir with the west of the central catchment draining directly to Daer Reservoir. The north of the Site (approximately 15% of the total Site area) drains via Meikle and Calf Burn to Daer Water downstream of the reservoir. A very small area (<5% of the total Site area) drains in a north westerly direction to Potrail Water. Approximately 30% of the Site is within the Daer Water Drinking Water Protected Area (DWPA, Surface).
- 2.2.10 Immediately to the south of the Site Boundary is the Shiel Dod Site of Special Scientific Interest (SSSI), which is designated for blanket bog; 282 ha of this SSSI overlap with the land within the Applicants control (refer to **Figure 1.2, EIAR Volume 3a**). Whilst no construction activities or development would occur within the SSSI, certain areas are proposed to be used for some measures as set out in the Biodiversity Enhancement and Management Plan (**Technical Appendix 6.7, EIAR Volume 4**).
- 2.2.11 There is extensive wind energy development within this part of southern Scotland and there are several windfarms within the surrounding landscape of the Site including Clyde and Clyde Extension (operational) to the northeast, Daer and Rivox Wind Farms (both at application stage) to the east, and Harestanes and Minnygap (operational) to the southeast¹.

¹ The status of cumulative developments is as of the 18 December 2025.

2.3 Project Description

Overview

- 2.3.1 The Proposed Development would comprise up to 13 turbines, and a Battery Energy Storage System (BESS) of approximately 50 MW along with associated infrastructure, arranged as illustrated on **Figure 2.1 (EIAR Volume 3a)**.
- 2.3.2 The Proposed Development would include the following key components:
- Up to 13 wind turbines with a maximum tip height of 240 m and with a combined generation capacity of > 50 MW;
 - Permanent foundations supporting each wind turbine, and associated crane hardstanding at each wind turbine base;
 - Two site accesses for use during construction and operation; the Western Access from the A702 through Watermeetings Forest and the Eastern Access from the Daer Water road to enter the Site at Wintercleugh, with both access points designed to accommodate abnormal indivisible loads (AIL) required for turbine component delivery;
 - Series of upgraded and new on-site access tracks with associated watercourse crossings, passing places and turning heads;
 - Underground power cables, generally laid in trenches alongside access tracks connecting the turbines to the on-site substation;
 - On-site Substation Compound inclusive of substation and control building;
 - On-site BESS Compound to accommodate a BESS of approximately 50 MW capacity²; and
 - Temporary Construction Compound and laydown areas.
- 2.3.3 In addition, the following ancillary works may be necessary:
- Extraction of rock from borrow pits - two borrow pits locations have been identified;
 - Temporary on-site concrete batching plant which would be located within the Temporary Construction Compound area;
 - Temporary anemometer masts for three to six months during the construction period for calibration purposes;
 - Habitat management and enhancement areas; and
 - Permanent diversion to a short section (approximately 880 m) of the SUW at the point where the Western Access route enters the main development area of the Site.
- 2.3.4 A temporary diversion during construction would be put in place for the part of the SUW and this would follow an established diversion route used during forestry operations and is formed of an existing track alignment.
- 2.3.5 The locations of the proposed turbines and other infrastructure would be subject to 'micrositing'. This process allows for minor changes in turbine or infrastructure locations to respond to possible variations in ground conditions across the Site, which would only be confirmed following detailed site investigation work carried out prior to construction. This process also provides scope for further mitigation of localised potential environmental effects through avoidance of sensitive features. It is anticipated that a micrositing distance of 100 m would form a condition accompanying any consent. Any repositioning would be carried out under the supervision of an Ecological Clerk of Works (ECoW) and an appropriately

² Approximate capacity of the BESS within the BESS Compound based on current technology.

experienced and qualified engineer with the objective to optimise the development whilst avoiding or minimising any new or additional significant environmental effects. The proposed layout for the Proposed Development is shown on **Figure 2.1 (EIAR Volume 3a)**.

Wind Turbines and Turbine Layout

- 2.3.6 The turbine coordinates of the proposed turbines are set out in **Table 2.1**.

Table 2.1: Turbine Locations		
Turbine Number	Easting	Northing
1	295138	608020
2	294004	608436
3	294210	608044
4	295198	607540
5	294455	607687
6	294266	607086
7	293875	606403
8	293921	605354
9	294596	605841
10	295263	606185
11	295885	606169
12	295299	605418
13	294650	605231

- 2.3.7 The turbine locations would be subject to micro-siting during the construction phase. The Construction Environmental Management Plan (CEMP) would include detailed guidance on the application of the proposed micro-siting tolerance. An outline CEMP (OCEMP) is included in **Technical Appendix 2.1 (EIAR Volume 4)**.
- 2.3.8 The exact model of wind turbine to be installed at the Proposed Development would be selected through a competitive procurement process. For each assessment in the EIA a worst-case scenario of the turbine dimensions/characteristics has been used. An indicative turbine for the Proposed Development is shown on **Figure 2.2 (EIAR Volume 3a)**.
- 2.3.9 Wind turbines are available in a variety of colours, the most common being off white or light grey. The finish is normally semi-matt. The final turbine details including their colour would be submitted to SLC for approval during the process of discharging to conditions associated with the consent.
- 2.3.10 Based on current (2025) wind turbine generator technology, the typical generation capacity for a turbine of the size 240 m tip height and design proposed would be approximately 7 MW.

Turbine Foundations

- 2.3.11 Turbines are typically fixed to a reinforced concrete foundation, which is made up of a central excavation approximately 25 m in diameter and 3.5 m deep depending upon ground conditions. Sloping batters would increase the excavated area to approximately 32 m diameter at ground level. A typical foundation is illustrated on **Figure 2.3 (EIAR Volume 3a)**.
- 2.3.12 Prior to excavation, topsoil and existing vegetation would be lifted and stored. After completion the foundation would be backfilled with suitable excavated, or if required imported

material, and the original vegetation would be reinstated around the hardstanding areas where possible.

- 2.3.13 Concrete for construction, including turbine foundations, would likely be batched on-site within the Temporary Construction Compound.

Turbine Hardstanding

- 2.3.14 The turbines would be erected using mobile cranes. These require areas of hardstand adjacent to the turbine locations, which can support the load of the cranes on their outriggers. Hardstand areas are both temporary and permanent and are formed by excavating soft ground and infilling with compacted stone (refer to **Figure 2.3, EIAR Volume 3a**).
- 2.3.15 The permanent hardstand area is located immediately adjacent to the turbine foundation and is used to support the crane and heavy machinery operation during both the initial construction and ongoing operational maintenance. Temporary hardstand areas are used during construction for crane assembly, component laydown, material storage and as a general working area, with these areas returned to their original condition following construction.
- 2.3.16 Typical permanent hardstand areas per turbine are approximately 2,016 m², with the temporary hardstand area at each turbine location approximately 4,414 m². These dimensions are dependent on the site ground conditions.

Turbine Lighting

- 2.3.17 The Proposed Development would require visible aviation lighting under the current Civil Aviation Authority (CAA) policy statement³. In order to mitigate the nighttime visual impact of the Proposed Development on non-aviation receptors a reduced lighting scheme has been designed and would be submitted to the CAA for approval.
- 2.3.18 The reduced lighting scheme proposes 2000 candela (cd) nacelle lighting on seven of the 13 turbines (T1, T2, T7, T8, T9, T11 and T13) and no mid-tower lighting. The lighting scheme also includes for the reduction of the intensity of the lights (to 200 cd) during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km.
- 2.3.19 Infrared lighting as required by the Ministry of Defence (MoD) (not visible to the naked eye) is proposed to be installed all turbines.
- 2.3.20 Further details on the reduced lighting scheme are included in **Technical Appendix 4.5 (EIAR Volume 4)**.

Electrical Cabling

- 2.3.21 Electrical connections from the wind turbines to the on-site substation would be made via underground cables. All electrical cabling on-site would be laid in trenches approximately 1.25 m to 2 m wide (depending on the number of circuits in each trench) and approximately 1 m deep, located adjacent to the access tracks, in the verge or close to the track which would allow for easy access to lay the cable.
- 2.3.22 Typical cable trench detail is illustrated on **Figure 2.6 (EIAR Volume 3a)**.

³ Safety & Airspace Regulation Group (2017), Policy Statement Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level. Available at <https://www.caa.co.uk/publication/download/16178>

On Site Substation and Compound

- 2.3.23 The Substation Compound would measure approximately 8,000 m² (80 m x 100 m) and would be located adjacent to the BESS compound (refer to **Figure 2.1, EIAR Volume 3a**). It would comprise of a substation and control building, including basic welfare facilities (e.g., toilets and parking area), and potentially external electrical equipment. **Figure 2.5 (EIAR Volume 3a)** shows a typical substation and control building layout. The control building would be approximately 550 m², with a maximum height of 8.5 m.
- 2.3.24 The Substation Compound would have two separate access points consisting of crushed stone hardstanding. The crushed stone hardstanding would be located around the substation infrastructure to allow for access and maintenance to all parts of the substation area during operation.

Battery Energy Storage System

- 2.3.25 A BESS Compound, with a footprint measuring approximately 9,500 m² (190 m x 50 m) would be located adjacent to the Substation Compound (refer to **Figure 2.1, EIAR Volume 3a**). The BESS compound would comprise a BESS MV switch and Control room and a series of containers for the batteries and power conversion systems (PCS) units, together with a buried firewater tank and associated parking areas and security fencing (**Figure 2.8, EIAR Volume 3a**).
- 2.3.26 The MV switch and control room would require an approximate area of 185 m² at a maximum height of approximately 3.2 m.
- 2.3.27 Each battery container would be approximately 15 m² with a maximum height of 3 m (refer to **Figure 2.9, EIAR Volume 3a**). Each PCS unit would be approximately 30 m² with a maximum height of approximately 3 m (refer to **Figure 2.10, EIAR Volume 3**).
- 2.3.28 The BESS Compound would have two separate access points consisting of crushed stone hardstanding. The crushed stone hardstanding would be located around the BESS infrastructure to allow for access and maintenance to all parts of the BESS area during operation.

Temporary Construction Compound

- 2.3.29 A Temporary Construction Compound would be required to enable construction of the Proposed Development. The compound would be located as shown on **Figure 2.1 (EIAR Volume 3a)** and would include:
- Access tracks and internal circulation routes for vehicles and pedestrians;
 - Lighting for security and safety during hours of darkness;
 - Surface water management measures;
 - Concrete batching plant area;
 - Equipment storage;
 - Receiving area for incoming vehicles;
 - Maintenance and refuelling facilities;
 - Waste, recycling and materials management facilities;
 - General laydown areas;
 - Temporary office accommodation and welfare buildings (toilets, kitchen/canteen, drying rooms); and
 - Parking.

- 2.3.30 The temporary construction compound approximate area would be approximately 7,540 m².
- 2.3.31 A typical layout for the Temporary Construction Compound is shown in **Figure 2.7 (EIAR Volume 3a)**.

Access and Site Tracks

- 2.3.32 There are two access routes into the Site:
- Western Access – from the A702 through Watermeetings Forest; and
 - Eastern Access – from the Daer Water road to enter the site at Wintercleugh.
- 2.3.33 For more information on the delivery route to the Site see **Chapter 9: Transport, Traffic and Access (EIAR Volume 2)**.
- 2.3.34 The on-site track length for the Proposed Development is approximately 17.37 km. This would include the construction of new tracks (13.97 km), upgraded of existing tracks (2.73 km) and tracks that are proposed to be floated (0.67 km) in deeper areas of peat (refer to **Figure 2.1, EIAR Volume 3a**).
- 2.3.35 Tracks would have a typical 6 m running width on straight sections with a 0.5 m wide shoulders on each side. The track would be widened on bends, at junctions and passing places as required.
- 2.3.36 Given the restrictive junctions at the connecting tracks to T5, and T12/13, which constrains AIL manoeuvrability, a dedicated turning loop is proposed between T11 and T10. This eliminates the need for turning heads at the affected track junctions.
- 2.3.37 In areas where the peat and topsoil are consistently less than (<) 1 m deep, the vegetation and soil would typically be stripped to a suitable subsoil layer and the track (approximately 300 mm to 500 mm thick) would be constructed on the subsoil. The upper topsoil layer, together with turf, would be stored temporarily and then used in landscaping and revegetating the track shoulders and track side drainage, where possible.
- 2.3.38 Once the soil has been removed, as described above, to a suitable founding layer, the road and running surface would be constructed by tipping and compacting aggregate to the required shape and thickness. Cross-sections of the final road shape following reinstatement of the roadside slopes by replacing the layers of excavated material in the correct order are presented in **Figure 2.4 (EIAR Volume 3a)**.
- 2.3.39 Where it is not possible to avoid areas of peat greater than (>) 1 m and suitable engineering criteria are met, for example shallow topography (below 5%), floating tracks would be required to be constructed. It is anticipated that there would be a maximum of 0.67 km of floating track required in the southwest of the Site between Turbines 7 and 8. The use of 'floating roads' in these areas of deeper peat eliminates the need for peat excavation and minimises effects on ecology and disruption to existing water paths and allows for some filtration.
- 2.3.40 The on-site track layout has been designed to minimise environmental disturbance and land take, avoiding areas of deeper peat, wherever possible, and steep slopes in excess of 21% as well as, wherever possible, avoiding or minimising areas of identified environmental constraints.
- 2.3.41 The track layout has also been carefully designed to minimise the number of watercourse crossings where possible.

Footpath Diversions

- 2.3.42 A temporary diversion during construction would be put in place for the part of the SUW which would follow an established diversion route used during forestry operations and is formed of an existing track alignment.
- 2.3.43 A permanent diversion to a short section (approximately 880 m) of the SUW at the point where the Western Access route enters the main development area of the Site is proposed. The permanent diversion would be provided so that users of the SUW can avoid infrastructure associated with the Proposed Development. During the construction phase, the permanent diversion would not be used by construction traffic associated with the Proposed Development, instead it would provide continuing access for existing users away from the active construction areas at the Proposed Development. Typical cross sections of the proposed permanent SUW diversion (footpath) are shown in **Figure 2.11 (EIAR Volume 3)**.

Borrow Pits and Aggregate Material Requirements

- 2.3.44 Two borrow pit search areas have been identified within which the borrow pits would be excavated (refer to **Table 2.3**). The proposed borrow pit excavation area covers a total of approximately 26,960 m² to supply material to construct the Proposed Development.
- 2.3.45 It is estimated that the borrow pits could provide approximately 112,000 m³ (approximately 90% of aggregate material required) of suitable material for use in construction of the Proposed Development. However, it should be noted that prior to construction detailed ground investigation surveys would be undertaken to determine the specific quality of rock and the rock head depth underlying the borrow pit locations. This would provide greater certainty to the suitability and quantity of material available for use in construction from this source.
- 2.3.46 **Table 2.3** summaries the borrow pit excavation area with further details provided in the Borrow Pit Assessment (**Technical Appendix 2.2, EIAR Volume 4**).

Table 2.3: Borrow Pit Excavation Areas			
Borrow Pit Search Area No.	NGR Reference (Centre)		Approximate Excavation Dimensions (m²)
BP01	295704	608398	12,210 m ²
BP02	294392	605641	14,750 m ²
TOTAL			26,960 m ²

- 2.3.47 Site-won aggregate materials would also be available from the excavation required for the construction of the BESS and substation compounds. This would equate to approximately 27,840 m³. As with the borrow pits, prior to construction detailed ground investigation surveys would be undertaken to determine the specific quality of rock and the rock head depth underlying these areas which would provide greater certainty to the suitability and quantity of material available for use in construction from these sources.
- 2.3.48 The volume of material won from borrow pits and through the construction of the BESS and substation compounds assumes a 20% reduction in quantity to account for unsuitable material or bulking of materials on excavation.
- 2.3.49 The construction of the Proposed Development would require approximately 126,585 m³ of aggregate. Site-won aggregate from a combination of the borrow pits and construction of the BESS and substation compounds (approximately 139,840 m³), is expected to meet these requirements.

- 2.3.50 Due to phasing of the construction activities, there may be a requirement for some short sections of track to be constructed from imported materials, for example, for the construction of the initial phase of the on-site access track from the Western Access to connect to the existing forestry tracks within the Site and allow access to BP01 utilising the existing track network within the Site.

Connection to Electricity Grid

- 2.3.51 The Proposed Development has a grid connection offer for 2036 to connect to the Elvanfoot Substation (NGR), approximately 8.5 km north from the on-site substation. The grid connection would be the responsibility of the transmission licence holder (Scottish Power Energy Networks (SPEN)) and would be subject to a separate consenting process. As such the details of the grid connection route are unknown at this stage and this is not considered within the EIAR.

Site Reinstatement and Restoration

- 2.3.52 Following commissioning of the Proposed Development, the construction site would be reinstated. Reinstatement would form part of the contractual obligations for the appointed Contractor and would include all temporary works, such as crane pads, borrow pits, temporary compounds and laydown areas.
- 2.3.53 Following removal of the temporary works, best practice techniques would be used to ensure soils are replaced in the order they were removed with original vegetation reinstated around the permanent hardstanding areas where possible. Where required, reseeding of the temporary works areas would also be undertaken with an appropriate seed mix. Details for site reinstatement would be included in the CEMP.

2.4 Land Take

- 2.4.1 The area of the Site Boundary is approximately 1,089 ha (**Figure 2.1, EIAR Volume 3a**). Within this area the permanent land take would be limited to the wind turbine hardstanding area (including turbines, crane pads and laydown areas), access tracks and the Substation and BESS Compound hardstanding area. This collectively accounts for approximately 1.38% of the total area within the Site.
- 2.4.2 Temporary land take which would include approximately 6.5 ha accounts for 0.60% of the total area within the Site.
- 2.4.3 **Table 2.4** details the permanent and temporary land take required for the Proposed Development.

Table 2.4: Summary of Temporary and Permanent Land Take		
Energy Project Element	Temporary (m²)	Permanent (m²)
Turbines and Hardstand Areas	31,382	26,208
On-site Access Tracks (New)	-	106,651
Substation Compound	-	8,000
BESS Compound	-	9,500
Construction Compound	7,540	-
Borrow Pits (2 Borrow Pits)	26,960	-
Total Land Take	65,882 m²	150,359 m²

Table 2.4: Summary of Temporary and Permanent Land Take

Energy Project Element	Temporary (m ²)	Permanent (m ²)
% of Site Area	0.60 %	1.38 %

2.5 Construction Activities

Construction Programme

- 2.5.1 Based on the current grid connection date of 2036, a construction start date of 2035 has been assumed for the purposes of the EIAR. The estimated construction period of the Proposed Development is approximately 18 months. This period is indicative only and may be subject to variation as a result of factors which include, but are not limited to, weather restrictions, ground conditions encountered through detailed investigation, turbine component and material delivery, timing of grid connection works and public highway constraints. However, this is considered to represent a realistic case for the purposes of assessment.
- 2.5.2 Construction by the appointed Principal Contractor would begin following agreement of the detailed design and approval of any pre-commencement Conditions with the appropriate consenting authority. Key construction activities would involve:
- Forestry felling for construction of the access track (as required);
 - Public road improvement and junction creation;
 - Construction of the Temporary Construction Compound and laydown areas;
 - Installation of concrete batching plant;
 - Construction of initial sections of site access track;
 - Construction of all access tracks having established all required borrow pits;
 - Design and construction of temporary and permanent drainage measures;
 - Construction of turbine foundations, crane hardstandings and laydown areas;
 - Excavation of cable trenches;
 - Laying of electricity and communications cables in trenches;
 - Construction of substation and control building;
 - Construction of BESS and control building;
 - Delivery, installation, testing and commissioning of wind turbines and ancillary equipment;
 - Installation of external turbine transformers and switchgear in enclosed kiosks;
 - Site reinstatement and restoration; and
 - Implementation of Biodiversity and Enhancement Management Plan (BEMP) measures.
- 2.5.3 The works would broadly follow the order as detailed above, however many activities would be undertaken concurrently to minimise the overall construction programme. Site restoration would be undertaken as soon as possible in affected areas to minimise disruption to land use and reduce the period of time that extracted materials to be used in restoration are stored. Where appropriate, measures to be delivered as part of the BEMP (refer to **Technical Appendix 6.7, EIAR Volume 4**) would be implemented at the earliest practicable opportunity to maximise and expedite the potential for beneficial effects.
- 2.5.4 Further ground investigation surveys would be required prior to the main construction works to determine the specific quality of rock and the rock head depth underlying the locations for

site infrastructure including the borrow pit locations. Initial site investigations have included Phase 1 and Phase 2 Peat probing, and the findings of this work have informed the design of the layout of the Proposed Development including positioning and anticipated construction characteristics of Site access tracks. The full site investigation works required to inform detailed civil engineering design would take place six months to one year before the main construction period commences.

- 2.5.5 The appointed Principal Contractor would develop the details of the site design and construction methods in compliance with the Applicant's contract requirements and the EIAR.
- 2.5.6 The access tracks would be left in place following construction to provide permanent access for maintenance, repairs and eventual decommissioning of the Proposed Development. The construction works would be undertaken by a competent and experienced contractor in accordance with the project consent and any associated conditions and also in accordance with good industry practice. Prior to commencing construction, a more detailed construction and reinstatement programme would be submitted to the consenting authority for approval.
- 2.5.7 Traffic movements associated with the construction of the Proposed Development including required Heavy Goods Vehicles (HGV) and heavy/abnormal load movements are described in **Chapter 9: Traffic and Transport (EIAR Volume 2)**.
- 2.5.8 An indicative construction programme is illustrated in **Table 2.5** below.

Table 2.5: Indicative 18-Month Construction Programme																		
Task*	Month																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		

*Task:

1. Forestry felling
2. Site establishment/plant deliveries
3. Borrow pit working, access track construction and hardstanding areas
4. Turbine Foundations
5. Substation construction
6. BESS Installation and civils works
7. Cabling
8. Erection and commissioning of turbines
9. Site reinstatement and restoration
10. Testing and commissioning
11. BEMP implementation works

Hours of Work

- 2.5.9 The normal working hours would be as follows:
- Monday to Friday 07:00 to 19:00;

- Saturday 07:00 to 13:00; and
- no working on Sundays or public holidays without prior written approval from SLC.

2.5.10 No works, with the exception of turbine delivery, the completion of turbine erection, concrete pours, or emergency work, would take place outside these hours. Other such out-of-hours works would be subject to prior approval from SLC. The requirement for out-of-hours work could arise, for example, from delivery and unloading of abnormal loads or health and safety requirements, or to ensure optimal use is made of fair-weather windows for the erection of turbine blades and the erection and dismantling of cranes.

Construction Traffic and Plant

2.5.11 Vehicle movements associated with construction works would include:

- Cars and minibuses for transporting construction personnel to the Site;
- HGVs for pre-construction delivery of site offices, construction equipment and materials;
- HGV abnormal load vehicles for delivery of the turbine components and base rings;
- Mobile road going cranes, used for the erection of the turbines; and
- Standard HGVs for transporting electric cable, steel reinforcement for foundations, construction plant fuel and other items and equipment.

2.5.12 A Traffic Management Plan would be developed in consultation with SLC and Transport Scotland. This would address the scheduling, routing and overall management of abnormal loads movements along with the programming and management of all other HGV movements (**Technical Appendix 9.1, EIAR Volume 4**).

Standard Mitigation and Working Methods during Construction

Construction Environmental Management Plan (CEMP)

2.5.13 The assessment in this EIAR has been carried out on the basis that standard/best practice mitigation measures would be implemented during the construction work, including compliance with both project wide and site-specific environmental management procedures, which would be included in the CEMP. An OCEMP is provided in **Technical Appendix 2.1 (EIAR Volume 4)**. Prior to construction commencing, a detailed CEMP would be submitted to SLC for approval in consultation with relevant statutory consultees.

2.5.14 The CEMP would, as a minimum, include details of:

- Construction methodologies;
- Pollution prevention measures;
- Drainage management and SuDS;
- Water quality monitoring;
- Control of contamination/pollution prevention;
- Peat slide, erosion and compaction management;
- Management of construction traffic;
- Control of noise;
- Control of dust and other emissions to air; and
- Public liaison provision.

2.5.15 **Technical Appendix 2.1 (EIAR Volume 4)** provides a list of standard/best practice mitigation measures that would be included in the CEMP and implemented during the

construction and decommissioning of the Proposed Development. It would be a contractual requirement that the appointed Principal Contractor complies with the CEMP.

Watercourse Crossings

- 2.5.16 **Technical Appendix 8.2 (EIAR Volume 4)** contains details of the 11 watercourse crossings required as part of the Proposed Development and the proposed crossing type together with the relevant requirements in relation to Environmental Authorisations (Scotland) Regulations 2018⁴. The final crossing type would be identified as part of the detailed design of the Proposed Development prior to construction and in line with current best practice guidance.

Private Water Supplies

- 2.5.17 A review of Private Water Supplies (PWS) has been undertaken for the Site and a 5 km buffer around the Site Boundary (refer to **Chapter 8: Hydrology, Hydrogeology, Geology and Soils, EIAR Volume 2**). The assessment identified two Private Water Supply abstractions within the Site and one within close proximity to the Site Boundary in the north. However, these were either located outwith a 250 m buffer of any site infrastructure or were determined not to be hydrologically linked to the Site.

Peat Management

- 2.5.18 An outline Peat Management Plan (OPMP) has been prepared (refer to **Technical Appendix 8.5, EIAR Volume 4**) provides details of the predicted volumes of peat that would be excavated for the Proposed Development, the characteristics of the peat that would be excavated, and how the excavated peat would be reused and managed. This document would be updated during the detailed design stage and approved by SLC in consultation with SEPA prior to construction and would be included in the final version of the CEMP.
- 2.5.19 The detailed peat surveys across the Site have identified that approximately 48,480 m³ of peat would be excavated as part of the construction activities associated with the Proposed Development. Refer to **Technical Appendix 8.5 (EIAR Volume 4)** for further details.

Peat Slide Risk

- 2.5.20 **Technical Appendix 8.6 (EIAR Volume 4)** provides further technical information on the likely risk and hazards associated with peat instability, and the proposed standard mitigation and working methods that would be implemented during construction to seek to avoid adverse effects associated with peat instability.

2.6 Operation Management and Maintenance

Life of the Project

- 2.6.1 The expected operational lifetime of the Proposed Development is 40 years from the date of commissioning.
- 2.6.2 Wind turbines and wind energy projects are designed to operate largely unattended with operational monitoring often undertaken remotely with regular monthly or weekly maintenance on-site and emergency works as required.
- 2.6.3 Each turbine at the Proposed Development would be fitted with an automatic system designed to supervise and control a number of parameters to ensure proper performance (e.g., start-

⁴ Available at: <https://www.legislation.gov.uk/ssi/2018/219/contents/made>

up, shut-down, rotor direction, blade angles etc.) and to monitor condition (e.g., generator temperature). The control system would automatically shut the turbine down should the need arise. Sometimes the turbines would re-start automatically (if the shut-down had been for high winds, or if the grid voltage had fluctuated out of range), but other shutdowns (e.g., generator over temperature) would require investigation and manual restart.

Construction and Operational Residues and Emissions

2.6.4 The EIA Regulations⁵ require that the EIAR provides an estimate, by type and quantity, of expected residues and emissions (such as water, air and soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced) resulting from the construction and operation of the Proposed Development.

2.6.5 **Table 2.6** includes a summary of the anticipated residues and emissions.

Table 2.6: Residues and Emissions	
Topic	Potential Residue/Emission
Water	<u>Construction</u> Occasional and low quantity discharges could arise from pumping, or over-pumping in order to dewater foundation excavations and borrow pits (if required). Pollution sources could arise as a result of soil erosion or from oil/fuel or chemical storage and use. All discharges would be managed in accordance with the Environmental Authorisations (Scotland) Regulations 2018. The proposals for the control and management of water quality and quantity from the Proposed Development are presented in the OCEMP in Technical Appendix 2.1 (EIAR Volume 4). Further detail on the surface water management proposed during construction is provided in Chapter 8: Hydrology, Hydrogeology Geology and Soils (EIAR Volume 2). <u>Operation</u> No water emissions or pollution sources have been identified for the operational phase.
Air	<u>Construction</u> The construction phase would require the transport of people and materials by road, with associated emissions to the atmosphere. There are no air quality management areas within the vicinity of the Proposed Development. Overall, the quantity of air emissions is expected to be low relative to the general background air emissions from road traffic. No significant air emissions are anticipated. <u>Operation</u> Due to the nature of the Proposed Development no significant point source or diffuse air emissions would be produced during its operation. The Proposed Development would contribute to providing renewable electricity, in turn displacing emissions associated with fossil fuel-based electricity generation elsewhere. The construction of the proposed infrastructure, and subsequent operation and decommissioning of the Proposed Development would include activities that either directly or indirectly result in CO₂ emissions. Technical Appendix 2.4 (EIAR Volume 4) calculates the greenhouse gas emissions and carbon payback times for wind farm developments in Scottish peatlands and concludes that the Proposed Development would 'pay back' the carbon emissions associated with its construction, operation and

⁵ Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>

Table 2.6: Residues and Emissions	
Topic	Potential Residue/Emission
	decommissioning in a 0.2 - 1.8-year period, with an expected value of 0.9 years.
Soil and Subsoil	<u>Construction</u> Soil and subsoil excavation, handling and storage would be required during construction. All soil and subsoil would be stored temporarily for use in reinstatement, such that there would be no residue (surplus) remaining following the construction work. Further details on peat management are provided in Technical Appendix 8.5 (EIAR Volume 4). <u>Operation</u> No requirement for soil or subsoil excavation or handling during the operation phase has been identified. No pollution sources have been identified for the operational phase.
Noise and Vibration	<u>Construction</u> Noise sources during the construction phase would include increased traffic flows and noise from construction plant. Further details are provided in Chapter 10: Noise (EIAR Volume 2). <u>Operation</u> The wind turbines would generate noise during operation, and the noise levels would vary according to the wind speed. The location of residential receptors in relation to the Proposed Development was a consideration in the design development process and with mitigation, including the adoption of low noise modes (at a limited range of wind speeds and directions), the wind turbines would operate in compliance with the Site-Specific Noise Limits. The BESS would also generate noise, but due to the relatively small scale of the BESS and the separation distance between the proposed BESS and residential receptors, operational noise levels from the BESS are expected to be very low such that noise limits could be met. Full details of the noise assessment are presented in Chapter 10: Noise (EIAR Volume 2).
Light	<u>Construction</u> Technical Appendix 2.1 (EIAR Volume 4) notes that temporary lighting would be required at the temporary construction compound for security purposes and to ensure that a safe working environment is provided to construction staff. In addition, temporary lighting could be required to ensure safe working conditions at infrastructure locations during construction. All temporary lighting installations would be downward facing, and all lights would be switched off during daylight hours and out with working hours. <u>Operation</u> The turbines would require visible aviation lighting in line with CAA requirements. A reduced lighting scheme is proposed with seven of the 13 turbines lit with 2000 cd nacelle lights, reduced to 200 cd during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km. This would be submitted to the CAA for approval. Infrared lighting, not visible to the naked eye, would also be provide on all turbines as required by the MOD. Further details of the aviation lighting assessment is provided in Technical Appendix 4.5 (EIAR Volume 4). The substation and BESS buildings are likely to be equipped with passive infra-red controlled security lighting. These would illuminate the compound areas when activated. Any effect would be temporary and not expected to be significant during normal operation of the Proposed Development.
Heat and Radiation	No significant sources of heat and radiation have been identified during either the construction or operation phase of the Proposed Development.

Table 2.6: Residues and Emissions	
Topic	Potential Residue/Emission
Waste	<u>Construction</u> Technical Appendix 2.1 (EIAR Volume 4) provides details on pollution prevention control and site waste management that would be implemented during construction. A Site Waste Management Plan would be designed to follow the principles of: Avoidance; Minimisation; Separable; Recyclable. <u>Operation</u> The power generation aspect of the Proposed Development would not produce any waste emissions or pollutants. The general operation and maintenance of the Proposed Development has the potential to produce a small amount of waste. This is likely to be restricted to waste associated with the control building from employees and visiting contractors and the storage of oils and lubricants.

2.7 Decommissioning

- 2.7.1 At the end of the project's operational life, a decision would be made as to whether to refurbish, remove, or replace the turbines.
- 2.7.2 If refurbishment or replacement were to be chosen, relevant consent applications would be made at the relevant time.
- 2.7.3 If a decision were to be taken to decommission the Proposed Development, this would entail the removal of all the turbine components, transformers, the substation, BESS and associated buildings. Access tracks and underground cables would, subject to further appraisal of the best environmental option, be left in place, partially removed or fully removed. It is assumed that foundations would be removed to a depth of 0.5 m below ground level (bgl) (exact depth to be confirmed at point of decommissioning) to avoid environmental effects from full removal. A Decommissioning Environmental Management Plan (DEMP) would set out environmental protection measures and restoration principles which would be submitted to and approved by SLC in consultation with relevant consultees and then implemented by the Contractor appointed to undertake the decommissioning works. An outline DEMP is included in the OCEMP (**Technical Appendix 2.1, EIAR Volume 4**).
- 2.7.4 A detailed assessment of the decommissioning of the Proposed Development has not been undertaken as part of the EIA as: i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage, and ii) the proposals for refurbishment/decommissioning are not known at this stage. However, it is considered that in general the effects associated with decommissioning would be similar or less than those identified for the construction phase in this EIA.

3. Design Evolution and Alternatives

3.1 Introduction

- 3.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) provides a description of the reasonable alternatives studied by the Applicant, which are relevant to the Proposed Development and its specific characteristics, in accordance with Regulation 5(2)(d) and Schedule 4 (Paragraph 2) of the EIA Regulations¹. The Chapter provides a description of the main reasons for selecting the chosen option for the Proposed Development, taking into account the potential effects of the Proposed Development on the environment.
- 3.1.2 The Chapter is supported by the following figures which are referred in the text as appropriate:
- **Figure 3.1: Turbine Design Iteration (EIAR Volume 3a);** and.
 - **Figure 3.2: Environmental Constraints (EIAR Volume 3a).**
- 3.1.3 The Chapter is structured to provide the following:
- A brief summary of the key policy considerations;
 - A review of the site selection considerations, including the Site context and the Site feasibility assessment;
 - An overview of the design objectives for the Proposed Development having regard to the characteristics of onshore wind energy and battery energy storage development and the environmental sensitivity of the Site;
 - A description of the reasonable alternatives studied (noting that this is limited to those which are considered relevant to the Proposed Development); and
 - A description of the main reasons for selecting the final layout of the Proposed Development, with consideration of the potential effects on the environment.

3.2 Key Policy Considerations

National Planning Framework 4 (NPF4)

- 3.2.1 National Planning Framework 4 (NPF4)² is the national spatial strategy for Scotland, setting out the spatial principles, regional priorities, national developments and national planning policy.
- 3.2.2 A dominant theme within NPF4 is addressing the global climate emergency through the need to reduce greenhouse gas emissions and adapt to the impacts of climate change. NPF4 sets out a spatial strategy to ensure a net zero society and a nature positive country.
- 3.2.3 NPF4 has introduced centralised development management policies which are to be applied Scotland wide, and also continues the approach set out in NPF3 of identifying national developments. National Development 3 (ND3), entitled 'Strategic Renewable Electricity Generation and Transmission Infrastructure', includes onshore electricity generation from renewables of over 50 MW in capacity; therefore, the Proposed Development has national development status. The Proposed Development will make a contribution to the attainment of renewable energy and electricity targets and emissions reduction at both the Scottish and

¹ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

² Scottish Government (2023) National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/documents/>

UK levels; the quantification of this contribution is described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.

- 3.2.4 Policy 11 of NPF4, the principal policy used in the assessment of wind energy developments, intends to *"To encourage, promote and facilitate all forms of renewable energy development onshore and offshore. This includes energy generation, storage, new and replacement transmission and distribution infrastructure and emerging low-carbon and zero emissions technologies including hydrogen and carbon capture utilisation and storage (CCUS)"*.
- 3.2.5 Policy 11e of NPF4 states that project design and mitigation should demonstrate how the following impacts are addressed:
- *"impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;*
 - *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;*
 - *public access, including impact on long distance walking and cycling routes and scenic routes;*
 - *impacts on aviation and defence interests including seismological recording;*
 - *impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised;*
 - *impacts on road traffic and on adjacent trunk roads, including during construction;*
 - *impacts on historic environment;*
 - *effects on hydrology, the water environment and flood risk;*
 - *biodiversity including impacts on birds;*
 - *impacts on trees, woods and forests;*
 - *proposals for the decommissioning of developments, including ancillary infrastructure, and site restoration;*
 - *the quality of site restoration plans including the measures in place to safeguard or guarantee availability of finances to effectively implement those plans; and*
 - *cumulative impacts"*.
- 3.2.6 The design and mitigation considerations within NPF4 Policy 11e have informed the iterative design process and the identification of the topics included as part of the design guidance set out within **Table 3.1** below. The Planning Statement that supports the Section 36 application sets out how the project design and mitigation of the Proposed Development has addressed the impacts as set out in NPF4 Policy 11e.

South Lanarkshire Local Development Plan 2 (LDP2)

- 3.2.7 South Lanarkshire Local Development Plan 2 (LDP2)³ (adopted in April 2021) forms part of the relevant statutory Development Plan for the area where the Proposed Development is located.
- 3.2.8 The SLC LDP was prepared and adopted prior to NPF4 coming into force and reflects the provisions of the former Scottish Planning Policy (SPP), now superseded. Where incompatibilities exist between the LDP and NPF4, or where the LDP is silent, the policies of NPF4 prevail.

³ Available at: <https://www.southlanarkshire.gov.uk/developmentplan2>

- 3.2.9 LDP2 has an overall strategic vision “*to promote the continued growth and regeneration of South Lanarkshire by seeking sustainable economic and social development within a low carbon economy whilst protecting and enhancing the environment*”.
- 3.2.10 LDP2 is presented in two volumes with Volume 1 containing the overall strategy and core policies and Volume 2 containing additional development management policies.
- 3.2.11 Policy 5: Development Management and Placemaking (Volume 1) sets out design considerations and notes that developments should not present an unacceptable impact on the natural or historic environment, including the water environment, nor on the amenity of residential properties.
- 3.2.12 Policy 18: Renewable Energy (Volume 1) supports in principle renewable energy developments subject to an assessment against principles set out in Scottish Planning Policy (SPP). The SPP criteria to be considered in determining a proposal for a wind farm have now been superseded by those set out in NPF4 Policy 11 (refer to above).
- 3.2.13 Whilst the requirement to produce a spatial framework has been superseded by NPF4, it is noted that the Proposed Development is located mainly⁴ within a Group 3 Area where wind farms are likely to be acceptable, subject to detailed consideration against identified policy criteria. The policy further notes that “*All renewable energy proposals shall be assessed against the relevant criteria and requirements set out in the Assessment Checklist for Renewable Energy Proposals contained in Volume 2*”.
- 3.2.14 Other documents which have been considered throughout the design development process include:
- Landscape Capacity Study for Wind Energy (2016)⁵; and
 - Tall Wind Turbines: Landscape Capacity, Siting and Design Guidance⁶ (2019).

Other Guidance

Siting and Designing Windfarms in the Landscape (NatureScot, 2017)

- 3.2.15 NatureScot’s (formally Scottish Natural Heritage (SNH)) ‘Siting and Designing Windfarms in the Landscape’⁷ guidance states that wind farms should be sited and designed so that adverse effects on landscape and visual amenity are minimised and allow landscapes that are highly valued to be protected.
- 3.2.16 The guidance note focuses on wind turbine design and layout, wind farm siting and design and designing in landscapes with multiple wind farms. In Section 2, it includes design principles which cover consideration of turbine form, size, scale and layout of the turbine array and as well guidance on associated infrastructure. Section 3 details how the design principles can be applied to landscape and visual effects noting that the application of these principles will reduce the overall landscape and visual effects of a wind farm. Section 4 of the guidance note reviews the principles of wind farm design when designing in landscapes with multiple wind farms.

⁴ Some localised areas of the Site are identified to include carbon rich soil/peatland Class 1 and 2 which would be classed as Group 2: Areas of significant protection.

⁵ South Lanarkshire Council (2016) Landscape Capacity Study for Wind Energy 2016.

⁶ South Lanarkshire Council (2019) Tall Wind Turbines: Landscape Capacity, Siting and Design Guidance Available at: <https://www.dpea.scotland.gov.uk/LibraryDocument.aspx?id=2402>

⁷ SNH (2017) Siting and Designing Windfarms in the Landscape. Available at: <https://www.nature.scot/sites/default/files/2017-11/Siting%20and%20designing%20windfarms%20in%20the%20landscape%20-%20version%203a.pdf>

Onshore Wind Policy Statement 2022

- 3.2.17 The Scottish Government's 'Onshore Wind: Policy Statement 2022' (OWPS '22)⁸ was published in December 2022. The OWPS notes that "*The only areas where wind energy is not supported are National Parks and National Scenic Areas. Outside of these areas, the criteria for assessing proposals have been updated, including stronger weight being afforded to the contribution of the development to the climate emergency, as well as community benefits*".
- 3.2.18 Furthermore, in relation to the design of wind farms the OWPS notes that the following will be a vital part of any wind farm design:
- Identification of the condition of existing peatland;
 - Minimising impacts on woodland and integrating enhancement measures where relevant;
 - Appropriate siting of wind farms within the landscape; and
 - Designing wind farms to make a positive contribution to biodiversity, with the overarching aim to enable the protection and restoration of local biodiversity and ensuring that wind energy can be deployed in harmony with, rather than at detriment to, our natural environment.
- 3.2.19 This EIAR does not make any judgements regarding the 'acceptability' of the Proposed Development. A separate Planning Statement accompanies the Section 36 application which presents an appraisal of the Proposed Development with reference to the energy and planning policy framework and other relevant material planning considerations.

3.3 Site Selection Considerations

- 3.3.1 This section provides a description of the factors that led to the selection of the Site as a suitable location for a renewable energy development.

Current Land Use and Site Context

- 3.3.2 The Site covers an area of approximately 1,089 ha and is located approximately 10 km south of Crawford and 12 km west of Moffat, in South Lanarkshire (approximate OS Grid Reference for Site centre: NS 94567 06768). The Site location and Site Boundary are shown in **Figures 1.1 and 1.2 (EIAR Volume 3a)**.
- 3.3.3 The Site predominantly comprises upland moorland used for livestock grazing with areas of commercial forestry in the northwest and smaller areas of broadleaf woodland in the northeast. The Site is intersected by a section of the Southern Upland Way (SUW), approximately 2 km in length. The landscape is typical of the wider location, undulating and includes a series of rounded hills characteristic of the Southern Uplands including Comb Hill, Watchman's Brae and Rodger Law.
- 3.3.4 The immediate vicinity of the Site is sparsely populated, with scattered dwellings within the valleys. There are a number of villages within 15 km of the Site. There is one uninhabited residential property located within the Site, with a number of residential properties also located within approximately 2.5 km of the Site including properties along the A702 road, and the minor road leading to the Daer Reservoir.
- 3.3.5 There is one Scheduled Monument within the Site: Smithwood, Bastle House (SM 5647), with a further 34 Scheduled Monuments located within 10 km of the Site. Other designated assets within 10 km include two Inventory Garden and Designed Landscapes (GDL), 57 Listed

⁸ Scottish Government (2022) Onshore Wind: Policy Statement 2022. Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/>

Buildings (three Category A, 37 Category B and 17 Category C) and four Conservation Areas. One Category A-Listed Building (Drumlanrig Castle) lies just beyond 10 km from the Site. Further to designated assets there are a number of non-designated assets that are located within 10 km that are considered to be of national importance⁹.

- 3.3.6 There are 30 non-designated heritage assets are located within the Site, all considered to be of local/regional importance. The non-designated heritage assets comprise of prehistoric, roman, medieval and modern sites and features.
- 3.3.7 A number of watercourses run through the Site. The south of the Site is within the catchment of Daer Water, upstream of Daer Reservoir which is located a short distance east of the Site. The central area of the Site drains to Kirkhope Cleuch which in turn flows to Daer Reservoir with the west of the central catchment draining directly to Daer Reservoir. The north of the Site (approximately 15% of the total Site area) drains via Meikle and Calf Burn to Daer Water downstream of the reservoir. A very small area (<5% of the total Site area) drains in a north westerly direction to Potrail Water.
- 3.3.8 Immediately to the south of the Site is the Shiel Dod Site of Special Scientific Interest (SSSI), which is designated for blanket bog. Whilst no construction activities or development would occur within the SSSI, certain areas may be used for some measures for biodiversity management and enhancement¹⁰.
- 3.3.9 There is extensive wind energy development within this part of southern Scotland and there are several windfarms within the surrounding landscape of the Site including Clyde and Clyde Extension (operational) to the northeast, Daer and Rivox Wind Farms (both at application stage) to the east, and Harestanes and Minnygap (operational) to the southeast¹¹.
- 3.3.10 Existing operational wind farms within 25 km of the Site range in turbine tip height from 62 m to 180 m.

Site Selection and Feasibility

- 3.3.11 In 2022, the Applicant identified the Site, and the wider area which encompasses the nearby sites of the M74 West, Ravengill, and Clyde South projects, as suitable for renewable energy development.
- 3.3.12 If developed for renewable energy generation, this would add to the established characteristic of wind farms as part of the landscape in the surrounding area. The general area has been attractive for wind farm development proposals due to its large-scale landscape character, anticipated high wind resource, potential for connections into the existing road and transmission network. Clustering of development allows the efficient use of existing infrastructure, including the 400 kV interconnector between Scotland and England, limiting the costs for consumers and helping reduce pressure on more sensitive environments elsewhere.
- 3.3.13 The Site of the Proposed Development benefits from a number of other strategic advantages for renewable energy development, including:
- The Site is situated amongst a cluster of operational, proposed, and consented wind farms, including the operational Clyde Wind Farm to the northeast, all located in the Southern Uplands Character type (or in one of its sub-types) and which share

⁹ Non-designated assets can be of national importance, although they don't hold statutory protection. They are considered to have heritage significance meriting consideration in planning decisions but have not yet been formally designated (e.g., listed or scheduled).

¹⁰ Land within the SSSI is within the Applicants Land Ownership Boundary – refer to **Figure 1.2 (EIAR Volume 3a)**.

¹¹ Cumulative status as of 18th December 2025.

characteristic features in terms of scale, topography and land use demonstrating the general suitability of the area for wind farm development;

- The Site can accommodate a renewable energy development whilst avoiding significant direct effects on areas designated for nature conservation and allow for the creation of biodiversity enhancement opportunities;
- There is scope to deliver suitable access to the Site for both construction traffic and abnormal indivisible loads (AIL) whilst avoiding potential for impacts on local road users;
- The Site has consistently high anticipated wind speeds, which would deliver excellent wind energy yields; and
- Site has good access to the electricity transmission network and it is expected that a grid connection can be achieved in a reasonable timeframe¹².

3.3.14 Overall, the Site has potential to accommodate a renewable energy park that would make a significant contribution to meeting national energy policy and climate emergency policy related goals of achieving net-zero emissions by 2045.

3.4 Design Approach

Design Process

3.4.1 The Applicant appointed a team of specialist consultants to work alongside the Applicant in designing and developing the layout of the Proposed Development. Consistent with renewable energy policy, the key overall objective was to maximise the energy generation potential of the Site, whilst having regard to the protection of sensitive environmental receptors.

3.4.2 The design process was underpinned by site specific design guidance in the form of a Design Brief document which was developed by and agreed with the Applicant, specialist consultants and design engineers.

3.4.3 The approach to the design was informed by and responded to:

- Good practice and windfarm design guidance such as SNH (2017) Siting and design of Wind Farms in the Landscape⁷;
- Planning policy documents (e.g., NPF4², South Lanarkshire LDP2)³; and
- Consultation responses received through pre-application consultation, EIA Scoping, and the Gatecheck process.

Design Brief

3.4.4 An initial Design Brief was agreed with the Applicant setting out key parameters for the Proposed Development. The initial brief included:

- A preliminary turbine layout (Layout 01: Initial Landscape Design) – refer to **Figure 3.1 (EIAR Volume 3a)** provided by the Applicant, based on early feasibility and due diligence studies undertaken by specialist landscape architects;
- Details of land available; and
- Project requirements in relation to infrastructure such as construction compounds, borrow pits, the substation, BESS, laydown areas, access track geometry, and crane hardstanding geometry.

¹² At the time of writing the Proposed Development has a grid connection offer for 2036 to connect to the Elvanfoot Substation (NGR), approximately 8.5 km north from the on-site substation.

- 3.4.5 Layout 01 (Initial Landscape Design) informed by input from the specialist landscape architects, and included consideration of the following design objectives in relation to the landscape:
- Objective 1: To create a balanced layout in views of the development from readily accessible public places;
 - Objective 2: To follow the broad topography of the Site; and
 - Objective 3: To ensure that the scale (both of the turbines and the scale of the 'ridges and valleys' landscape) was proportionate.
- 3.4.6 Subsequent to this, the Design Brief was updated to set the scope for constraint mapping by the specialist consultant teams, with the Applicant being responsible for defining technical requirements such as the turbine model and turbine parameters and other technical requirements for Site infrastructure such as:
- Minimum separation between turbines and the Site boundary should be by a distance equivalent to a turbine tip height (i.e., 240 m distance) where practicable;
 - All watercourses should have a 50 m exclusion area placed around them, in order to ensure protection of water quality, in line with SEPA requirements;
 - Access tracks should minimise the need for watercourse crossings;
 - Access track running width to be between 4.5 m and 7 m depending on gradient and bends;
 - Access tracks should be straight for 20 m before and after a bridge, culvert or hardstanding area;
 - Turning areas to be provided and sized to allow turning of loaded or unloaded blade transporters (as required); and
 - Where possible, borrow pit search areas should be sited in locations that can be reached via existing tracks, in order to avoid the need to construct extensive sections of track to reach them in the early stages of construction.

Constraints Mappings

- 3.4.7 Following agreement of the Design Brief, the team was instructed to undertake all necessary desktop studies and field work to identify key environmental receptors and constraints (including cumulative constraints) of relevance to the design and assessment of the Proposed Development.
- 3.4.8 Further analysis was completed to categorise constraints as either 'hard constraints' or 'soft constraints'. Hard constraints were defined as those features with formal protection as defined in legislation or adopted planning/industry guidance, whereas soft constraints were characterised as having potential to constrain the development but, subject to careful design consideration and/or mitigation measures, the Proposed Development could be accommodated.
- 3.4.9 Environmental constraints relevant to the Site and design process are detailed on **Figure 3.2 (EIAR Volume 3a)**.

Design Workshops

- 3.4.10 Details of the constraints and recommended design guidance was updated into the Design Brief as detailed in **Table 3.1**. This information, along with further survey work as required, was then used to review the design layout through a series of design workshops to avoid or minimise, as far as practicable, environmental impacts prior to the detailed environmental assessment of the preferred option as presented in this EIAR.

- 3.4.11 The conformity of the emerging layout with the specified landscape and visual objectives was reviewed and considered throughout the design process, with further amendments being made to each iteration of the layout (as required) to ensure adherence to these objectives.

3.5 Environmental and Design Constraints

3.5.1 Following the baseline characterisation of the Site, the key environmental constraints for consideration in the design process were identified. A summary of the baseline and the design recommendations in relation to the environmental constraints is provided in **Table 3.1**. Environmental constraints relevant to the Site and design process are also shown on **Figure 3.2 (EIAR Volume 3a)**.

3.5.2 The design process considered the following environmental constraints:

- Landscape character and visual, recreational and tourism amenity within a 25 km study area;
- Cultural heritage, including mapping all known assets within the Site, all designated heritage assets within 5 km and nationally important designated assets within a 10 km study area of the Site to assess the potential for visibility and setting effects;
- Sensitive fauna, with the mapping of the presence of protected species within the Site;
- Sensitive habitats, particularly peat forming habitats (supported by habitat, peat probing and peatland condition assessment surveys) and habitats dependent on groundwater within the Site;
- Ornithology, including surveys for bird flight activity and breeding bird activity on the Site;
- Hydrology, hydrogeology and geology, including identifying all sensitive surface water features, groundwater dependent terrestrial ecosystems (GWDTEs), and peat depth at the Site;
- Traffic and transport, including all trunk roads and local roads that are likely to experience increased traffic flows;
- Construction, operational and cumulative noise levels and exposure at nearby properties; and
- Aviation and telecommunications assets.

3.5.3 The design process led with the objective to 'design out' potential for significant effects. Where it was not possible to mitigate by design, the environmental constraints have been considered further as part of the EIAR.

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
Landscape and Visual: Landscape Fabric	The Site is located in the area between Daer Reservoir and Daer Water in the east, and the A702 road in the west within South Lanarkshire. Predominantly upland moorland in character, the Site is undulating and includes a series of rounded hills characteristic of the Southern Uplands including Comb Hill (645 m Above Ordnance Datum (AOD)), Watchman's Brae (594 m AOD) and Rodger Law (688 m AOD). To the north, elevations reduce and include the floodplain of the Daer Water comprising semi-improved farmland and woodland planting, including extensive commercial forestry plantations, beyond the Site Boundary. An approximate 2.0 km section of the SUW crosses through the Site in a northwest to southeast orientation following an existing forestry track.	Design Objectives for the Site: - Objective 1: To create a balanced layout in views of the development from readily accessible public places; - Objective 2: To follow the broad topography of the Site; and - Objective 3: To ensure that the scale (both of the turbines and the scale of the 'ridges and valleys' landscape) was proportionate. For this Site, these Objectives are applied as follows: - The scale of the landscape, both in absolute terms and in its character is large, and therefore the size of turbines can be taller. This is further reinforced by the large extent of the surrounding contiguous Landscape Character Type (LCT) Southern Uplands – Glasgow and Clyde Valley; - The Site landform demands following ridgelines precisely because these are narrow, and the Site does not feature any plateau like areas. - Due to the extensive existing and proposed wind farm development in the surrounding area, most views to the Site are also influenced by these wind farm developments. The likely visual effects should therefore be placed in the context of all proposed or existing development in the area.
Landscape and Visual: Landscape Character and Designations	LCTs relevant to the Site: - LCTs hosting the turbine array: Southern Uplands – Glasgow & Clyde Valley (LCT 217). - Other LCTs hosting other small parts of the Site: Upland Glen – Glasgow & Clyde Valley (LCT 209). National and local landscape designations to be considered for landscape and visual effects: - National - Drumlanrig Castle Garden and Designed Landscape (GDL); - Local - Leadhills and Lowther Hills Special Landscape Area (SLA) (South Lanarkshire); - Local - Thornhill Uplands Regional Scenic Area (RSA) (Dumfries & Galloway); - Local - Moffat Hills RSA (Dumfries & Galloway); and - Local - Tweedsmuir Uplands SLA (Scottish Borders).	Refer to Design Objectives and how these are applied to the Site under 'Landscape Fabric'.

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
Landscape and Visual: Visual Amenity	Visual receptors to be considered in relation to changes in visual amenity: - Residents within settlements and of individual properties; - People who travel through the area with potential views of the Proposed Development; and - People engaged in recreational activities including walkers on hills, Long Distance Footpaths, Core Paths and visitors to tourist destinations where the visual experience is likely to include a focus on the surrounding landscape.	Refer to Design Objectives and how these are applied to the Site under 'Landscape Fabric'.
Cultural Heritage	Designated Assets (National Importance) One Scheduled Monument (a designated asset of national importance) within the Site boundary (to the north): Smithwood, Bastle House 900 m southwest of Daerside (SM 5647).	- Where possible, turbines to be sited to minimise impacts on the setting of the Scheduled Monument within the Site Boundary. - Recommended minimum buffer of 200 m should be applied to the Scheduled Monument to reduce direct and indirect impacts. - No groundbreaking works to take place within the Scheduled area and there can be no potential for direct impacts on the asset.
	Non-Designated Assets (Regional or Local Importance) 30 non-designated heritage assets within the Site of regional or local importance, mainly located to the east and north of the Site. These include non-designated assets (of regional or local importance) recorded on the West of Scotland Archaeology Service (WoSAS) Historic Environment Records (HER) as well as those identified on historic maps and/or during the field survey.	- Recommended 10 m buffer should be applied to non-designated assets (regional or local importance). - Where possible, turbines and site infrastructure should be sited to avoid direct impacts upon known remains. - Where infrastructure would be located in close proximity to known assets, but would not directly impact upon them, mitigation measures such as the temporary fencing-off, or marking-off, of assets to prevent inadvertent damage by plant movement during the construction phase may be required. - Where assets cannot be avoided, potential direct impacts are likely to require mitigation through preservation by record undertaken through archaeological watching brief(s) or excavation.
Ecology	Designated Sites Shiel Dodd Site of Special Scientific Interest (SSSI) located immediately to the south of the Site Boundary.	- Recommended buffer of 75 m should be applied to the boundary of the SSSI. - Avoid watercourse crossings on watercourses hydrologically linked to the SSSI to reduce risk of impact.

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
	Bats - Preliminary Roost Assessment (PRA) noted 21 features with the potential to supporting roosting bats, with some Moderate and High potential. - No features with Moderate or High potential were recorded within 200 m + blade length of proposed turbine locations. - Bat activity surveys were undertaken in 2023 and 2024 and showed bat activity across the Site with species of high collision risk present.	- Implement a 50 m buffer from blade length to relevant habitat features, e.g., woodland edges. - Positioning of turbines to ensure potential bat roosts (Moderate or High potential) lie outwith a protection buffer of 200 m plus blade length (285 m). - Where access tracks within the Site are to be constructed, should these come within 30 m of potential roost features, further surveys (e.g., endoscope surveys, tree climbing, or dawn/dusk surveys at the appropriate time of year) may be required prior to construction.
	Internationally or nationally important habitats (Annex 1 habitats, Scottish Biodiversity List) - Based on the habitat surveys, the Site predominantly supports a mixture of marshy grassland, unimproved acid grassland, wet dwarf shrub heath and blanket bog. - Other habitat types distributed across the Site include wet modified bog, acid neutral flush, acid dry dwarf shrub heath, improved and semi-improved grassland, broad-leaved plantation woodland and coniferous plantation woodland.	- Blanket bog (including mosaics) generally considered the most sensitive habitat present and this is likely be present on areas of deeper peat – Avoid where feasible. - Wet modified bog (including mosaics) is also considered a sensitive habitat – Avoid where feasible. - Minimise the loss of the higher quality habitats. Where habitat loss cannot be avoided, enhancement, management and compensation to be considered through the Biodiversity Enhancement and Management Plan (BEMP).
	Riparian mammals (esp. Water vole) Signs of water vole, including burrows, feeding signs and runways, were recorded along Kirkhope Cleuch and Carsehope Burn, along the southern extent of the Site.	- Implement of a 50 m buffer between works and watercourses on-site. - Locations of proposed watercourse crossing to be reviewed against water vole burrow data as these would fall outwith the 50 m buffer recommended above.
	Fish - Site not accessible to migratory salmonids. - Freshwater surveys recorded a total of four fish species within watercourses within the Site: brown trout (<i>Salmo trutta</i>), minnow (<i>Phoxinus phoxinus</i>) and stone loach (<i>Barbatula barbatula</i>) and brook lamprey (<i>Lampetra planeri</i>). - American signal crayfish (invasive non-native species (INNS)) were recorded during surveys and should be assumed to be present throughout watercourses.	- Implement a 50 m buffer from watercourses. - Recommended to minimise the number of watercourse crossings (based on increased risk to fish species). - Biosecurity measures will be required on Site, implemented through the CEMP, due to presence of American signal crayfish.

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
Ornithology	Schedule 1 species breeding locations present within or close to the Site Boundary.	- No turbines or new infrastructure to be located within the relevant species disturbance avoidance buffers. - Access routes through the buffer may still be proposed but works to the existing road/tracks should be kept to a minimum within this area and working restriction measures may be required to avoid disturbance during the breeding season. Any required overrun or oversail should be designed to ensure no loss of known nest sites.
	Breeding wader species present within the Survey Area, with the majority located to the east of the Proposed Development.	Avoidance of the most sensitive habitats (Annex 1 habitats) on Site which are likely to support breeding waders would limit the level of displacement of breeding wader species.
	Black Grouse (lekking sites) – none within the Site from the site surveys but these were recorded in the wider area. RSPB data does record a historical lek site within the Site Boundary.	No turbines or key infrastructure to be located within the relevant buffer (500 m/750 m from lek sites).
Hydrology and Hydrogeology	Watercourses - Several watercourses within the Site. - South of the Site (approximately 50% of the total Site area) is within the catchment of Daer Water, upstream of Daer Reservoir. - Central area of the Site (approximately 30% of the total Site area) drains to Kirkhope Cleuch which in turn flows to Daer Reservoir, with the west of the central catchment draining directly to Daer Reservoir. - North of the Site (approximately 15% of the total Site area) drains via Meikle and Calf Burn to Daer Water downstream of the reservoir. - Small area (<5% of the total Site area) drains in a north westerly direction to Potrail Water. Larger waterbodies to which the Site discharges have been assessed by SEPA under the Water Framework Directive (WFD) classification system¹³ as follows Daer Water (upstream of Daer Reservoir), Daer Reservoir and Potrail Water: Good Overall Condition. Daer Water (downstream of Daer Reservoir): Moderate Overall Condition.	- Implementation of a 50 m buffer on watercourses and, where in proximity to the infrastructure, their extent on the ground must be verified as they may not coincide exactly with the mapped extents. - An exception to the above is made for watercourse crossings, which should be minimised in number and be laid perpendicular to watercourses. - Impermeable surface for infrastructure/battery storage etc would require detailed drainage design to manage surface water runoff.

¹³ SEPA Water Framework Directive. Available at: <https://www.sepa.org.uk/data-visualisation/water-environment-hub>

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
	Flood Risk (SEPA Flood Risk mapping)¹⁴ - Only lower lying land in close proximity to watercourses on the Site is at risk of flooding from rivers, including areas at a high risk of flooding (1 in 10 (10%) Annual Exceedance Probability (AEP)). The majority of the Site is assessed by SEPA to be at very low likelihood (>1 in 1,000 (0.1%)) AEP of flooding from rivers. - The majority of the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability). Areas close to smaller watercourses do show High (10%), Medium (0.5%) and Low (0.1%) probability of surface water flooding.	- Avoidance of infrastructure within Flood Zones (where feasible). - Sustainable Drainage during construction and operation should be incorporated to ensure no increase in run off volumes. - Watercourse crossings to be designed to a 1 in 200 annual probability plus allowance for climate change¹⁵.
	Groundwater Dependent Terrestrial Ecosystems (GWDTE) - Habitat surveys confirmed that areas of the Site are classified as 'potentially GWDTE'. - Further hydrological assessment has confirmed that while potentially groundwater dependent vegetation communities are present, these areas are not supported by groundwater.	- The design should assume a 250 m buffer to turbines and crane hardstanding/borrow pits and a 100 m to excavated tracks pending any relaxation of buffers agreed with SEPA. - Where development is within these buffers, a hydrological risk assessment should be prepared in order to demonstrate that no significant adverse impacts would occur.
	Private Water Supplies (PWS) - Two PWS locations in the south of the Site and one PWS close to the northern Site Boundary, but outwith the Site. - Further PWSs identified outwith the Site Boundary have been determined to not be in potential hydrological/hydrogeological connection to the Site.	- A 250 m buffer for PWS is recommended. - If possible, avoid development near source watercourses and preferably avoid development in their catchments.
	Daer Water Drinking Water Protected Area (DPWA) - Approximately 30% of the Site is within the Daer Water Drinking Water Protected Area (DWPA, Surface). - This DWPA also includes Daer Reservoir itself and public water supply is provided from the Daer Water Treatment Works, which are situated adjacent to and downstream from the reservoir.	Design of the layout must minimise the potential impact to watercourses draining into the DWPA.

¹⁴ SEPA Flood Maps - Available at: <https://beta.sepa.scot/flooding/flood-maps/>

¹⁵ Scottish Environment Protection Agency (2025) Climate change allowances for flood risk assessment in land use planning [Version 6]. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
	Southern area of the Site is within the catchment of Daer Water, upstream of Daer Reservoir, and is therefore in hydrological connection to the Daer Water DWPA.	
Peat	Stage 1 and Stage 2 Peat Surveys - The Stage 1 and Stage 2 peat depth survey results indicate that the Site is predominately underlain by areas where either no peat is present or a shallow depth of peat is present (approximately 85% of peat depth probes recorded peat depths less than or equal to 0.5 m depth). Further, approximately 95% of the peat depth probes recorded peat depths less than or equal to 1 m depth. - The mean depth of peat recorded during the surveys was 0.27 m, with the maximum peat depth recorded at 3.0 m in the southwest of the Site.	- Peat depth greater than 1.0 m should be avoided by turbines and infrastructure. - Where avoidance of peat greater than 1.0 m is not possible, the design should seek to minimise the effects on peat by adopting alternative construction methodologies and carefully planning site drainage. - Consideration should be given to the additional impacts of access tracks when siting turbines. - The option for floating tracks where they would cross peat depths greater than 1.0 m, should be considered if these areas of peat cannot be avoided.
Traffic and Transport	The main transport impacts would be associated with the movement of general HGV (and LGV) traffic travelling to and from the Site during the construction phase of the Proposed Development. Each turbine is likely to require between 11 and 13 abnormal loads to deliver the components to Site. The components are likely to be delivered on extendable trailers which would then be retracted to the size of a standard HGV for the return journey.	- No specific design recommendations regarding access route to the Site. - Reference should be made to specific design guidance included in this table for other environmental constraints when considering the design and route of the Site access.
Noise	The immediate vicinity of the Site is sparsely populated, with scattered dwellings within the valleys. There is one uninhabited residential property located within the Site, with a number of residential properties also located within approximately 2.5 km of the Site Boundary including properties along the A702 road, and the Daer Water road leading to the Daer Reservoir. Where noise levels resulting from the construction, operation or decommissioning of the Proposed Development are likely to be above the relevant limit levels, there is the potential for significant effects to occur.	- Consideration should be given to the location of the turbines in relation their distance from Noise Sensitive Receptors (NSRs); the greater the distance from NSRs the less potential there is for significant effects to occur. - Ensure that the 'Total ETSU-R-97 Noise Limits' are not exceeded by the cumulative operation of all turbines in the area. - To enable wind farm noise for individual developments to be controlled 'Site Specific Noise Limits' must be set which take account of the proportion of the Total ETSU-R-97 Noise Limit which has been given to, or could realistically be used by other schemes.

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
	In line with the recommendations contained within PAN1/2011¹⁶, operational wind farm noise from the Proposed Development would be assessed in line with ETSU-R-97¹⁷ and the IOA GPG¹⁸. Cumulative wind farm developments within 10 km of the Proposed Development are to be considered within the cumulative operational noise assessment. IOA GPG guidance states <i>'If the proposed wind farm produces noise levels within 10 dB of any existing wind farm/s at the same receptor location, then a cumulative noise impact assessment is necessary'</i>.	
Aviation	The Proposed Development has the potential to cause significant effects on the aviation assets and activities listed below. - National Air Traffic Services (NATS) En Route (NERL) Lowther Hill and Cumbernauld Primary Surveillance Radars (PSRs), as the Site is within the operational range of and has the potential to be detected by these radars. - Prestwick Airport IFPs, as the Site is within the area where the effects of tall constructions on IFPs are required to be assessed. Impacts may occur in the construction, operation and decommissioning phases. - Military low flying, as the Site is located in a specialist low flying area where flight at less than 250 feet above ground level (agl) is permitted. - Aviation Lighting will also be required by UK civil air law as turbines are higher than 150 m. MoD also required infrared lighting on all turbines to enhance wind farm visibility for military crew using night vision systems.	- Consideration of a reduced lighting scheme to be approved by the Civil Aviation Authority (CAA) – reduction of nighttime LVIA effects. - NERL will require the developer to enter into a radar mitigation services contract. This is likely to focus on using the inherent technical capacity of the Lowther Hill radar but may also require in-fill using another NATS radar that does not have line of sight to the turbines. - Likely commission of formal IFP assessment for Prestwick Airport IFPs.
Telecommunications	Wind turbines can cause electromagnetic interference through physical and electrical interference, which has the potential to be significant if not appropriately mitigated. Physical interference can cut across electromagnetic signals resulting in ghosting effect which largely affects television signals and radar. Electrical interference arises as a result of the operation of the generator	Any potential effects on telecommunication links should be mitigated during the turbine layout design stage via the implementation of exclusion zones (recommended 100 m buffer + blade length) around any link paths, where possible. Where this is not feasible suitable mitigation measures would be agreed with the system operators (if required).

¹⁶ Scottish Government (2011) Planning Advice Note 1/2011: Planning and Noise. Available at: <https://www.gov.scot/collections/planning-advice-notes-pans/>

¹⁷ The Working Group on Noise from Wind Turbines (1996). ETSU-R-97 The Assessment and Rating of Noise From Wind Farms. UK: Energy Technology Support Unit

¹⁸ Institute of Acoustics (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'. UK: Institute of Acoustics

Table 3.1: Preliminary Site and Design Guidance for Watchman Energy Park		
Topic	Baseline Constraints Analysis	Design Guidance
	within the nacelle of the turbine and can affect communication equipment in proximity to the turbines. - There is one fixed microwave telecommunications link within 1 km of the Site Boundary. This is operated by Mobile Broadband Network Ltd (MBNL) between Shiel Dod and Green Lowther. - WTR Wireless Telegraphy Link transects the western part of the Site.	Maintain a buffer of 100 m + blade length from identified WTR Wireless Telegraphy Link.

3.6 Design Evolution and Alternative Turbine Layouts

Do-Nothing Scenario

- 3.6.1 The "do nothing" scenario is considered in the EIAR as a basis for comparing the development proposal under consideration. This scenario is considered to represent the current baseline situation as described in the individual chapters of the EIAR (**EIAR Volume 2**). Section 3 of each Chapter of the EIAR outlines the Site Context which characterises the baseline environment and assumed future environmental conditions assuming no development on the Site is established.
- 3.6.2 It is recognised that the baseline would not remain static for the lifetime of the Proposed Development. In particular, and apart from any changes arising from economic and agricultural policies and economic market considerations, it is predicted that biodiversity and landscape would undergo some level of change as a result of climate change. Due to the complexities and uncertainties inherent in attempting to predict the nature and extent of such changes to landscape and biodiversity during the lifetime of the Proposed Development, it has been assumed that the current baseline would subsist.

Alternative Layout Design

- 3.6.3 **Figure 3.1 (EIAR Volume 3a)** shows the various layout iterations throughout the design evolution process for the Proposed Development. It should be noted that throughout the design evolution process, the removal/addition of turbines resulted in the need to re-number turbines (refer to **Table 3.2**).
- 3.6.4 The following paragraphs explain the changes made through the main design iterations with turbine references related to the turbine number within that design iteration (refer to **Figure 3.1, EIAR Volume 3a**).

Layout 01 (Initial Landscape Design) (16 Turbines)

- 3.6.5 Layout 01 (Landscape Design Layout) was informed by input from the specialist landscape architects, based on consideration of landscape capacity only, in conjunction with landownership constraints. The design considered three main objectives to (1) create a balanced layout in views, (2) to follow the broad topography of the Site; and (3) ensure the scale of turbines in relation to the ridges and valleys in the landscape was proportionate.
- 3.6.6 The outcome of this layout review determined that large scale turbines of up to 240 m in height to tip could be accommodated on-site in landscape and visual terms. This scale of turbine was taken forward to the ongoing design process as turbines of this size are expected to maximise the energy generation potential of the site, while minimising adverse significant effects by requiring fewer turbines.

Layout 02 (Scoping) (16 Turbines)

- 3.6.7 Layout 02 (Scoping Layout) was confirmed following a design workshop held in June 2024. The Scoping layout represented the layout that was developed based on an initial desk-based constraints review and taking account of findings of the initial ornithology and ecology surveys and the Stage 1 peat probing surveys.
- 3.6.8 At this stage in the design of the Proposed Development, it was considered that the Site could theoretically accommodate up to 16 turbines up to a maximum 240 m tip height.

Layout 03 (Further Environmental and Engineering Review) (13 Turbines)

- 3.6.9 Following the Scoping stage, further environmental constraints information was gathered which led to the development of an amended layout, which was then reviewed from an engineering/constructability perspective.
- 3.6.10 The revised layout was identified in response to the following:
- Initial noise modelling based on a number of candidate turbine models;
 - Community feedback following the initial public consultation period in December 2024;
 - The results of the Stage 2 peat probing survey;
 - A further review of the sensitivity of Groundwater Dependant Terrestrial Ecosystems (GWDTE); and
 - A review of the constructability of the turbines and associated infrastructure and access tracks, mainly in relation to topography of the Site.
- 3.6.11 As a result of a review of the constraints outlined above, the following main turbine movements were made:
- Turbines 1, 9 and 13 were removed in order to increase spacing between the turbines and maximise the potential generation from available wind resource. Following removal of these turbines a further review of turbine spacing was undertaken across the Site with Turbines 6, 7, 8, 9, 12 and 15 relocated for this purpose.
 - Turbine 2 was moved further west to allow for the relocation of the turbine hardstanding out of a small area of peat deeper than 1 m.
 - Turbines 3 and 4 were relocated further to the east to reduce the area of sensitive ecological habitat (Wet Heath/Acid Grassland Mosaic/Blanket Bog Mosaic (D6/E1.6.1) or Blanket Bog (E1.6.1)) affected, with Turbine 4 also relocated out of a GWDTE area buffer.
 - Turbines 4, 10, 12 and 14 were moved in order to reduce potential impact on sensitive ecological habitat in this area (Blanket Bog (E1.6.1) or Wet Heath/Acid Grassland Mosaic/Blanket Bog Mosaic (D6/E1.6.1)).
 - Turbine 11 was relocated further west to reduce the potential effects on sensitive ecological habitat (Unimproved Acid Grassland/Blanket Bog Mosaic (B1.1/E1.6.1)).
 - Turbine 16 was relocated further north (following the removal of Turbine 1), to allow the access track to be realigned, reducing the area of sensitive ecological habitat affected (Wet Dwarf Shrub Heath/Blanket Bog Mosaic (D2/E1.6.1)).
 - None of the proposed turbine locations are in areas of peat deeper than 1 m. A small area of the hardstanding for Turbine 4 and a small area of the access track to the substation and the access track to Turbine 11 are located in an area of peat deeper than 1 m. The access track from Turbine 14 to Turbine 15 is located in an area of deeper peat, where it is proposed that the access track would be floated.
- 3.6.12 Overall, three turbines were removed resulting in a 13-turbine layout.
- 3.6.13 Further to the turbine locations this layout also included associated infrastructure such as borrow pits, access tracks, turbine hardstands and the location of the temporary compound, substation and BESS.
- 3.6.14 The location for the BESS was determined in tandem with the location of the substation, as the BESS is required to be adjacent to the substation.

- 3.6.15 A number of locations immediately south of the forestry track which bisects the Site east to west were reviewed and the proposed location for the substation and BESS was selected due to the following:
- Appropriate topography allowing for a relatively level area minimising earthworks required;
 - Easily accessed as you enter the main area of the Site;
 - The location provides good opportunities for visual screening;
 - Reduced distance to the contracted grid connection point at Elvanfoot substation, 8.5 km north of the Site.

- 3.6.16 In addition, the BESS compound area was initially seeking a flat area of ground approximately 124 m x 160 m in plan. Review of the site topography, and specifically that in the location finally chosen for the BESS, led to the decision to change the arrangement of the BESS infrastructure to a longer and narrower 190 m x 50 m compound that better fits local topography and reduces the earthworks required.

Layout 04 (Design Freeze) (13 Turbines)

- 3.6.17 Layout 04 (Design Freeze) represents the final layout which amended Layout 03 in relation to the location of Turbine 5 and 15 and the number of borrow pits required.
- 3.6.18 One borrow pit was removed (by Turbine 6); a further review of the material requirements for the development meant that two borrow pit locations were proposed to be taken forward to the design freeze layout.
- 3.6.19 Turbines 5 and 15 were relocated 30 m north to review the location of the turbines in relation to the theoretical Line of Sight (LOS) of Glasgow Prestwick Primary Surveillance Radar (PSR).
- 3.6.20 The revised turbine locations were reviewed against more detailed terrain data which confirmed that the turbines were still within the theoretical LOS and as such this will be considered further in the EIAR. The revised turbine locations were maintained for the purposes of the design freeze.
- 3.6.21 Layout 04 (Design Freeze) includes two access routes which connect the main area of the Site where the turbines are located with the road network:
- Western Access – Off the A702 road through Watermeetings Forest; and
 - Eastern Access – Off the Daer Water road to enter the site at Wintercleugh.
- 3.6.22 For the Eastern Access, it is acknowledged that part of the track is located in close proximity to the scheduled area of the Smithwood, Bastle House Scheduled Monument. Informed through consultation with Historic Environment Scotland (HES), mitigation measures including the implementation of a stand-off buffer with protective fencing are proposed as part of the cultural heritage mitigation for the Proposed Development, in order to protect this asset from direct effects during construction. Refer to **Chapter 5: Cultural Heritage (EIAR Volume 2)**.
- 3.6.23 Turbine numbering was updated to align with the 13-turbine layout, as shown in **Table 3.2**.

Table 3.2: Turbine Numbering – Design Iteration vs Design Freeze			
Layout 01 to 03	Layout 04 (EIA Design Freeze)		
	Turbine No.	Easting	Northing
11	1	295138	608020
6	2	294004	608436
7	3	294210	608044
10	4	295198	607540
8	5	294455	607687
12	6	294266	607086
14	7	293875	606403
15	8	293921	605354
5	9	294596	605841
4	10	295263	606185
3	11	295885	606169
2	12	295299	605418
16	13	294650	605231

3.7 Section 36 Application Layout

- 3.7.1 The option taken forward for the Section 36 application and EIAR assessment is Layout 04 (Design Freeze) as described in **Chapter 2: Description of Proposed Description (EIAR Volume 2)** and shown on **Figure 2.1 (EIAR Volume 3a)**.
- 3.7.2 By following the design guidance described in **Table 3.1**, the turbines were sited to avoid or minimise potential environmental impacts. The main reasons for the selection of the final preferred option, both in terms of the proposed wind turbine geometry and Site layout relate to the reduction of effects to landscape and views, ecological features and peat/carbon rich soils. The infrastructure footprint has been optimised to reduce overall track length as far as practicable, reduce the number of watercourse crossings and avoid and reduce interaction with areas of deeper peat.
- 3.7.3 In conclusion, this Chapter has described the range of reasonable alternatives considered (which are relevant to the specific characteristic of the Proposed Development) including alternative turbine geometry and the layout of both turbines and other supporting infrastructure. The final size of turbine and Site layout proposed has been selected to balance maximising energy yield and avoiding or reducing likely significant effects as far as reasonably practicable.

4. Landscape and Visual

4.1 Introduction

- 4.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) identifies and assesses the potential effects that the Proposed Development would have on the landscape, views and visual amenity of the local environment.
- 4.1.2 Landscape and visual assessments are separate, though related processes. Effects on the landscape as a resource may be caused by change to the constituent elements of the landscape, its aesthetic or perceptual qualities and character. Visual effects, as experienced by people, may be caused by changes in the appearance of the landscape (views) as a result of the Proposed Development.
- 4.1.3 This Chapter sets out the baseline for the LVIA, and then assesses landscape and visual effects separately, followed by an assessment of cumulative effects. The reporting of assessments focuses on likely significant effects that may arise from the Proposed Development, and those that are informative to the decision maker.
- 4.1.4 This LVIA has been prepared by MVGLA, led by Marc van Grieken, a Fellow of the Landscape Institute (FLI), former member of the Board of Trustees, a Design Forum member for Architecture & Design Scotland (A&DS). Marc was also previously Chairman of the Landscape Institutes Technical Committee responsible for technical guidance and chair of the Advisory Panel of the Guidelines for Landscape and Visual Impact Assessment (GLVIA3)¹.
- 4.1.5 Marc was assisted by MVGLA's in-house team of landscape architects, Geographical Information Systems (GIS) consultants, photographer and visualisation specialist.
- 4.1.6 This Chapter is supported by the following Technical Appendices and Figures:
- **EIAR Volume 3a: Figures – Figures 4.1 to 4.19;**
 - **EIAR Volume 3b: Visualisations – Figures 4.20 to 4.35;** and
 - **EIAR Volume 4: Technical Appendices:**
 - **Technical Appendix 4.1: Landscape and Visual Impact Assessment Methodology;**
 - **Technical Appendix 4.2: Landscape Character Assessment;**
 - **Technical Appendix 4.3: Visual Assessment;**
 - **Technical Appendix 4.4: Cumulative Assessment;**
 - **Technical Appendix 4.5: Aviation Lighting Assessment;**
 - **Technical Appendix 4.6: Implications for Designated Landscapes;** and
 - **Technical Appendix 4.7: Residential Visual Amenity Assessment.**
- 4.1.7 Figures and technical appendices are referenced in the text where relevant.

4.2 Assessment Methodology

Overview

- 4.2.1 The LVIA methodology is detailed in **Technical Appendix 4.1 (EIAR Volume 4)** and follows the principles set out in the Guidelines for Landscape and Visual Impact Assessment, Third

¹ Landscape Institute., Institute of Environmental Management and Assessment. (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition. London. Routledge

Edition (GLVIA3) (Landscape Institute and the Institute of Environmental Assessment, 2013)¹.

- 4.2.2 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being '**Major**' or '**Moderate**'.
- 4.2.3 Using a precautionary approach, and although people may consider the appearance of wind farms to be positive for a variety of reasons, all likely landscape and visual effects are identified as adverse.

Scope of Assessment

- 4.2.4 This Chapter considers potential effects as a result of the construction, operation, and decommissioning phases of the Proposed Development on landscape character and views, including effects from aviation lighting, cumulative effects (additional and combined) with potential future wind farms, and the implications of these landscape and visual effects on designated landscapes. Effects associated with decommissioning are considered to be similar to those as a result of construction, over a shorter duration.
- 4.2.5 The assessment considers potential effects across the wider Study Area, with reporting focussed on effects that are significant or pertinent to the meaningful discussion of landscape and visual effects of the Proposed Development.
- 4.2.6 The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)**.

Potential Effects Scoped In

- 4.2.7 The scope of this Chapter is set out in **Table 4.1**. The scope of the assessment has been informed by initial fieldwork and ZTV coverage, the Scoping Report and Opinion (**Technical Appendix 1.4 and 1.5, EIAR Volume 4**) and consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)** and draws upon the principles set out within the following documents:
- Technical Guidance Note LITGN-2024-01, Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Landscape Institute (LI), 2024)²;
 - Landscape Character Assessment: Guidance for England and Scotland (Countryside Commission and Scottish Natural Heritage (SNH, 2002)³;
 - Siting and Designing Windfarms in the Landscape (SNH, 2017)⁴;
 - Visual Representation of Wind Farms, Guidance (SNH, 2017)⁵;
 - Technical Guidance Note 06/19 Visual Representation of Development Proposals (LI, 2019)⁶;

² Landscape Institute (2024) Technical Guidance Note LITGN-2024-01 Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) Available online from: https://www.landscapeinstitute.org/wp-content/uploads/2024/08/LITGN-2024-01-GLVIA3-NC_Aug-2024.pdf

³ Swanwick, C., Department of Landscape University of Sheffield., Land Use Consultants. (2002) Landscape Character Assessment, Guidance for England and Scotland. Cheltenham. Countryside Agency Publications.

⁴ Scottish Natural Heritage. (2017) Siting and Designing Wind Farms in the Landscape, Guidance. Available online from: <https://www.nature.scot/sites/default/files/2017-11/Siting%20and%20designing%20windfarms%20in%20the%20landscape%20-%20version%203a.pdf>

⁵ Scottish Natural Heritage. (2017) Visual Representation of Wind Farms, Guidance. Available online from: <https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf>

⁶ Landscape Institute (2019) Technical Guidance Note 06/19. Visual Representation of Development Proposals. Available online from: https://www.landscapeinstitute.org/wp-content/uploads/2019/09/LI_TGN-06-19_Visual_Representation-1.pdf

- Assessing the Cumulative Landscape and Visual Impact of Onshore Developments (NatureScot, 2021)⁷;
- Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024)⁸;
- Special Landscape Qualities - Guidance on assessing effects (NatureScot, 2025)⁹;
- Assessing Impacts on Wild Land Areas: Technical guidance (NatureScot, revised 2023)¹⁰; and
- Residential Visual Amenity Assessment (RVAA), Technical Guidance Note 2/19 (LI, 2019)¹¹.

4.2.8 Distances noted below are from the nearest proposed turbine and based on the Study Areas stated in **Technical Appendix 4.1 (EIAR, Volume 4)**.

Table 4.1: Effects Considered within the Assessment			
Effects	Phase*		
	C	O/M	D
Effects on the Site	Yes	Yes	Yes
Effects on landscape character within approximately 15 km	No	Yes	No
Effects on views from routes and hill tops within approximately 25 km	No	Yes	No
Effects on views from local paths and locally promoted paths within approximately 5 km	No	Yes	No
Effects on views from settlements within approximately 10 km	No	Yes	No
Cumulative effects within approximately 25 km from the Site	No	Yes	No
Effects on landscape and visual receptors from aviation lights within 25 km	No	Yes	No
Effects on designated landscapes within approximately 25 km	No	Yes	No

*C=construction, O=operation and maintenance and D=decommissioning.

4.2.9 The Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are consented or the subject of a valid planning application. Operational, and under construction developments are considered as part of the LVIA baseline.

4.2.10 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.

Potential Effects Scoped Out

4.2.11 To allow focussing of the assessment, the scoping exercise identified where receptors are unlikely to be affected by the Proposed Development, either through having little or no theoretical visibility, or being distant from the Proposed Development. Those receptors have been scoped out of the LVIA. In addition to this, the scope of reporting was further focussed

⁷ NatureScot (2021) Assessing the Cumulative Landscape and Visual Impact of Onshore Developments. Available online from: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments>

⁸ NatureScot (2024) Guidance on Aviation Lighting Impact Assessment. Available online from: <https://www.nature.scot/doc/guidance-aviation-lighting-impact-assessment>

⁹ NatureScot. (2025) Special Landscape Qualities - Guidance on assessing effects. Available online from: <https://www.nature.scot/doc/special-landscape-qualities-guidance-assessing-effects>

¹⁰ NatureScot. (2023) Assessing impacts on Wild Land Areas - technical guidance. Available online from: <https://www.nature.scot/doc/assessing-impacts-wild-land-areas-technical-guidance>

¹¹ Landscape Institute (2019) Residential Visual Amenity Assessment (RVAA), Technical Guidance Note 2/19. Available online from: <https://www.landscapeinstitute.org/technical-resource/rvaa/>

on those effects that were found to be significant or contribute to the meaningful discussion of landscape and visual effects of the Proposed Development.

4.2.12 Scoped out of the LVIA, on the basis of initial fieldwork and ZTV coverage, are the following elements (distances from the outermost turbines) with justification provided in **Technical Appendix 4.1 (EIAR Volume 4)**:

- Effects on landscape character beyond approximately 15 km;
- Effects on views from routes and hill tops beyond approximately 25 km;
- Effects on views from local paths and locally promoted paths beyond approximately 5 km;
- Effects on views from settlements beyond approximately 10 km;
- Cumulative effects with turbines of less than 50 m to blade tip;
- Effects on landscape and visual receptors beyond 25 km;
- Effects on designated landscapes beyond approximately 25 km; and
- Decommissioning effects, which are similar to, but in reverse of construction effects, reducing on completion.

4.2.13 Viewpoint selection was also a form of containing the scope of the assessment, through the selection of viewpoints that are representative of sensitive landscape and visual receptors identified by ZTV mapping of receiving theoretical visibility of the Proposed Development, rather than exhaustive inclusion of all locations within the ZTV.

Method of Baseline Characterisation

Extent of the Study Area

4.2.14 NatureScot guidance (SNH, 2017)⁵ suggests that for turbines of over 150 m to blade tip, an initial Study Area of 45 km radius should be considered, followed by refinement of the Study Area to focus on potential significant effects.

4.2.15 A tip-height ZTV map to 45 km is shown on **Figure 4.2.1 (EIAR Volume 3a)** at a scale of 1:340,000 at A3 size, and at a scale of 1:100,000 at A1 size on **Figure 4.2.2 (EIAR Volume 3a)**. The Study Area was reduced to allow reporting to focus on the extent of likely significant effects. This was based on a desk-top review, fieldwork, analysis of ZTV mapping, consultation and professional judgement. The following provides details of the Study Areas assessed:

- Landscape effects were considered for landscape character within 15 km of the outer turbines, see **Technical Appendix 4.2 (EIAR Volume 4)**;
- Visual effects were considered for locations across the wider area, but those reported on in detail are within an area of approximately 25 km radius for routes and hill tops, approximately 10 km radius for settlements, and 5 km for local paths, see **Technical Appendix 4.3 (EIAR Volume 4)**;
- Cumulative effects on landscape character and visual amenity within 25 km, see **Technical Appendix 4.4 (EIAR Volume 4)**;
- Landscape and visual effects from aviation lighting within 25 km, see **Technical Appendix 4.5 (EIAR Volume 4)**;
- Effects on the special qualities of designated landscapes within 25 km, see **Technical Appendix 4.6 (EIAR Volume 4)**; and
- Visual effects on residential amenity has focussed on properties within 2.5 km of the outer turbines, see **Technical Appendix 4.7 (EIAR Volume 4)**.

Desk Study

4.2.16 Desk studies were undertaken to provide information about the baseline landscape and visual resource and to inform fieldwork and the evaluation of effects. For this work, the following data sources have been consulted:

- Ordnance Survey (OS) topographic and geological maps;
- South Lanarkshire Local Development Plan 2 (South Lanarkshire Council (SLC), 2021)¹² ;
- SiteLink (NatureScot, 2025)¹³;
- Scottish Landscape Character Types Map and Descriptions (NatureScot, 2019)¹⁴;
- Landscape Character Assessment: Glasgow and the Clyde Valley – Landscape Evolution and Influences (NatureScot, 2019)¹⁵;
- South Lanarkshire Landscape Character Assessment (Ironside Farrar, 2010)¹⁶;
- Wild Land Areas (SNH, 2017)¹⁷; and
- South Lanarkshire Validating Local Landscape Designations (Ironside Farrar, 2010)¹⁸.

4.2.17 The LVIA also takes cognisance of other supplementary assessments of landscape character and sensitivity provided in the South Lanarkshire Landscape Capacity Study for Wind Energy (Ironside Farrar, 2016)¹⁹.

Field Survey

4.2.18 Field survey work was carried out during several visits under differing weather conditions, between September 2023 and October 2025. Records were made in the form of field notes and photographs. Field survey work included visits to viewpoints and designated landscapes, and extensive travel around the wider Study Area to consider potential effects on landscape character and on experiences of views seen from routes and the summits of hills.

Method of Assessment

Overview

4.2.19 Detailed information on the assessment methodology, including criteria for assessing sensitivity of receptors, magnitude of change and cumulative effects, as well as overall significance criteria, is provided in **Technical Appendix 4.1 (EIAR Volume 4)**.

Limitations and Assumptions

4.2.20 Limitations to the LVIA include a reliance on bare-ground modelling for wireframes and ZTVs used in graphics, which does not take account of potential screening by existing buildings and vegetation, or subsequent modifications to landform since the Digital Terrain Model (DTM) was created.

¹² South Lanarkshire Council. (2021) South Lanarkshire Local Development Plan 2. Available online from: <https://www.southlanarkshire.gov.uk/developmentplan2>

¹³ NatureScot. (2025) SiteLink. Available online from: <https://sitelink.nature.scot/home>

¹⁴ NatureScot. (2019) Scottish Landscape Character Types Map and Descriptions. Available online from: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions>

¹⁵ NatureScot. (2019) Landscape Character Assessment: Glasgow and the Clyde Valley – Landscape Evolution and Influences. Available online from: <https://web.archive.org/web/20250119153854/https://www.nature.scot/doc/landscape-character-assessment-glasgow-and-clyde-valley-landscape-evolution-and-influences>

¹⁶ Ironside Farrar (2010) South Lanarkshire Landscape Character Assessment.

¹⁷ Scottish Natural Heritage. (2017) Wild Land Areas. Available online at: <https://www.nature.scot/doc/wild-land-areas-map-and-descriptions-2014>

¹⁸ Ironside Farrar (2010) South Lanarkshire Validating Local Landscape Designations.

¹⁹ Ironside Farrar (2016) South Lanarkshire Landscape Capacity Study for Wind Energy. Available online from: https://www.southlanarkshire.gov.uk/downloads/download/868/renewable_energy_supplementary_guidance

- 4.2.21 The theoretical visibility indicated by the bare-ground models is therefore an over-estimation of visibility. Actual visibility is described for receptors based on fieldwork and is illustrated in photomontages.
- 4.2.22 Whilst this issue has been identified, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant effects on landscape and visual amenity.
- 4.2.23 Viewpoint photography captures the landscape at the date taken (displayed on each visualisation) and does not consider any forestry felling or wind-blown trees occurring thereafter.
- 4.2.24 It should be noted that due to the date at which photography was taken, the assessment does not include any storm damage or felling of trees, woodland and forestry post-September 2025.
- 4.2.25 It should be noted that illustrations and modelling cannot replace the need for site visits and can only be used to represent what people may see from the viewpoint. Whilst accuracy of modelling is essential, modelling can only be as accurate as the data used and cannot be used to replace field visits. It is noted also that the movement of the turbines may render them more noticeable in the view than static photographs/photomontages can portray.
- 4.2.26 Limitations to the cumulative assessment include the uncertainty of whether the proposed wind farms would be built in the future. This includes consented developments that may or may not be built. The assessment also relies on currently available data, and it should be noted that the locations and specifications of turbines may change for proposed and consented developments before they are built, through redesign and/or micro-siting. A cumulative cut-off date of 18 December 2025 was applied to allow sufficient time to undertake the assessment and production of supporting figures and visualisations.
- 4.2.27 Wirelines have been produced with cumulative developments out to 25 km from the turbine array. Therefore, photographs may include operational or under construction wind farms that are not shown on wirelines.
- 4.2.28 The Future Baseline is based on sources of information covering the Study Area rather than the opinion of the assessors.

4.3 Baseline Conditions

Current Baseline

- 4.3.1 The Proposed Development site is located on high ground to the west of Daer Reservoir entirely within South Lanarkshire Council's (SLC) administrative area. The Site forms part of a larger upland area extending between the M74 Motorway/A74(M) road in east, and the A702 road in the west and part of the Southern Uplands. The Site lies entirely within the Leadhills and Lowther Hills Special Landscape Area (SLA).
- 4.3.2 There are several wind farms within the surrounding landscape including Clyde and Clyde Extension to the northeast, Daer and Rivox Wind Farms (both currently at application stage) to the east, and Harestanes and Minnygap (operational) to the southeast. All these sites have been located further back from the surrounding valleys with turbines being located on the gentler undulating upper slopes.
- 4.3.3 Clyde Wind Farm and Extension are more reflective of the Site being situated in a similar type of topography of large, rounded hills where wind turbines follow ridgelines with limited visibility of connecting access tracks in views from lower elevations within the surrounding valleys.

- 4.3.4 The general topography of the Site is one of undulating rounded hills and is characteristic of the Southern Uplands. The Site covers a range of elevations rising from the floodplain of the Daer Water in the north, to the pronounced hills to the south including Comb Law 645 m AOD, Hirstane Rig 622 m AOD, Watchman's Brae 594 m AOD and Rodger Law 688 m AOD, and Ewe Gair 559 m AOD. This group of hills are separated internally by steep clefts containing Kirkhope Cleuch, Carshope Burn and a series of minor watercourses.
- 4.3.5 The northern part of the Site is located within the Upland Glen – Glasgow and Clyde Valley LCT (LCT 209) around 290 m AOD, gradually rising southwards through a transitional area comprising farmland and forestry. To the south, the landscape is more elevated and open which is characteristic of the Southern Uplands - Glasgow and Clyde Valley LCT (LCT217) forming part of the wider landscape.
- 4.3.6 Within the wider 25 km Study Area, the landscape is predominantly upland with a series of hills forming the Southern Uplands to the north in South Lanarkshire, northeast and east in the Scottish Borders, and to the south and west in Dumfries and Galloway. These comprise a series of large-rounded hills incised by narrow steep valleys where rivers and tributaries along with roads occupy lower elevations. The M74 Motorway/A74 (M) road is the main man-made feature within the 25 km Study Area generally orientated north to south and is the main route between Scotland and England. Also utilising this route through the hills are several utilities and several settlements such as Abington, Crawford and Beattock, with several more off the main route following older roads such as to Douglas and Lockerbie.
- 4.3.7 The character of the landscape is upland with moorland and forestry forming the main landcover, and at lower elevations farmland although this retains an upland feel owing to the percentage of rough grazing and limited arable land.
- 4.3.8 The character of the landscape is simple and large scale, with smaller scale areas in valleys. Man-made features are recurrent in the landscape including a motorway and associated infrastructure, telecommunication masts, Battery Energy Storage System (BESS) and operational wind farms such as Clyde Wind Farm in the Southern Uplands, developments along the M74 Motorway corridor, and wind farms further to the west.

Table 4.2 provides a list of operational and developments currently under construction (as of the 18th of December 2025) within 25 km of the Proposed Development. These are also shown on **Figure 4.6 (EIAR Volume 3a)**.

Table 4.2 Operational and Under Construction Wind Farms (within 25 km)		
Site	Details	Distance and Direction from the nearest proposed turbine
Operational²⁰		
1. Andershaw	11 turbines at 140 m to tip	17.5 km, northwest
2. Clyde	152 turbines at 126.5 m to tip	4.3 km, northeast
3. Clyde Extension	54 turbines at 142 m to tip	13.2 km, northeast
4. Dalswinton	15 turbines to 126 m to tip	15.5 km, south
5. Glenkerrie	11 turbines at 118 m to tip	23.2 km, northeast
8. Harestanes	68 turbines at 125 m to tip	7.6 km, northeast
9. Kennoxhead Phase 1	13 turbines at 180 m to tip	22.6 km, northwest

²⁰ Hare Hill and Harehill Extension (No. 6 and 7) are excluded from Table 4.2 as they are located outwith the 25 km Study Area. They are shown on the relevant cumulative figures for completeness.

Table 4.2 Operational and Under Construction Wind Farms (within 25 km)		
Site	Details	Distance and Direction from the nearest proposed turbine
10. Middle Muir	15 turbines at 152 m to tip	17.5 km, northwest
11. Minnygap	10 turbines at 125 m to tip	10.6 km, southeast
12. Sandy Knowe	24 turbines at 125 m to tip	23.2 km, west
13. Sanquhar	9 turbines at 130 m to tip	22.6 km, west
14. Sunnyside	2 turbines at 62 m to tip	17.5 km, west
15. Twenty Shilling	9 turbines at 140 m to tip	15.1 km, southwest
16. Whiteside	10 turbines at 121.2 m to tip	21.4 km, west
Under Construction		
17. Priestgill	7 turbines at 200 m to tip	16.9 km to the north
18. Sanquhar Phase 2	44 turbines at 149 and 200 m to tip	20.4 km to the west
19. Whitelaw Brae	14 turbines at 133.5 m to tip	15.9 km, northeast

Future Baseline

- 4.3.9 The Site is expected to stay similar to the landscape baseline described previously and predominantly managed for moorland and rough grazing, with tree crops on lower slopes gradually being restructured, probably under the terms of an agreed Long Term Forest Plan (LTFP). The species proportions are expected to slightly change to reflect the requirements of the UK Forestry Standard (UKFS), with the forest being mainly dominated by commercial conifer crops.

Summary of Sensitive Receptors

- 4.3.10 A summary of the receptors considered likely to be affected by the Proposed Development, and therefore scoped into the EIA Report, are set out in **Table 4.3**, together with their associated sensitivity.

Table 4.3: Summary of Sensitive Receptors		
Receptor	Sensitivity	Justification
The Site	Medium	Potential direct effects on the physical fabric of the Site
LCT 209 Upland Glen – Glasgow & Clyde Valley	High to Medium	The Proposed Development is partially located within the LCT which would also receive close theoretical visibility.
LCT 217 Southern Uplands – Glasgow & Clyde Valley	Medium	The majority of the Site is located within this LCT which would also receive close theoretical visibility of the proposed turbines beyond the Site.
M74 Motorway/A74 (M) road/ National Cycle Route (NCR) 74	Low (road) High (NCR)	Theoretical visibility predicted along the route at distances of approximately up to 20.3 km to the northeast of the Site.
A76 road	Medium	Intermittent theoretical visibility predicted at approximately 19 – 25 km from the Site.
A701 road	Medium	Intermittent elevated theoretical visibility of the Proposed Development predicted from 10.8 km to the east and southeast of the Site.
A702 road	High	Close views of the Proposed Development between Elvanfoot and the Dalveen Pass approximately 1.3 to 7.5 km to the west of the Site.

Table 4.3: Summary of Sensitive Receptors

Receptor	Sensitivity	Justification
Southern Upland Way (SUW)	High	Would obtain close views from upland areas directly to the east and west of the Site and includes a 2 km section of the footpath that passes through the Site.
Roman Reivers Route	High	Elevated views of the Proposed Development from the southeast.
Annandale Way	High	Elevated views of the Proposed Development from the east and southeast.
Scottish Hill Tracks within 25 km	High	Elevated views of the Proposed Development from surrounding areas within the 25 km Study Area.
Core Paths with 5 km	High	Close views of the Proposed Development within 5 km of the Site.
Hill tops to the north and northeast	High	Elevated views of the Proposed Development on the upper slopes and hill tops to the north and northeast of the Site.
Hill tops to the east	High	Elevated views of the Proposed Development from the east of the Site.
Hill tops to the south	High	Limited but elevated close views of the Proposed Development from the south of the Site.
Hill tops to the west	High	Elevated close views of the Proposed Development from the west.
Drumlanrig Castle	High	Views from a popular visitor attraction.
Leadhills and Lowther Hills SLA	High	Designated landscape
Dumlanrig Castle GDL	High	Garden and Designed Landscape

4.4 Mitigation

- 4.4.1 Mitigation of landscape and visual effects has been undertaken through design modifications and input to the design process. The design evolution is set out in **Chapter 3: Design Evolution and Alternatives, (EIAR Volume 2)**.
- 4.4.2 On the basis of the large scale of the landscape and the topographic character of the area, the landscape design of the Proposed Development has been designed to relate to the large topographic features. The design has also considered the Site landform with turbine locations following the ridgelines to lead to a clear 3D landform and 3D turbine composition.
- 4.4.3 A summary of the standard/best practice mitigation considered for the LVIA are set out in **Table 4.4**.

Table 4.4: Summary of Standard/Best Practice Mitigation

ID	Timing of Mitigation	Description	Purpose of Mitigation
LV01	Construction/ Decommissioning	Effective management of construction and decommissioning phases using measures set out the Construction Environmental Management Plan (CEMP) and appointment of experienced contractors. Outline CEMP provided in (Technical Appendix 2.1, EIAR Volume 4) .	To mitigate direct effects within the Site as a result of ground disturbance and construction/decommissioning activity.

Table 4.4: Summary of Standard/Best Practice Mitigation

ID	Timing of Mitigation	Description	Purpose of Mitigation
LV02	Operation	Reduced lighting scheme (i.e., not all turbines lit) and reduced intensity of turbine aviation lighting. Proposing use of 2000 candela (cd) steady red lights reducing to 200 cd in clear weather with no mid-tower lighting. Includes the reduction of intensity of the lights during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km. At other times they would be at 10%, i.e., 200 cd. Candidate lights are designed to give a horizontal beam with reduced upward and downward spill of light, such that the brightness of the light is decreased for viewers close to the turbines viewing them from below.	To mitigate the nighttime visual effects of the Proposed Development on visual amenity of non-aviation receptors.

- 4.4.4 As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no additional specific mitigation measures implemented with regards to landscape and visual. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented and all effects identified are residual effects. It is noted that mitigation for Ecology would be undertaken that overtime would result in an increase in diversity on the Site (see **Chapter 6, EIAR Volume 2**, and **Technical Appendix 6.7, EIAR Volume 4**).

4.5 Assessment of Likely Effects

Potential Construction Effects

The Site

- 4.5.1 The Site forms a transitional landscape between LCT 209 Upland Glen - Glasgow & Clyde Valley, and LCT 217 Southern Uplands Glasgow & Clyde Valley, and therefore includes characteristics of both LCTs.
- 4.5.2 Approximately 1.5 km of upgraded access track and 0.4 km of new access track would be situated in LCT 209 Upland Glen – Glasgow & Clyde Valley. The remaining elements of the Proposed Development would be located in LCT 217 Southern Uplands – Glasgow & Clyde Valley and include the following:
- Up to 13 wind turbines with a maximum tip height of 240 m and with a combined generation capacity of >50 MW;
 - Permanent foundations supporting each wind turbine, and associated crane hardstanding at each wind turbine base;
 - A series of new and upgraded on-site access tracks with associated watercourse crossings and turning heads;
 - Underground power cables, generally laid in trenches alongside access tracks connecting the turbines to the onsite substation;
 - An on-site substation and control building;
 - A BESS with an approximate capacity of 50 MW;

- Temporary construction compound and laydown areas;
- Extraction of rock from borrow pits - two borrow pits have been located within the turbine area;
- Temporary on-site concrete batching plant – located within the construction compound areas;
- Temporary anemometer masts for three to six months during the construction period for calibration purposes;
- Habitat management and enhancement areas; and
- A permanent diversion to a short section (approximately 880 m) of the Southern Upland Way (SUW) at the point where the western access route enters the main site area.

4.5.3 During construction, the Site would become active with the presence of vehicles and construction activities within the footprint of the Proposed Development. Activities would be associated with site clearance, the extraction of stone for the access roads and platforms from two borrow pits, the construction of tracks, temporary construction compound, laydown areas, import of materials, crane works associated with erecting turbines, establishment of the met mast, control building, substation and battery storage, followed by reinstatement works at the end of the construction phase. There would be lights on the Site during the construction phase during periods of low light in winter, months and on moving vehicles including flashing beacons.

4.5.4 The construction works would be of short-term duration and reversible in that construction activities would cease, and operational effects would take over. The extent of the physical effects of the construction works within the Site would involve a relatively small geographical proportion of the Site, the larger part of which would be physically unaffected by either construction works or operation and would continue to be managed for moorland and forestry. The scale of the components such as wind turbines and supporting infrastructure would change the moorland and forested characteristics of the Site.

4.5.5 The magnitude of change during the construction phase would be **High**, temporary and reversible. The decommissioning phase would be similar to the activities discussed during construction but be undertaken over a shorter timeframe and involve less disturbance of the ground.

4.5.6 Overall, the predicted effect on the Site is judged to be **significant (Major)** for the duration of the construction and decommissioning phases.

Potential Operational Effects

The Site

4.5.7 During operation, activity on Site would be less than during the construction phase and would be related to the operation and maintenance of the turbines, substation and BESS. The magnitude associated with the change from moorland, forestry and woodland to a renewable energy generating site with supporting ground level infrastructure would be **High**, long-term, and reversible.

4.5.8 Overall, the predicted effect on the Site during operation is judged to remain as **significant (Major)**.

Operational Effects on LCTs

4.5.9 The assessment of landscape character considered potential effects on eleven LCTs, out to approximately 15 km, which is an appropriate range to catch all likely significant effects based on previous reviews and site visits (refer to **Technical Appendix 4.2, EIAR Volume 4**). Using the ZTV shown on **Figure 4.8 (EIAR Volume 3a)** as an indicator of likely visibility, a review took forward two LCTs for detailed assessment as follows:

- LCT 209 Upland Glen – Glasgow & Clyde Valley; and
- LCT 217 Southern Uplands – Glasgow & Clyde Valley.

LCT 209 UPLAND GLEN – GLASGOW & CLYDE VALLEY

4.5.10 The proposed turbines would be viewed beyond the LCT, and theoretical visibility is predicted to be widespread to approximately 10 km to around the vicinity of Elvanfoot. From this location the proposed turbines would be viewed in conjunction with the nearby turbines of Clyde Wind Farm, which often appear closer to the LCT when viewed from the north. For much of the LCT, there would be a natural separation between the developments in the form of the Daer Water floodplain.

4.5.11 For the majority of the LCT, theoretical visibility is predicted from the same locations as where Clyde Wind Farm is visible and is a feature within the surrounding uplands and alters the perception of this LCT to a wind farm landscape. The addition of the Proposed Development would result in turbines being located further west with a similar pattern to Clyde Wind Farm, resulting in a slight intensification of turbines. However, the key characteristics of the glen would still be readable. Magnitude of change is judged as **Medium**.

4.5.12 Overall, the effect on the character of the landscape is judged as **significant (Major) to (Moderate)** within approximately 7.5 km to the north of the of the Site, thereafter, reducing to **not significant levels (Minor) and (Negligible)**.

LCT 217 SOUTHERN UPLANDS – GLASGOW & CLYDE VALLEY

4.5.13 The ZTV (**Figure 4.8, EIAR Volume 3a**) indicates widespread theoretical visibility of the Proposed Development within 5 km, thereafter, reducing to summits, south facing upper slopes and interconnecting ridgelines with distance to the north. The extent of actual visibility would reduce further as a result of forestry although it is acknowledged that some of these areas would be clear-felled during the lifespan of the Proposed Development. Clyde Wind Farm and Extension are prominent features in this LCT.

4.5.14 Potential effects on character would mainly be associated with views of the proposed turbines which would have greatest visibility within the LCT whilst the other areas of infrastructure would be less visible due to a combination of screening by landform and forestry. The size and scale of the change would be medium on account of the large-scale and openness of the landscape and presence of other wind turbines both within the LCT (Clyde + Extension) and in neighbouring LCTs. Changes occurring would be limited in comparison to the overall size of the LCT, magnitude of change is judged as **Medium**.

4.5.15 Overall, the effect on the character of the landscape is judged as **significant (Moderate)** for an area of the LCT approximately within 5.1 km to the northeast, and extending northwards to 7.5 km of the proposed turbines, thereafter, levels of effect would reduce to **not significant levels (Minor) and (Negligible)** overall for the LCT.

Visual Amenity

ROADS

4.5.16 Four roads were identified as receiving theoretical visibility of the Proposed Development as follows:

- M74 Motorway/A74 (M) road/NCR 74;
- A76 road;
- A701 road; and
- A702 road.

4.5.17 A 4.4 km section of the A74 (M) road and the A702 road were identified as the only roads that would receive significant effects to its views as follows:

M74 MOTORWAY/A74 (M) ROAD/NCR 74

4.5.18 The M74 Motorway and A74 (M) road is one of the main roads between Scotland and England, passing through the 45 km Study Area generally in a northwest to southeast direction. The NCR 74 broadly follows the M74/A74 (M) roads on an adjacent lower speed limit road. The road and NCR 74 enter the 25 km Study Area south of Happendon in north, and exit around Templand in the south, and is known as the M74 motorway north of Abington, and the A74(M) road to the south.

4.5.19 Between the south of Crawford and Elvanfoot, a 4.4 km section of both routes is predicted to have visibility at approximately 8.3 km to the northeast of the nearest turbine. This section includes a bend close to the River Clyde valley which affords views along the floodplain between hillsides to the southwest. From here the turbines would be viewed within the context of nearby Clyde Wind Farm but further along the valley and appear as separate development on the hillside and be briefly visible when travelling north and south. Visual magnitude of change is predicted to be **Medium** resulting in a **significant (Moderate)**. Thereafter, a **not significant (Negligible)** effect is predicted due to screening by landform and forestry.

A702 ROAD

4.5.20 The ZTV indicates that theoretical visibility would occur as the road rounds the corner southeast of Elvanfoot shown in Viewpoint 4 (see **Figures 4.24.1-6: Viewpoint 4: A702 Road, EIA Volume 3b**) and would be viewed to the south extending turbines westwards from Clyde Wind Farm which is also prominent within the view. This would be experienced when travelling to the west of the Site between distances of 1.3 – 7.5 km from the nearest turbine, for approximately 10.3 km section to the top of the Dalveen Pass, before landform would screen potential views. This section of the road would experience close views of the proposed turbines depending on direction of travel. Magnitude of change would be **High** for this section due to the turbines' close proximity and would be viewed within the context of Clyde Wind Farm and other infrastructure which becomes more prevalent as the road gets closer to the A74 (M) road.

4.5.21 **Significant (Major)** effects are judged to occur to views from the A702 road between the bend southeast of Elvanfoot to above the Dalveen Pass for approximately 10.3 km. Thereafter, a **not significant (Minor)** and **(Negligible)** effect is predicted due to screening by a combination of landform and woodland, as well as distance.

Long Distance Paths

4.5.22 Three long distance paths were identified as receiving theoretical visibility as follows:

- SUW;
- Roman Reivers Route; and
- Annandale Way.

4.5.23 Of these three long distance paths, only the SUW was identified as receiving potential significant effects as follows.

SOUTHERN UPLAND WAY (SUW)

4.5.24 SUW leaves the forestry plantation on Beld Knowe and follows the forested edge to Hods Hill. **Figures 4.31.1-6 - Viewpoint 11: Hods Hill – Southern Upland Way (EIAR Volume 3b)** illustrates that the Proposed Development would be viewed to the west above Daer Reservoir on the opposite hillsides. Clyde Wind Farm is partially visible to the north, with Harestanes and Minnygap Wind Farms more distant features to the south. The Proposed Development would appear as separate owing to the gap between the other three wind farms.

4.5.25 From Hods Hill, the SUW descends towards Daer Waterworks, and the path bypasses the north of the works or continues over the Daer Reservoir dam. **Figures 4.32.1-4 - Viewpoint 12: Daer Reservoir – Southern Upland Way (EIAR Volume 3b)** illustrates the type of view obtained of the Proposed Development from lower elevations. From here, the Proposed Development would be viewed above on the opposite hillsides and although there is some screening by forestry around Daer Waterworks and Hitteril Hill 491 m AOD, close views of all 13 turbines would be experienced.

4.5.26 From Hitteril Hill the SUW passes between a series of hills with woodland and forestry to the north and there would be a slight decrease in the number of turbines (1 – 9 turbines) viewed to the south due to screening by foreground landform, however, there would be close views of the BESS and substation from a section of the SUW between Meikle Shag and Hitteril Hill. On reaching the A702 road, the SUW follows the road for approximately 760 m before ascending towards Lowther Hill 725 m AOD, passing over the slopes of Laght Hill 507 m AOD, and Comb Head and Cold Moss 628 m AOD. **Figures 4.29.1-5 - Viewpoint 9: Comb Head (EIAR Volume 3b)** and **Figures 4.28.1-5 - Viewpoint 8: Lowther Hill (EIAR Volume 3b)** show close views of the Proposed Development to the east in its entirety.

4.5.27 Visual magnitude of change for the sections of the SUW mentioned above is judged as **High**. Thereafter, a combination of screening by landform and forestry would reduce visual effects to **Low** and **Negligible** levels.

4.5.28 **Significant (Major)** effects are judged to occur to views from a section of the SUW between Beld Knowe to Lowther Hill for approximately 16.6 km. Thereafter, a **not significant (Minor)** and **(Negligible)** effect is predicted to views from the SUW due to screening by a combination of landform and woodland, as well as distance from the proposed turbines.

Scottish Hill Tracks (SHTs)

4.5.29 A total of thirteen SHTs were identified with theoretical visibility within the 25 km Study Area as follows:

- 15/15a/15b: Moffat to Ettrick or Eskadale;
- 16/ 16a/ 16b: Tweedsmuir to Ericstane;
- 55: Lamington to Broughton;
- 56: Coulter to Crawford;
- 57: Robertson to Douglas;
- 58: Douglas to Wanlockhead;

- 59: Muirkirk to Wanlockhead;
- 60: Muirkirk to Kirkconnel;
- 61/61a: Wanlockhead to Sanquhar;
- 62: Wanlockhead to Enterkinfoot by the Enterkin Pass;
- 63/63a/63b: Daer Reservoir to Durisdeer/64/64a/64b: Daer Reservoir to Thornhill;
- 65/65a: Ae Village to Beattock by the Forest of Ae; and
- 83: St John's Town of Dalry to Sanquhar.

4.5.30 Of these, SHT 62: Wanlockhead to Enterkinfoot by the Enterkin Pass and SHT 63/63a/63b: Daer Reservoir to Durisdeer and 64/64a/64b: Daer Reservoir to Thornhill were identified as receiving potential significant effects as follows.

SHT 62: WANLOCKHEAD TO ENTERKINFOOT BY THE ENTERKIN PASS

4.5.31 This footpath is located to the west of the Proposed Development and is approximately 11 km long between Wanlockhead and Enterkinfoot. Crossing the Southern Uplands, visibility is extensive over the surround hill tops.

4.5.32 Theoretical visibility is predicted from the top of the ridgeline between Threehope Height 551 m AOD, and Holbrae for approximately 2.4 km at 7.1 km from the proposed turbines. These would be viewed breaking the ridgeline to the east with some screening of the bottom of the towers by landform but introducing wind turbines closer to the hill track in open views. Visual magnitude of change would be **Low**.

4.5.33 A **significant (Moderate)** effect to views from this SHT is predicted from a 2.4 km section, reducing to **not significant (Minor)** and **(Negligible)** elsewhere due to intervening landform.

SHT 63/63A/63B: DAER RESERVOIR TO DURISDEER AND 64/64A/64B: DAER RESERVOIR TO THORNHILL

4.5.34 This footpath hill track is formed by a series of different paths that start at the junction with the A702 road in the north and follows the Daer Water Road and access road to Crookburn to the north and east of the Site.

4.5.35 Theoretical visibility is predicted for much of the footpath in the north extending from the A702 road to approximately the border with Dumfries and Galloway.

4.5.36 From this section of the path, the proposed turbines would be prominent features and whilst there would be some screening by forestry, the turbines would be visible for much of the route. This would also include the footpath across the Site as far as Durisdeer Hill. Visual magnitude of change is predicted to be **High** resulting in a **significant (Major)** effect.

4.5.37 Short sections of the path are predicted to receive theoretical visibility of 1-3 turbines crossing Cample Cleuch where blades would be seen breaking the horizon to the northeast, and from a section east of Thornhill where 1-6 turbines are predicted to be visible but likely to be screened by woodland. Visual magnitude of change is **Negligible** resulting in a **not significant (Negligible)** effect.

Core Paths

4.5.38 Three Core Paths with predicted theoretical visibility of the Proposed Development were identified as follows:

- CL/3558/1 Southern Upland Way, Portrail Water-Coom Rig;
- CL/5692/1 Watermeetings – Coom Rig; and

- ROYS/444/1 Sweetshaw Brae.

4.5.39 All three Core Paths are assessed as receiving a **High** visual magnitude of change. This would result in a **significant (Major)** effect to their views on account of their proximity to the Proposed Development.

Hill tops

4.5.40 The Study Area is predominantly an upland landscape that is popular as a hill walking area. Although many of the summits are not classified as Munros and Corbetts, they are promoted for walking and from summits, extensive views across the Southern Uplands including summits in the Scottish Borders, South Lanarkshire, East Ayrshire and Dumfries and Galloway can be experienced. There are too many to assess individually however for the purposes of this assessment, have been grouped together and represented by photomontages, and wirelines. The following groups have been identified:

- Hill tops to the north and northeast;
- Hill tops to the east;
- Hills to the south; and
- Hills to the west.

4.5.41 Significant effects were predicted for hill tops to the south and west due to their proximity to the Proposed Development and open views experienced as follows.

HILL TOPS TO THE SOUTH

4.5.42 Theoretical visibility for this grouping is predicted to be limited to several summits to the south within 5 km, extending south-eastwards to the border with Dumfries and Galloway. This would include the summits of Ballencleuch Law 689 m AOD, Shiel Dod 668 m AOD, Earncraig Hill 611 m AOD, Ganna Hill 668 m AOD, and Queensberry Hill (697 m AOD). From the summits and upper slopes of these hills, the proposed turbines would be viewed to the northwest and be more visible than Clyde Wind Farm to the north, and Harestanes and Minnygap Wind Farms that lie to the southeast of Queensberry Hill. Due to proximity, the proposed turbines would be prominent and backclothed by the Lowther Hill escarpment beyond. Visual magnitude of change is judged as **High**.

4.5.43 **Significant (Major)** effects are predicted as a result of the hill grouping proximity to the Site.

HILLS TO THE WEST

4.5.44 The ZTV shows extensive theoretical visibility of the Proposed Development covering the high to lowest facing slopes and summits at distances of approximately 1.4 to 6.8 km. The proposed turbines would be visible in close views to the east as represented in **Figures 4.28.1-5 - Viewpoint 8: Lowther Hill** and **Figures 4.29.1-5 - Viewpoint 9: Comb Head (EIAR Volume 3b)**. Visual magnitude of change is judged as **High**.

4.5.45 **Significant (Major)** effects are predicted as a result of the hill grouping proximity to the Site.

Visitor Attraction

4.5.46 One visitor attraction was identified, Drumlanrig Garden and Designed Landscape (GDL) approximately 7.2 km to the southwest of the Site. No significant effects were predicted for the GDL due to screening from policy woodland and intervening landform and forestry.

Potential Cumulative Operational Effects

- 4.5.47 The assessment of cumulative effects is set out in **Technical Appendix 4.4 (EIAR Volume 4)** and considers the additional effects of the introduction of the Proposed Development with other wind farm developments. There are several wind farms consented, and in-planning within approximately 25 km of the Proposed Development, as set out in **Table 4.4.1 in Technical Appendix 4.4 (EIAR Volume 4)** and shown on **Figure 4.12 (EIAR Volume 3)**. Scoping sites are shown on the figure, but are not assessed due to their uncertainty both in design and progression through the planning process but are shown for context.
- 4.5.48 The cumulative assessment in **Technical Appendix 4.4 (EIAR Volume 4)** considered the potential additional effects of the Proposed Development in two scenarios:
- Consented scenario with consented wind farms present in the baseline (in addition to existing wind farms and developments currently under construction), i.e., a likely future scenario; and
 - In-Planning scenario with undetermined proposals in planning, including those at appeal, present in the baseline (in addition to the above), i.e., a less certain future scenario.
- 4.5.49 In the Consented scenario, i.e., with both existing/under construction and consented wind farms included in the baseline, there would be a further concentration of turbines around existing wind farm sites discussed previously, the exception to this would be Glenmuckloch, Lethans Extension and Lethans which occupy an area to the west between Kennoxhead and Sandy Knowe and results in a larger concentration of turbines to the west than currently experienced. The closest of the consented developments would be Crookedstane and Lion Hill Wind Farms which would be located west and south of Clyde Wind Farm appearing as the same development as the Clyde Wind Farm.
- 4.5.50 The In-Planning scenario, i.e., with existing/under construction, consented and in-planning sites in the baseline, would lead to a further concentration of turbines along the M74 Motorway corridor to the north of the 25 km Study Area, and further turbines at Clyde Extension, Harestanes and Minnygap, and to the already developed west. In addition, the two in-planning sites of Daer and Rivox Wind Farms would be located to the east of the Site and occupy an area between Clyde Wind Farm and Harestanes, but still retain a gap notably as a separate developments.
- 4.5.51 In the Consented scenario, both Crookedstane and Lion Hill would not alter the pattern of development around Clyde. The introduction of the Proposed Development would therefore have similar effects to those identified for the Existing scenario in the LVIA (i.e., no change in findings of effect).
- 4.5.52 In the In-Planning scenario, Daer and Rivox would result in a new cluster of turbines between Clyde and Harestanes Wind Farms occupying the east of the Site. The addition of the Proposed Development to this baseline would result in an intensification of wind turbines in views from the southern and western hills, and SUW where a 'wind farm landscape' would be perceived. Therefore, cumulative effects are most likely to occur in an area between Clyde Wind Farm in the north, Harestanes Wind Farm in the south, the A74 (M) road in the east and Lowther Hills in the west. In addition, there would be sequential views on the A74 (M) although the Proposed Development has limited visibility from this road to a short section east of Elvanfoot.

Combined Cumulative Effects

- 4.5.53 The assessment of additional cumulative effects follows current guidance and considers the effect of the introduction of the Proposed Development to the landscape in addition to other

wind farms and considers two possible cumulative scenarios. It is acknowledged that this does not provide a view on the role of the Proposed Development in the overall combined effect of all wind farm developments that may occur depending on which proposed wind farms are consented and built.

- 4.5.54 The future pattern of development is likely to lie somewhere between no additional development, and a maximum of all currently proposed (and potentially more proposals not currently in the planning system) being consented and built. In the 'Minimum scenario', the future pattern of development would be very similar to the current pattern, as assessed in the LVIA. In the 'Maximum scenario', existing wind farm clusters may be enlarged, others may be introduced, and clusters may start to coalesce. Whilst this may be evident when looking at maps of developments, it would not necessarily be evident on the ground when moving around the landscape.
- 4.5.55 An LVIA assesses the effect on landscape character resulting from introducing the Proposed Development into the landscape. Several developments of the same type lead to an accumulation of effect on landscape character. In an assessment of cumulative effects on landscape character the increasing influence of turbines on LCTs may be described with terminologies reflecting a succession of landscape change. Terms may include '*landscapes with occasional wind farms*', through to '*landscapes with wind farms*', and '*wind farm landscapes*'.
- 4.5.56 With consented wind farms present as well as existing wind farms, Crookedstane and Lion Hill would slightly enlarge Clyde Wind Farm and Extension and appear as part of a larger wind farm. There would be essentially neither change in the pattern of development nor the role of the Proposed Development in the perception of wind energy development in the study area when compared with the Existing Scenario. The southern fringe of the Southern Uplands range would remain '*with occasional wind farms*' with the introduction of the Proposed Development.
- 4.5.57 With in-planning wind farms present as well as consented and existing wind farms, Daer and Rivox Wind Farms would form a separate group extending south from Clyde Wind Farm occupying a gap between it and Harestanes to the south. Within the wider landscape, although the groups of wind farms across the Southern Uplands and hills to the north and west would be larger, there would be essentially little change in the overall pattern of development. The role of the Proposed Development as additional turbines to the southwest of Clyde Wind Farm and directly west of Daer Wind Farm would increase the perception of wind farm development within an area between the A74 (M) road and the Lowther Hills to a '*wind farm landscape*'.

Potential Aviation Lighting Effects

- 4.5.58 In agreement with the Civil Aviation Authority (CAA)²¹, the Proposed Development would be lit with seven turbines, Turbine 1, 2, 7, 8, 9, 11 and 13, each having medium intensity 2000 cd steady red lights on the top of the hub (a second light on each hub would be installed as backup, but would not be lit when the primary light is functional). No mid-tower lights would be used. The hub lights would come on at half an hour after sunset and would be switched off at half an hour before sunrise (to be on during nautical twilight).
- 4.5.59 Proposed mitigation includes the reduction of intensity of the lights during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km; at other times they would be at 10%, i.e., 200 cd. Meteorological data for the local area suggests that the 2000 cd lights would be at 2000 cd for 7 to 10% of the time and at 200 cd for 90 to 93% of the time. The lights used would be designed to emit a horizontal

²¹ A reduced lighting scheme would be submitted to SLC for approval in consultation with the CAA.

beam of light with reduced upward and downward spill of light, such that the brightness of the light emitted is decreased for viewers close to the turbines viewing the lights from below.

- 4.5.60 The assessment of the effects of the lighting on views after dark considered selected footpaths and hill-top areas and assessed the appearance of the proposed lighting relative to existing lights in the views and the change to the nighttime viewing experience. Off-road locations are likely to have very few viewers, but the potential for people to be out at night is also considered for off-road viewpoints.
- 4.5.61 The assessment of aviation lights established that the following visual receptors judged as having High nighttime sensitivity that would receive views of aviation lights considered to be significant:
- Southern Upland Way (SUW);
 - Scottish Hill Track (SHT) 63/63a/63b: Daer Reservoir to Durisdeer/64/64a/64b: Daer Reservoir to Thornhill;
 - Core Path CL/3558/1 Southern Upland Way, Portrail Water-Coom Rig;
 - Core Path CL/5692/1 Watermeetings – Coom Rig;
 - Core Path ROYS/444/1 Sweetshaw Brae;
 - Hills to the south;
 - Hills to the west; and
 - Residential properties within 2.5 km.
- 4.5.62 The magnitude of change is predicted to be **Low** for the receptors mentioned above resulting in a **significant (Moderate)** effect during the hours of darkness.
- 4.5.63 The unlit turbines would be seen as dark structures or silhouettes. Due to the higher elevation, the aviation lights would be viewed at 0 to -4 degrees due to being located below within the River Clyde valley, and from the surrounding uplands at their strongest intensity due to the higher level of elevation although distance would reduce this somewhat.

Implications for Designated Landscapes

- 4.5.64 There are numerous designated landscapes within approximately 25 km of the Proposed Development as shown on **Figure 4.5 (EIAR Volume 3a)**. The implications of the findings of the LVIA for the designated landscapes are considered in **Technical Appendix 4.6 (EIAR Volume 4)**.
- 4.5.65 Many of the designated landscapes have limited or no ZTV coverage and are scoped out of detailed consideration as having no likelihood that their special qualities and reasons for designation would be affected by the Proposed Development. Those considered further include:
- Leadhills and Lowther Hills Special Landscape Area (SLA) – Proposed Development is located within the SLA;
 - Moffat Hills Regional Scenic Area (RSA) (Dumfries & Galloway) – approximately 9.9 km to the east;
 - Tweedsmuir Uplands RSA (Scottish Borders) – 11.3 km to the northeast; and
 - Thornhill Uplands RSA (Dumfries & Galloway) – 16 km to the south, and 2.0 km to the west; and
 - Drumlanrig GDL – 7.2 km to the southwest.

- 4.5.66 The Site would be located entirely within the Leadhills and Lowther Hills SLA and would be theoretically visible from a relatively large part of the southern half of the designation, thereafter, reducing to the upper slopes and summits on elevated ground in the northern half. As a result of this visibility, the Proposed Development would reduce the '*sense of emptiness*' in the southern half of the SLA as identified in the special qualities. However, it should be noted that views of wind farms are already a feature from the SLA and include Middle Muir to the north, and Clyde Wind Farm to the northeast and nearby. The combination of visibility of the Proposed Development with Clyde Wind Farm in particular effectively creates the boundary of the designated area. Neither Clyde nor Middle Muir Wind Farms have given rise to further amendments of the SLA.
- 4.5.67 No other SLA special qualities, cultural artefacts, extensive moorland etc are impacted upon and whilst there is some loss of the sense of emptiness in the southern half of the SLA, this does not substantively affect the integrity of the designation.
- 4.5.68 If the two in-planning sites of Daer and Rivox Wind Farms were consented which lie directly to the east of the Site, then the landscape would be perceived as a *wind farm landscape*, and the addition of the Proposed Development would further contribute to this.
- 4.5.69 The addition of the Proposed Development was not considered to affect the special qualities of the remaining four local designations.

Residential Visual Amenity

- 4.5.70 An assessment of the effects on the visual aspects of residential amenity is set out in **Technical Appendix 4.7 (EIAR Volume 4)**. There are fifteen properties within 2.5 km of the Proposed Development, as shown on **Figure 4.19 (EIAR Volume 3a)**. These have been considered as 13 individual properties or groups. Grouped properties have similarity of location, setting, outlook and screening.
- 4.5.71 The Residential Visual Amenity Assessment (RVAA) considered the change to visual amenity at each property, including consideration of likely views from the property, its curtilage (garden) and approach. Properties for which a **High** magnitude of change are considered further with respect to whether or not the effect would reach what in current guidance is called a '*Residential Visual Amenity Threshold*'. It is noted that although the Proposed Development includes BESS, and other ground level infrastructure elements, it is the turbines that are most likely to affect visual aspects of residential amenity. At night, aviation lighting would theoretically be visible from some of the properties considered, although with strong downward angles at which the lights would emit light at limited intensities, such that the lights would be perceived as less bright at these locations have low brightness, including some properties for which the angle of view is -4° or below such that the lights would theoretically not be visible (see also **Technical Appendix 4.5, EIAR Volume 4**).
- 4.5.72 A total of three properties are financially involved in the Proposed Development; Kirkhopecleugh Cottage (property 13), Crookburn (property 14) and Kirkhope Farm (property 15).
- 4.5.73 The assessment found that whilst there would be 15 properties judged to have a **High** magnitude of change, to the views experienced, no properties were judged to receive effects on visual aspects of residential amenity such that they would reach what in current guidance is called a '*Residential Visual Amenity Threshold*'. This is due to a combination of elements including distance from the proposed turbines, influence of screening by intervening landform, and orientation of view from the properties involved.

- 4.5.74 RVAA wirelines for each property are shown on **Figures 4.20.1 to 4.20.15 (EIAR Volume 3b)**.

4.6 Specific Mitigation and Residual Effects

- 4.6.1 As stated above, mitigation of landscape and visual effects has been undertaken through design modifications and input to the design process (as set out in **Chapter 3: Design Evolution and Alternatives, EIAR Volume 2**). All effects identified are therefore residual effects.
- 4.6.2 There are some measures that would be beneficial to the landscape character of the Site and in providing screening to the substation, and BESS related to the Outline Biodiversity Enhancement Management Plan (OBEMP) set out in **Technical Appendix 6.7 (EIAR Volume 4)**. However, these measures would not provide total screening of these elements of the Proposed Development.

4.7 Summary of Assessment

- 4.7.1 **Table 4.5** below provides a summary the LVIA for the construction, operation and decommissioning phases as well as any cumulative considerations.

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction & Decommissioning Phases					
Potential change to the physical landscape within the Site	LV01	Effective management of construction and decommissioning phases using measures set out in the CEMP and appointment of experienced contractors. Outline CEMP provided in Technical Appendix 2.1 (EIAR Volume 4) .	Submission of CEMP to SLC for approval prior to commencement of construction.	Significant (Major)	Ecological Clerk of Works (ECoW)
Operation					
Potential degradation to key characteristics of LCT 209 Upland Glen – Glasgow & Clyde Valley	-	The layout design has been informed by the large scale of the landscape and topographical features in order to reduce potential landscape and visual effects whilst retaining turbine efficiency.	Through the design process	Localised Significant (Major) to (Moderate) within 7.5 km to the north, thereafter, not significant (Minor) and (Negligible) elsewhere.	
Potential degradation to key characteristics of LCT 217 Southern Uplands – Glasgow & Clyde Valley			Through the design process	Localised Significant (Moderate) approximately 5.1 km to the northeast, and within 7.5 km to the northwest, thereafter, not significant (Minor) and (Negligible) elsewhere.	
Potential change to views experienced from A74(M) Motorway/ National Cycle Route (NCR) 74			Through the design process	A significant (Moderate) effect is predicted for a 4.4 km section of the A74(M) road and NCR 74 as they pass the River Clyde valley south of Abington near Elvanfoot, thereafter, not significant (Negligible) effects are predicted due to screening by landform and forestry.	
Potential change to views experienced from A76 road			Through the design process	Not significant (Minor) and (Negligible) effects are judged to occur to views from the A76 road due to the speed that receptors would be travelling at, combined with screening by intervening landform, woodland and forestry.	

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Potential change to views experienced from A701 road			Through the design process	Not significant (Minor) and (Negligible) effects are judged to occur to views from the A701 road due to the speed that receptors would be travelling at, combined with screening by intervening landform, woodland and forestry.	
Potential change to views experienced from A702 road			Through the design process	Significant (Major) effects are judged to occur to views from the A702 road between the bend southeast of Elvanfoot to above the Dalveen Pass for approximately 10.3 km. Thereafter, a not significant (Minor) and (Negligible) effect is predicted due to screening by a combination of landform and woodland, as well as distance.	
Potential change to views experienced from Southern Upland Way (SUW)			Through the design process	Significant (Major) effects are judged to occur to views from Beld Knowe to Lowther Hill for approximately 16.6 km. Thereafter, a not significant (Minor) and (Negligible) effect is predicted due to screening by a combination of landform and woodland, as well as distance from the proposed turbines.	
Potential change to views experienced from Roman Revier Route			Through the design process	Not significant effects (Minor) and (Negligible) are predicted as a result of screening by landform and forestry.	
Potential change to views experienced from Annandale Way			Through the design process	Not significant effects (Minor) and (Negligible) are predicted as a result of screening by landform and forestry.	
Potential change to views experienced from SHT 15/15a/15b: Moffat to Ettrick or Eskdale			Through the design process	The visual significance of effect is judged as not significant (Minor) and (Negligible) due to distance and screening by landform and forestry.	
Potential change to views experienced from SHT 16/ 16a/ 16b: Tweedsmuir to Ericstane			Through the design process	The visual significance of effect is judged as not significant (Minor) and (Negligible) as a result of screening by landform and forestry.	

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Potential change to views experienced from SHT 55: Lamington to Broughton			Through the design process	No theoretical visibility of the Proposed Development is predicted from this route due to distance from the Proposed Development which would be viewed alongside the operational Clyde Wind Farm.	
Potential change to views experienced from SHT 56: Coulter to Crawford			Through the design process	Visual significance of effect would be not significant (Negligible) effect due to distance from the Proposed Development which would be viewed alongside the operational Clyde Wind Farm.	
Potential change to views experienced from 57: Robertson to Douglas			Through the design process	Visual significance of effect would be not significant (Negligible) effect due to distance from the Proposed Development which would be viewed alongside the operational Clyde Wind Farm.	
Potential change to views experienced from 58: Douglas to Wanlockhead			Through the design process	Visual significance of effect would be not significant (Negligible) effect due to distance from the Proposed Development which would be viewed alongside the operational Clyde Wind Farm.	
Potential change to views experienced from 59: Muirkirk to Wanlockhead			Through the design process	Visual significance of effect would be not significant (Negligible) effect due to distance from the Proposed Development and limited visibility due to landform and forestry screening.	
Potential change to views experienced from 60: Muirkirk to Kirkconnel			Through the design process	Visual significance of effect would be not significant (Negligible) effect due to distance from the Proposed Development which would be viewed alongside the operational Clyde Wind Farm.	
Potential change to views experienced from 61/61a: Wanlockhead to Sanquhar			Through the design process	Visual significance of effect would be not significant (Minor) effect due to distance from the Proposed Development and screening from landform.	

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Potential change to views experienced from 62: Wanlockhead to Enterkinfoot by the Enterkin Pass			Through the design process	Visual significance of effect would be significant (Moderate) effect for a 2.4 km stretch, and not significant (Minor) and (Negligible) elsewhere due to screening by intervening landform.	
Potential change to views experienced from 63/63a/63b: Daer Reservoir to Durisdeer/ 64/64a/64b: Daer Reservoir to Thornhill			Through the design process	Visual significance of effect would be significant (Major) effect from much of the footpath in the north extending from the A702 road to approximately the border with Dumfries and Galloway where the proposed turbines would be prominent features. This would also include the footpath across the Site as far as Durisdeer Hill. Short sections of the path are predicted to receive a not significant (Negligible) effect due to the limited number of turbines predicted to be visible and screening by both landform and woodland.	
Potential change to views experienced from 65/65a: Ae Village to Beattock by the Forest of Ae			Through the design process	Visual significance of effect would be not significant (Negligible) effect.	
Potential change to views experienced from 83: St John's Town of Dalry to Sanquhar			Through the design process	Visual significance of effect would be not significant (Minor) effect due to distance from the Proposed Development.	
Potential change to views experienced from CL/3558/1 Southern Upland Way, Portrail Water-Coom Rig			Through the design process	Visual significance of effect would be significant (Major) for approximately 900 m. Not significant (Negligible) thereafter due to screening by forestry.	
Potential change to views experienced from CL/5692/1 Watermeetings – Coom Rig			Through the design process	Visual significance of effect would be significant (Major) effect for approximately 920 m. Not significant (Negligible) thereafter due to screening by forestry.	

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Potential change to views experienced from ROYS/444/1 Sweetshaw Brae			Through the design process	Assessed under the SUW - Visual significance of effect would be significant (Major) .	
Potential change to views experienced from hill tops to the north			Through the design process	Not significant (Minor) effects predicted as a result of distance and presence of other wind farms.	
Potential change to views experienced from hill tops to the northeast			Through the design process	Not significant (Minor) effects predicted as a result of being beyond existing wind farms	
Potential change to views experienced from hills to the south			Through the design process	Significant (Major) effects predicted as a result of the hill groupings proximity to the Site.	
Potential change to views experienced from hills to the west			Through the design process	Significant (Major) effects predicted as a result of the hill groupings proximity to the Site.	
Potential change to views experienced from Drumlanrig Castle and Gardens			Through the design process	Not significant (Minor) effects predicted from the GDL as a result of distance and screening by surrounding woodland.	
Cumulative operation					
Consented Scenario					
Potential cumulative degradation to key characteristics of: LCT 209 Upland Glen – Glasgow & Clyde Valley LCT 217 Southern Uplands – Glasgow & Clyde Valley	-	On the basis of the large scale of the landscape and the topographic character of the area, the landscape design of the Proposed Development should relate to the large topographic features or to the large-scale infrastructure.	Through design process	No increase to effects assessed in the LVIA	Not applicable
Potential cumulative change to views experienced from Visual Receptors				No increase to effects assessed in the LVIA	Not applicable

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
In-Planning Scenario					
Potential cumulative degradation to key characteristics of LCT 209 Upland Glen – Glasgow & Clyde Valley	-	On the basis of the large scale of the landscape and the topographic character of the area, the landscape design of the Proposed Development should relate to the large topographic features or to the large-scale infrastructure.	Through design process	No increase to effects assessed in the LVIA.	Not applicable
Potential cumulative degradation to key characteristics of LCT 217 Southern Uplands – Glasgow & Clyde Valley				Increase from significant (Moderate) to (Major)	
Potential cumulative change to views experienced from Visual Receptors				No increase to effects assessed in the LVIA	
Aviation Lighting					
Potential change to views experienced from Southern Upland Way (SUW)	LV03	Reduced lighting scheme (for seven turbines) and turbine aviation lighting to reduce intensity proposing use of 2000 candela steady red lights reducing to 200 cd in clear weather with no mid-tower lighting. Includes the reduction of intensity of the lights during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km. At other times they would be at 10%, i.e., 200 cd Candidate lights are designed to give a horizontal beam with reduced upward and downward spill of light, such that the brightness of the light is	Reduced lighting scheme submitted to SLC for approval in consultation with the CAA.	Significant (Moderate)	Not applicable
Potential change to views experienced from SHT 63/63a/63b: Daer Reservoir to Durisdeer/ 64/64a/64b: Daer Reservoir to Thornhill				Significant (Moderate)	Not applicable
Potential change to views experienced from Core Path CL/3558/1 Southern Upland Way, Portrail Water-Coom Rig				Significant (Moderate)	Not applicable

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Potential change to views experienced from Core Path CL/5692/1 Watermeetings – Coom Rig		decreased for viewers close to the turbines viewing them from below.		Significant (Moderate)	Not applicable
Potential change to views experienced from Core Path ROYS/444/1 Sweetshaw Brae				Significant (Moderate)	Not applicable
Potential change to views experienced from Hills to the south				Significant (Moderate)	Not applicable
Potential change to views experienced from Hills to the west				Significant (Moderate)	Not applicable
Potential changes to views experienced from residential properties within 2.5 km				Significant (Moderate)	Not applicable
Implications on Designated landscapes					
Potential degradation to key characteristics of Leadhills and Lowther Hills SLA	-	On the basis of the large scale of the landscape and the topographic character of the area, the landscape design of the Proposed Development should relate to the large topographic features or to the large-scale infrastructure.	Through design process	Significant effects to the special qualities.	Not applicable
Potential degradation to key characteristics of Tweedsmuir Uplands SLA				No significant effects assessed to the special qualities.	Not applicable
Potential degradation to key characteristics of Thornhill Uplands RSA				No significant effects assessed to the special qualities.	Not applicable
Potential degradation to key characteristics of Moffat Hills RSA				No significant effects assessed to the special qualities.	Not applicable

Table 4.5: Summary of Potential Landscape and Visual Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Residential Visual Amenity Assessment					
Potential change to views experienced by residential properties within 2.5 km	-	On the basis of the large scale of the landscape and the topographic character of the area, the landscape design of the Proposed Development should relate to the large topographic features or to the large-scale infrastructure.	Through design process	Overall, it is judged that the RVAA threshold would not be engaged due to a combination of distance from the proposed turbines and screening by landform and forestry.	Not applicable

5 Cultural Heritage

5.1 Introduction

- 5.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant environmental effects arising from the construction, operation, and decommissioning of the Proposed Development on cultural heritage (historic environment sites and features, archaeological remains, and built heritage), hereafter referred to as 'heritage assets.'
- 5.1.2 The Chapter details the results of a desk-based assessment and field survey of the Proposed Development Site Boundary ('the Site') undertaken by CFA Archaeology Ltd. (CFA), using information provided by Historic Environment Scotland (HES) and by the Historic Environment Records (HERs) maintained by West of Scotland Archaeology Services (WoSAS) and Dumfries and Galloway Council Archaeology Service (DGCAS).
- 5.1.3 The specific objectives of the Chapter are to:
- Describe the cultural heritage baseline;
 - Describe the assessment methodology and significance criteria used in completing the impact assessment;
 - Describe the potential effects, including direct, indirect, and cumulative effects;
 - Describe the mitigation measures proposed to address likely significant effects; and
 - Assess the residual effects remaining following the implementation of mitigation.
- 5.1.4 The assessment has been carried out by Jack Litchfield BA MA PhD ACIfA of CFA Archaeology Ltd (CFA), a Registered Organisation (RO) of the Chartered Institute for Archaeologists (CIfA), based in Musselburgh, East Lothian. Jack has several years' postgraduate experience in cultural heritage, including three years as a consultant, and holds Associate status with the Chartered Institute for Archaeologists (CIfA).
- 5.1.5 This Chapter is supported by the following figures and technical appendices:
- **Figures (EIAR Volume 3a):**
 - **Figure 5.1: Cultural Heritage: Inner Study Area;**
 - **Figure 5.2: Cultural Heritage: Outer Study Area;** and
 - **Figure 5.3: Cultural Heritage: Cumulative Developments.**
 - **Figures (EIAR Volume 3b):**
 - **Figures 5.4 to 5.6 Cultural Heritage Visualisations.**
 - **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 5.1: Cultural Heritage Assessment Methodology;**
 - **Technical Appendix 5.2: Heritage Assets within the Inner Study Area;**
 - **Technical Appendix 5.3: Heritage Assets within the Outer Study Area with Predicted Visibility of the Proposed Development;** and
 - **Technical Appendix 5.4: Heritage Assets within the Outer Study Area with No Visibility of the Proposed Development.**
- 5.1.6 Figures and technical appendices are referenced in the text where relevant.

5.2 Assessment Methodology

Overview

- 5.2.1 The Cultural Heritage methodology is detailed in **Technical Appendix 5.1 (EIAR Volume 4)**.
- 5.2.2 Where required, the assessment is presented with reference to specific 'areas' of the Site within the Site Boundary. These areas comprise the wind turbine array and associated access routes (Eastern and Western), as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.
- 5.2.3 Effects considered to be significant for the purposes of the EIA Regulations¹ are those classified as being '**Major**' or '**Moderate**'.

Scope of Assessment

Potential Effects Scoped In

- 5.2.4 The scope of this Chapter is set out in **Table 5.1**. The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)**, and the following legislation, planning policy, and industry guidance:

LEGISLATION

- 5.2.5 The following legislation has been consulted as part of this assessment:
- The Ancient Monuments and Archaeological Areas Act 1979²;
 - The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997³; and
 - Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017¹.

PLANNING POLICY

- 5.2.6 The following policy documents, applicable at both national and local levels, relevant to cultural heritage have been consulted as part of this assessment:
- National Planning Framework 4 (NPF4) (2023)⁴:
 - Policy 7: Historic Assets and Places;
 - Historic Environment Policy for Scotland (HEPS)⁵;
 - South Lanarkshire Local Development Plan 2 (2021)⁶:
 - Policy NHE2: Archaeological Sites and Monuments;
 - Policy NHE3: Listed Buildings;
 - Policy NHE4: Gardens and Designed Landscapes;
 - Policy NHE5: Historic Battlefields;
 - Policy NHE6: Conservation Areas; and
 - Policy RE1: Renewable Energy.

¹ Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>

² Available at: <https://www.legislation.gov.uk/ukpga/1979/46>

³ Available at: <https://www.legislation.gov.uk/ukpga/1997/9/contents>

⁴ Scottish Government (2023) National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

⁵ Historic Environment Scotland (2019a) Historic Environment Policy for Scotland (HEPS). Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7>

⁶ South Lanarkshire Council (2021) South Lanarkshire Local Development Plan 2 (SLLDP 2) Available at: <https://www.southlanarkshire.gov.uk/developmentplan2>

GUIDANCE

5.2.7 The following industry guidance relevant to cultural heritage have been consulted as part of this assessment:

- Scottish Natural Heritage (SNH, now NatureScot) and Historic Environment Scotland (HES) (2018) 'Environmental Impact Assessment Handbook'⁷;
- Institute of Environmental Management and Assessment (IEMA, now Institute of Sustainability and Environmental Professionals (ISEP)) Principles of Cultural Heritage Impact Assessment in the UK⁸;
- Planning Advice Note 1/2013 (PAN 1): Environmental Impact Assessment (revised 2017)⁹;
- Planning Advice Note 2/2011 (PAN 2): Planning and Archaeology¹⁰;
- HES (2020a) 'Designation Policy and Selection Guidance'¹¹;
- HES (2020b) 'Managing Change in the Historic Environment: Setting'¹²;
- Chartered Institute for Archaeologists (CIfA) (2014a) 'Code of Conduct: professional ethics in archaeology' (revised)¹³;
- CIfA (2014b) 'Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment' (updated 2020)¹⁴;
- CIfA (2014c) 'Standard and Guidance for Historic Environment Desk-Based Assessment' (updated 2020)¹⁵; and
- South Lanarkshire Council (SLC) (2021) Supplementary Guidance 9: Natural and Historic Environment¹⁶.

5.2.8 It is noted that on 8 December 2025 a number of Planning Advice Notes were withdrawn by the Scottish Government¹⁷. This included PAN1/2013 and PAN2/2011. However, these are still noted as relevant guidance for this assessment as they were published guidance notes at the time of the assessment.

⁷ SNH/HES (2018) EIA Handbook Version 5. Available at: <https://www.nature.scot/doc/archive/environmental-impact-assessment-handbook-version-5-2018>

⁸ IEMA (2021) Principles of Cultural Heritage Impact Assessment in the UK. Available at: <https://ihbconline.co.uk/toolbox/docs/Principles%20of%20Cultural%20Heritage%20Impact%20Assessment.pdf>

⁹ PAN 1 (2013) Environmental Impact Assessment. Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/>

¹⁰ PAN 2 (2011) Planning and Archaeology. Available at: <https://www.gov.scot/publications/pan-2-2011-planning-archaeology/>

¹¹ HES (2020a) Designation Policy and Selection Guidance, Edinburgh. Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b>

¹² HES (2020b) Managing Change in the Historic Environment: Setting. Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=80b7c0a0-584b-4625-b1fd-a60b009c2549>

¹³ CIfA (2014a) Code of Conduct. Available at: <https://www.archaeologists.net/sites/default/files/2023-11/CIfA-Code-of-Conduct-2022.pdf>

¹⁴ CIfA (2014b) Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment. Available at: <https://www.archaeologists.net/sites/default/files/2023-11/CIfA-SandG-Archaeological-Consultancy-2020.pdf>

¹⁵ CIfA (2014c) Standard and Guidance for Historic Environment Desk-Based Assessment. Available at: <https://www.archaeologists.net/sites/default/files/2023-11/CIfA-SandG-DBA-2020.pdf>

¹⁶ SLLDP 2 (2021) Supplementary Guidance 9: Natural and Historic Environment.

¹⁷ Refer to: <https://blogs.gov.scot/planning-architecture/2025/12/08/publications-declutter/>

Table 5.1: Effects Considered within the Assessment			
Effect	Phase*		
	C	O/M	D
Direct and indirect construction effects on designated and non-designated heritage sites and features within the Site.	Yes	No	No
Effects on the settings of cultural heritage assets with statutory and non-statutory designations within 10 km of the outermost turbines of the Proposed Development, and beyond 10 km where an asset present within the blade-tip height Zone of Theoretical Visibility (ZTV) has a setting identified as being sensitive to change. Scheduled Monuments, Category A and B Listed Buildings, Conservation Areas, and Inventory Gardens and Designed Landscapes are included in the assessment. Category C Listed Buildings and non-designated assets of regional significance are considered within this context where they are within 5 km of the outermost turbines of the Proposed Development.	No	Yes	No
Cumulative operational effects on the settings of cultural heritage assets resulting from the Proposed Development in combination with other wind farms that are consented or currently at the application stage. Operational and under construction developments are considered part of the baseline, and developments close to the end of their operational life will also be included in the baseline to present a 'worst case scenario' of possible cumulative effects. Proposed Developments at the scoping or pre-application stage are not included in the assessment, as such proposals are not fully formed and may be subject to changes that cannot be foreseen.	No	Yes	No

*C=construction, O/M=operation and maintenance and D=decommissioning.

Potential Effects Scoped Out

- 5.2.9 Assessment of the effect of the Proposed Development on the settings of World Heritage Sites and Inventory Historic Battlefields has been scoped out. There are no assets with these designations within 10 km of the Proposed Development, and there are none beyond 10 km with the potential to be subject to adverse effects on their settings as a result of the Proposed Development.
- 5.2.10 Assessment of the effects of the Proposed Development on the settings of Category C Listed Buildings and non-designated assets identified in the HER as being 'regionally significant' which lie beyond 5 km of the outermost turbines have been excluded from the assessment. These assets generally have localised settings, and no such assets beyond 5 km have been identified with the potential to be subject to adverse effects on their setting as a result of the Proposed Development.
- 5.2.11 Assessment of the effect of the Proposed Development on the settings of Listed Buildings that lie within the Leadhills and Wanlockhead townscapes have been scoped out, in addition to the two respective Conservation Areas (CA 393 and CA 180) within which many of the buildings are located. The ZTV (**Figure 5.2, EIAR Volume 3a**) indicates that the Proposed Development would be entirely screened in views from Leadhills and Wanlockhead. In addition, the settings of these Listed Buildings are constrained to, and defined by, the surrounding built environment and interrelationship between local buildings. As such, the settings of these Listed Buildings and Conservation Areas would not be adversely affected by the Proposed Development.
- 5.2.12 Assessment of direct (physical) impacts on heritage assets during the operational and decommissioning phases of the Proposed Development has been scoped out. Any maintenance, repair or replacement, and decommissioning work, would utilise the as-built infrastructure.

- 5.2.13 Assessment of the effect on the settings of heritage assets during the construction and decommissioning phases of the Proposed Development has been scoped out. Any such effects would be short-term and temporary. The operational phase represents the worst-case scenario and is considered sufficient for assessing setting impacts overall.

Method of Baseline Characterisation

Extent of the Study Area

- 5.2.14 Two study areas have been used for the assessment:

- The Inner Study Area: The Site, defined by the Site Boundary within which components of the Proposed Development are to be sited, forms the Study Area for the identification of heritage assets that could receive potential direct and indirect effects arising from the construction of the Proposed Development. **Figure 5.1 (EIAR Volume 3a)** shows the Site Boundary, the Proposed Development layout, and the locations of heritage assets within the Site (also described in **Technical Appendix 5.2, EIAR Volume 4**).
- The Outer Study Area: a Study Area extending 10 km from the outermost turbines has been used for the identification of heritage assets with settings that may be affected by the operation of the Proposed Development. The Study Area extent aligns with that used by the Landscape and Visual Impact Assessment (LVIA) and was agreed by HES to be appropriate in combination with a ZTV. **Figure 5.2 (EIAR Volume 3a)** shows the infrastructure of the Proposed Development alongside the blade-tip height ZTV, in addition to heritage assets from which there would be a theoretical view of the infrastructure. Details of these heritage assets are provided in **Technical Appendix 5.3 (EIAR Volume 4)**, which also provides a tabulated summary assessment of the predicted effects on their settings on a case-by-case basis. Consideration has also been given to designated heritage assets beyond 10 km where long-distance views and intervisibility are considered to be important aspects of an asset's setting.

Desk Study

- 5.2.15 The following sources were consulted as part of the desk-based assessment:

- HES Spatial Data Warehouse (HES 2025a¹⁸): for up-to-date data on the locations and extents of Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Garden and Designed Landscapes and Inventory Historic Battlefields.
- The South Lanarkshire HER: a digital database extract was obtained directly from WoSAS in May 2024 for all assets within 10 km from Proposed Development. Consultation with WoSAS was undertaken in April 2025 and it was confirmed that the data remained valid for this assessment.
- The Dumfries and Galloway HER: a digital database extract was obtained directly from DGCAS in June 2025 for assets within 10 km of the Proposed Development.
- The National Record of the Historic Environment (NRHE) (Trove) (HES 2025b¹⁹): for any information additional to that contained in the HERs.
- Historic Land-Use Assessment Data for Scotland (HLaMap) (HES 2025c²⁰): for information on the historic land use character of the Site and the surrounding area.

¹⁸ HES (2025a) Historic Environment Scotland (HES) GIS downloader. Available at: <https://portal.historicenvironment.scot/apex/f?p=PORTAL:downloads:::DATASET:ALL>

¹⁹ HES (2025b) Historic Environment Scotland's National Record of Historic Environment (NRHE) database (Canmore). Available at: <https://pastmap.org.uk/>

²⁰ HES (2025c) Historic Land-Use Assessment Data for Scotland (HLaMap). Available at: <https://hlapmap.org.uk/>

- National Library of Scotland Map Library: for Ordnance Survey maps (principally first and second editions) and other historical map resources.
- Modern aerial photographs available through Google Earth and Bing Maps.
- Scottish Remote Sensing Portal (Scottish Government 2025²¹): for 1 m DTM Lidar data (where available) covering the Inner Study Area.
- Relevant bibliographic references and on-line historic resources were consulted to provide background and historic information.

Field Survey

- 5.2.16 A targeted field survey was carried out for the Inner Study Area concentrating on heritage assets identified through the desk-based assessment to lie within the micro-siting allowance for the Proposed Development (e.g., those within or near to the footprints of proposed access tracks, Battery Energy Storage System (BESS) and substation locations, and turbines).
- 5.2.17 The field survey was undertaken between the 1st and 5th September 2025, with the following aims:
- To assess the baseline condition of the known heritage assets identified through the desk-based assessment;
 - To assess the character and sensitivity of the settings of heritage assets in the Outer Study Area;
 - To identify any further features of cultural heritage interest not detected through the desk-based assessment that could be affected by the Proposed Development; and
 - To identify areas with the potential to contain currently unrecorded buried archaeological remains.
- 5.2.18 All data was captured electronically using a Trimble TDC600 Handheld GNSS with sub-metre accuracy. The baseline condition of identified assets was recorded on pro-forma monument recording sheets and by digital photography.
- 5.2.19 No intrusive archaeological interventions have been carried out as part of this assessment.

Method of Assessment

Overview

- 5.2.20 The assessment methodology, including criteria for assessing sensitivity of receptors, magnitude of change and cumulative effects, as well as overall significance criteria, is detailed in **Technical Appendix 5.1 (EIAR Volume 4)**.

Limitations and Assumptions

- 5.2.21 The desk-based assessment draws on WoSAS and Dumfries and Galloway HERs, provided as digital geographic systems (GIS) data in May 2024 and June 2025 respectively. Designated heritage assets within the Outer Study area (**Figure 5.2, EIAR Volume 3a**) have been identified using the HES database, downloaded in April 2025. The combined data used for the assessment is assumed to have been current and up to date at the time of receipt of the data.

²¹ Scottish Government (2025). Scottish Remote Sensing Portal. Available at: <https://remotesensingdata.gov.scot>

5.3 Baseline Conditions

Current Baseline

Heritage Assets within the Inner Study Area

- 5.3.1 Heritage assets within the Inner Study Area are outlined within **Figure 5.1 (EIAR Volume 3a)** and **Technical Appendix 5.2 (EIAR Volume 4)**.

DESIGNATED HERITAGE ASSETS

- 5.3.2 There is one Scheduled Monument within the Inner Study Area: the Smithwood Bastle House (SM 5647). The monument comprises a fortified farmhouse dating to between the 16th to 17th centuries, with the defensive architecture related to the Anglo-Scottish border raids that were common during the period. It is located within an area of rough grazing, within which evidence for a wider agricultural complex has been recorded. As a Scheduled Monument, the bastle house is of national heritage value and high sensitivity.

NON-DESIGNATED HERITAGE ASSETS

- 5.3.3 There are 30 non-designated heritage assets located within the Inner Study Area, with the assets comprising both those recorded on the WoSAS HER as well as those identified on historic maps and/or during the field survey undertaken as part of this assessment. Asset locations and extents are shown on **Figure 5.1 (EIAR Volume 3a)**, and **Technical Appendix 5.2 (EIAR Volume 4)** provides detailed gazetteer information on the character and baseline condition of the assets. The heritage value and relative sensitivity of the assets are summarised below.

PREHISTORIC

- 5.3.4 The WoSAS HER records the sites of possible burnt mounds (13306, 50860, 50868) concentrated within the eastern half of the Inner Study Area. The assets comprise stone tumuli which have been variously interpreted as evidence for prehistoric food production, funerary traditions, or hot-stone technologies such as involved in water heating. Another example (50861) is recorded as part of a wider post-medieval settlement, constructed subsequent to and partially upon the earlier mound. The field survey confirmed that the mound remains partially visible amidst the later settlement.
- 5.3.5 Burnt mounds have been identified by the Scottish Archaeological Research Framework (ScARF) as requiring further investigation and typological recording²². As such, due to their potential to further the national research agenda, the above assets are assessed to be of regional heritage value and medium sensitivity.
- 5.3.6 A group of three small stone cairns (52616), recorded north of Hem Hill, may represent the site of prehistoric field clearance, but may also derive from later activity. As relatively minor and unconfirmed elements of a possible prehistoric landscape, the cairns are assessed to be of local heritage value and low sensitivity.
- 5.3.7 The field survey recorded a possible standing stone (HA14) located near the peak of Watchman's Brae. The stone stood just over 1 m tall, tapering to a tip which bore signs of breakage. A number of upthrust bedrock formations were identified in the wider Site during the survey, although none were seen in close vicinity to the stone. It may be that the stone is a natural feature, or the lower half of a broken cattle-rubbing stone.

²² ScARF National Framework entry 'Burnt Mounds'. Accessible at: <https://scarf.scot/national/scarf-bronze-age-panel-report/3-lifeways-and-lifestyles/3-3-settlement-landuse-and-resources/3-3-1-burnt-mounds/>

- 5.3.8 Notwithstanding this, there is potential that the stone may represent the remains of a standing stone of possible prehistoric date. As a possible but unconfirmed element of the prehistoric landscape, the stone is assessed to be of local heritage value and low sensitivity.

ROMAN

- 5.3.9 The course of a Roman road (12130) is recorded to align the with the modern A702 road as at the point where the western access track is diverted at the northwestern extent of the Inner Study Area. The field survey did not identify any trace of the Roman road beside the developed course of the modern road or amidst the surrounding farmland; however, any below ground remains associated with the Roman road would be of regional heritage value and medium sensitivity.

MEDIEVAL AND LATER AGRICULTURE

- 5.3.10 The majority of heritage assets identified in the Inner Study Area are associated with historic agricultural activity, particularly post-medieval pastoral farming.
- 5.3.11 Of these, the most substantial is a 17th century settlement (50862) located near the Coom Burn, comprising farmhouses, byres and other outbuildings, in addition to livestock enclosures. The field survey confirmed that elements of the settlement remain identifiable as rubble remains. Related, smaller-scale rural settlement sites include single farmhouses dating to the 18th and 19th centuries (52609, 52619), again often with attached or associated enclosures. By far the most numerous of the agricultural remains recorded in the Inner Study Area are sheepfolds and other structures associated with pastoral farming (50865, 52610, 52611, 52614, 86119, HA01 to HA13), although evidence for arable farming is present in possible rig and furrow field systems (HA04, HA05).
- 5.3.12 As minor features of the post-medieval agricultural landscape, the above features are assessed to be of local heritage value and low sensitivity. A single exception concerns the site of a sheepfold (HA02) which is no longer visible on modern aerial photography or Lidar imagery and is likely to have been removed during construction of a modern track. This asset is assessed to be of little or no intrinsic heritage value and negligible sensitivity.

MODERN AND/OR MISCELLANEOUS

- 5.3.13 The field survey recorded an Ordnance Survey triangulation station (HA15) at the summit of Rodger Law. The station is shown on the first edition Ordnance Survey map (1862) and comprises a concrete obelisk with some signs of damage. As a surviving element of post-medieval to modern mapping programmes, the station is assessed to be local heritage value and low sensitivity.
- 5.3.14 Two heritage assets include the site of a spoil heap (52355) comprised of material excavated during the construction the Daer Reservoir, and a ruined schoolhouse (HA13) dating to the later 19th century. Both assets are assessed to be of little or no intrinsic heritage value and negligible sensitivity.

Archaeological Potential

- 5.3.15 The Site is primarily undeveloped, hilly upland with areas of commercial forestry at the north and northwest. The Daer Reservoir lies to the east, fed by several burns which cross the Site. The Site topography is characterised by several prominent hills, including Watchman's Brae, Comb Law, and Rodger Law, which stands the highest at 688 m.
- 5.3.16 The Historic Land-Use Assessment map (HLAmap) categorises the Proposed Development Site as largely 'moorland and rough grazing', confirming the picture of historic land-use outlined above (Sections 5.3.10 to 5.3.12). In addition, a small parcel at the Site's northeast, which

corresponds to the location of a large enclosure and sheep fold (HA07), is categorised as an 18th century agricultural settlement.

- 5.3.17 Roy's map of 1747-55 shows the Site as hilly upland, while the first edition Ordnance Survey map of 1863 highlights the pastoral character of the Site with several annotated sheepfolds. Subsequent Ordnance Survey editions show very little change in the historic landscape.
- 5.3.18 Within the Site, the greatest areas of archaeological potential correspond to the recorded sites of two 17th century settlements (50861 and 50862), located near to the Coom Burn. A burnt mound, indicating prehistoric activity within the same area, was recorded within one of the settlements (50861).
- 5.3.19 Recorded archaeological remains in the Outer Study Area (see below) indicate the potential for remains associated with prehistoric settlement and funerary activity, Roman military occupation, and the operation of fortified farmhouses to be encountered in the Site. A series of cairns has been recorded approximately 100 m to the north of the Site, within an enclosure. The cairns have been interpreted as a cremation cemetery, sited in close proximity to a stone circle (Ward 2002). Whilst these are non-designated heritage assets located outwith the Site, and hence are not included in the assessment baseline, the cairns highlight the potential for similar remains to be encountered within the Inner Study Area.
- 5.3.20 Overall, taking into account both the historic and ongoing pastoral land-use of the Site, in addition to evidence for earlier prehistoric activity both within and just outside the Site boundary, the potential for hitherto undiscovered buried archaeological remains to survive within the Inner Study Area is assessed to be moderate.

Heritage Assets within the Outer Study Area

- 5.3.21 Heritage assets within the Outer Study Area are outlined within **Figure 5.2** and **Figure 5.3 (EIAR Volume 3a)** and **Technical Appendices 5.3** and **5.4 (EIAR Volume 4)**.
- 5.3.22 There are 34 Scheduled Monuments, assets of national heritage value and high sensitivity, within the Outer Study Area. Those relating to earlier activity include the remains of prehistoric domestic and defensive sites (SM 650, SM 2605, SM 10790, SM 12615), amongst which platform settlement sites are particularly well represented (SM 4296, SM 4516, SM 4644, SM 4646, SM 4647), prehistoric ritual and funerary monuments (SM 3947, SM 4106, SM 4238, SM 4641, SM 12622, SM 12655), and a series of Roman military fortifications and associated infrastructure (SM 102, SM 670, SM 2745, SM 3348, SM 3941).
- 5.3.23 Scheduled Monuments deriving from medieval and later activity include the remains of medieval and post-medieval settlements (SM 678, SM 5385), including fortified sites such as castles and moated residences (SM 8566, SM 8567, SM 8659, SM 90221), as well as further examples of bastle houses (SM 4798, SM 5279, SM 8610), constructed during the early modern period. The remaining Scheduled Monuments include the ruins of a 16th-century church (SM 681) and remains associated with post-medieval lead and gold-mining operations (SM 5597, SM 5817, SM 13677, SM 90310) located to the northwest of the Site, in Wanlockhead and Leadhills.
- 5.3.24 The closest Scheduled Monument to the Site is the Durisdeer Roman Fortlet (SM 670), which is located to the west within a valley within the Durisdeer Hills, approximately 3.5 km from the nearest turbine.
- 5.3.25 There are two Inventory Garden and Designed Landscapes, assets of national heritage value and high sensitivity, in the Outer Study Area. One denotes the expansive 19th-century parkland, farmland, and formal gardens of Drumlanrig Castle (GDL 00143), approximately

7.5 km to the southwest, while the other marks a smaller 18th-century garden at Scot's Mining Company House (GDL 00339) in Leadhills, approximately 8 km to the northwest.

- 5.3.26 A total of 57 Listed Buildings are recorded in the Outer Study Area: three Category A, of national heritage value and high sensitivity; 37 Category B, of regional heritage value and medium sensitivity; and 17 Category C, of local heritage value and low sensitivity. The closest Listed Building to the Site is the Category A Listed Durisdeer Parish Church (LB 3856), which lies just under 5 km to the southwest.
- 5.3.27 Overall, the majority of the Listed Buildings in the Outer Study Area are rural buildings, such as cottages, farmsteads, and village churches, or post-medieval infrastructure including bridges and viaducts. The settings of these designated assets are generally localised, with long-distance views or visual prominence not representing important aspects of the buildings' settings. Elsewhere, such as to the northwest in Leadhills and Wanlockhead, the settings of Listed Buildings are primarily defined by a more enclosed townscape environment.
- 5.3.28 Four Conservation Areas, assets of national heritage value and high sensitivity, are located in the Outer Study Area: those of Wanlockhead (CA 180), Leadhills (CA 393), Carronbridge (CA 495), and Durisdeer (CA 496). Only the Durisdeer Conservation Area lies within 5 km of the nearest turbine, being located approximately 4.6 km to the southwest.
- 5.3.29 In addition to the designated heritage assets above, there are six non-designated heritage assets with predicted visibility of the Proposed Development that are recognised by WoSAS as being of presumed national importance (NSR codes C/V), two within 5 km of the outermost turbines. The majority of these assets comprise remains of similar type and periodisation as the heritage assets outlined above. Four of the NSR sites represent additional prehistoric platform settlements (10382, 10417, 10424, 10426), while the remainder include the sites of further cairns (10391), likely relating to field clearance, and a moated farmstead (10401).
- 5.3.30 A further seven non-designated heritage assets of presumed national importance with predicted visibility of the Proposed Development are recorded on the DGCAS HER to lie within the Outer Study Area; however, none of these lie within 5 km of the outermost turbines. Just over half of the assets represent further sites of later prehistoric settlement (e.g., MDG191, MDG200, MDG201 MDG211), while the remainder includes unidentified enclosures (MDG5629, MDG5630) and post-medieval mining remains (MDG13074). There are an additional two heritage assets of regional importance with predicted visibility of the Proposed Development recorded on the DGCAS HER within 5 km of the outermost turbines. They are both located to the west, in the Durisdeer Hills, and include evidence for prehistoric settlement (MDG11680) and a Roman road (MDG8793). Further details on non-designated heritage assets of presumed regional and national importance are provided in **Technical Appendix 5.3 (EIAR Volume 4)**.

Future Baseline

- 5.3.31 If the Proposed Development were not to proceed, there would likely be little or no change to the baseline condition of the various heritage assets and features recorded within the Site. In areas of rough grazing, surviving heritage assets would be subject to only natural decay and erosion processes. Within areas of commercial forestry, such as at the northwest of the Site, this land use would likely continue and those heritage assets that already exist within forestry would continue to be preserved (and potentially affected) by normal forest management practices in line with standard forestry practices in respect of conservation of the cultural heritage²³.

²³ Forestry Commission 2017 The UK Forestry Standard: The Governments' Approach to Sustainably Forestry. Edinburgh.

Summary of Sensitive Receptors

Scoped In Receptors

- 5.3.32 A summary of scoped-in receptors identified as being sensitive to the Proposed Development is presented as **Table 5.2**, together with the justification for their inclusion. Gazetteers of these assets are included in **Technical Appendices 5.2, 5.3, and 5.4 (EIAR Volume 4)**.

Table 5.2: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
Scheduled Monuments up to 10 km from the outermost turbines, and beyond this where the setting of a Scheduled Monument has been identified as being potentially sensitive to effects from the Proposed Development.	High	These are statutorily protected monuments. They are protected under the Ancient Monuments and Archaeological Areas Act 1979. The consent of Scottish Ministers is required before any works are carried out which would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding, or covering up a Scheduled Monument. In addition, effects of the Proposed Development upon the setting of a Scheduled Monument form an important consideration in the granting or refusal of planning consent to conduct development works.
Inventory Gardens and Designed Landscapes (GDL) up to 10 km from the outermost turbines, and beyond this where the setting of a GDL has been identified as being potentially sensitive to impacts from the Proposed Development.	High	The Inventory Status of a GDL is conferred under the terms of the Ancient Monuments and Archaeological Areas Act 1979. Although GDLs lack the same statutory protection of Scheduled Monuments, landscapes with Inventory Status are a material consideration during the planning process. The consent of the local planning authority, in consultation with HES, is required for any works greater than those required for the day-to-day maintenance and operation of a GDL.
Category A and B Listed Buildings up to 10 km from the outermost turbines, and beyond this where the setting of a building has been identified as being potentially sensitive to impacts from the Proposed Development.	High (Category A) Medium (Category B)	Buildings which are statutorily protected as buildings of special architectural or historic interest. They are protected under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Planning authorities and Scottish Ministers are required to have special regard for the desirability of preserving Listed Buildings and their settings and any features of special architectural or historic importance they possess.
Non-designated heritage assets identified by the HERs as being 'nationally significant' up to 10 km from the outermost turbines, and those identified as being 'regionally significant' within 5 km.	High (National) Medium (Regional)	NSR Sites which are considered by the local planning authority (WoSAS) to be potentially of schedulable quality (NSR Sites Code V and C).
Conservation areas up to 10 km from the outermost turbines.	Medium	Areas proposed by Local Development Plans as areas of special architectural or historic interest and contain key features which it is desirable to conserve, sustain, and enhance. Planning authorities are required to consider planning applications affecting the appearance, character or setting of conservation areas under the Planning

Table 5.2: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
		(Listed Buildings and Conservation Areas) (Scotland) Act 1997.
Category C Listed Buildings up to 5 km from the outermost turbines.	Low	Buildings which are statutorily protected as buildings of special architectural or historic interest. They are protected under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Planning authorities are required to have special regard for the desirability of preserving Listed Buildings and their settings and any features of special architectural or historic importance they possess.
Other non-designated historic environment assets within the Site.	Negligible to Medium	A range of other non-designated archaeological sites, monuments, and areas of historic interest which do not have statutory protection but are curated by the local planning authority.

5.4 Mitigation

5.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

- Embedded mitigation - design stage mitigation, as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and the design evolution narrative in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.
- Standard/Best Practice mitigation – standard/best practice mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness (refer to **Table 5.3**).
- Specific mitigation - bespoke mitigation determined as a result of the EIA (refer to **Section 5.6**).

5.4.2 The results of the desk-based assessment and field survey were digitised as GIS data, showing the locations (and where relevant, the extent) of heritage assets. The layout of the Proposed Development, including the positioning of proposed turbines, the BESS and the siting of other infrastructure, has subsequently been designed to avoid or minimise construction effects and to minimise effects on the settings of heritage assets as far as possible. Specifically, the Proposed Development, including access elements, has been designed to avoid any direct/indirect impacts on Scheduled Monuments. The layout shown on **Figure 5.1 (EIAR Volume 3a)** therefore embeds design mitigation into the siting of the proposed turbines, the BESS and the ancillary infrastructure, as far as possible.

5.4.3 A summary of the standard/best practice mitigation considered for the Cultural Heritage assessment is set out in **Table 5.3**.

Table 5.3: Summary of Standard/Best Practice Mitigation			
ID	Timing of Mitigation	Description	Purpose of Mitigation
CH01	Construction	Construction works would proceed in accordance with the measures set out in the Outline Construction Environmental Management Plan (see Technical Appendix 2.1, EIAR Volume 4).	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.

Table 5.3: Summary of Standard/Best Practice Mitigation			
ID	Timing of Mitigation	Description	Purpose of Mitigation
CH02	Construction	A professionally qualified Archaeological Contractor would be appointed to act as an Archaeological Clerk of Works (ACoW). Their role would be to provide advice to the appointed Contractor regarding micro-siting of development components, where there is a possibility of intersecting with identified heritage assets, and to undertake archaeological monitoring of topsoil stripping operations in areas designated and approved by the Council's Archaeological Advisors (WoSAS).	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.
CH03	Pre-Construction	Scheduled Monuments within the Site will be marked out with a suitable stand-off buffer, agreed prior to construction with HES, with protective fencing erected and a site-protection plan implemented if required. Fencing would remain in place for the duration of the construction activities on Site.	To avoid direct impacts on Scheduled Monuments.
CH04	Construction	Construction machinery would operate only within defined working areas and access corridors, limiting ground disturbance.	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.
CH05	Construction	Upstanding cultural heritage remains would be retained where possible. Where necessary, existing cultural heritage features may be fenced off or otherwise visibly marked out to signal their presence to construction workers. The fence/markers would remain in place for the duration of the construction activities on Site.	To avoid potential direct or indirect impacts to known heritage assets.
CH06	Construction	Archaeological monitoring (watching briefs) and set-piece excavation may be undertaken to record heritage assets (e.g., 12130, 50865) where these cannot be avoided through design. The scope of the works would be agreed with WoSAS (as advisors to SLC) and detailed in a Written Scheme of Investigation (WSI).	To preserve archaeological remains 'by record' where preservation in situ is not practicable.
CH07	Construction	Should they be encountered, previously unidentified archaeological remains would be subject to a programme of archaeological works to be developed in consultation with WoSAS and detailed in a WSI.	To preserve archaeological remains 'by record' where preservation in situ is not practicable.

5.4.4 As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the conclusions of the assessment of likely significant

effects below assumes that these mitigation measures are implemented and this is discussed below. Any further specific mitigation required is detailed in **Section 5.6**.

5.5 Assessment of Likely Effects

Potential Construction Effects

- 5.5.1 Any ground-breaking activities associated with the construction of the Proposed Development, (such as those required for turbine hardstandings, BESS and substation footings, access tracks, cable routes, borrow pits, etc.) have the potential to disturb or destroy heritage assets. Direct impacts can also occur as result of above ground disturbance: for example, as a result of landscaping, vehicle movement over cultural heritage features, or from the storage of construction materials above them. Direct effects on heritage assets are normally adverse, permanent, and irreversible.
- 5.5.2 The Proposed Development has been designed to avoid impacts on heritage assets as far as possible (see **Chapter 3: Design Evolution and Alternatives, EIA Volume 2**); however, there are heritage assets that could be directly or indirectly affected by construction works associated with the Proposed Development, and these are discussed further below.

Smithwood Bastle House (SM 5647)

- 5.5.3 The scheduled area of the Smithwood Bastle House (SM 5647), a Scheduled Monument of high sensitivity, extends to within 20 m of the Eastern Access route; however, the ruined remains of the bastle house itself stand approximately 100 m to the northwest of the Eastern Access route, within the wider scheduled area.

DIRECT CONSTRUCTION EFFECTS

- 5.5.4 No works (including any that may be undertaken as part of a micro-siting allowance) are proposed within the scheduled area. To further limit the potential for direct and indirect (see below) effects, standard/best practice mitigation (mitigation ref: CH03) stipulates that a suitable stand-off buffer would be marked out, as agreed prior with HES, around the Scheduled Monument, with protective fencing erected and a site-protection plan implemented if required. The stand-off buffer would supersede the Proposed Development's micro-siting allowance, which would not apply within the area of the buffer to ensure that this buffer was maintained. With this mitigation in place, it is assessed that, in consequence, there would be **no impact (direct)** upon the Smithwood Bastle as a result of the construction of the Proposed Development.

INDIRECT CONSTRUCTION EFFECTS

- 5.5.5 In their scoping response, HES suggested that the movement of construction traffic and machinery along the Eastern Access track may have the potential to cause vibrations which could result in adverse indirect effects upon upstanding remains of the bastle house. CFA have consulted a specialist consultant at TNEI to consider the likelihood of indirect impacts to the Smithwood Bastle House as a result of construction vibrations.
- 5.5.6 Whilst there is no specific guidance for assessing vibration effects on archaeological sites, the British Standard (BS) and Design Manual for Roads and Bridges (DMRB)^{24 25 26} provide relevant standards and guidance in respect to the measurement and assessment of vibration.

²⁴ Design Manual for Roads and Bridges (DMRB) 2020 LA111 Noise and Vibration.

- 5.5.7 The vibration threshold values to determine the potential for damage to buildings are detailed in BS 7385 2:1993²⁵. The unit of measurement used for this assessment method is the Peak Particle Velocity (PPV), which is quantified in mm/s. For 'unreinforced or light framed structures' and 'residential or light commercial type buildings', the vibration threshold is set at 15 mm/s PPV for possible cosmetic damage. Minor damage may occur at twice this value, and major damage may occur at four times the values.
- 5.5.8 It is acknowledged, however, that these limits relate to complete buildings, and a lower limit may be more appropriate for the ruined remains of the bastle house. BS 5228²⁶ provides a lower threshold limit of 10 mm/s PPV for potentially sensitive masonry walls, which is recommended in respect to the bastle house.
- 5.5.9 Taking the application of this vibration limit (10 mm/s PPV) into account, it is considered highly unlikely that construction works necessary for the Eastern Access track would result in any indirect impacts. Indeed, the distance (100 m) at which the upstanding remains of the bastle house are set from the road exceeds the distances generally considered by the DMRB as liable to produce significant adverse effects. As such, it is assessed that there would be **no impact (indirect)** upon the Smithwood Bastle House as a result of the Proposed Development.

Roman Road (12130)

- 5.5.10 A possible section of Roman road (12130), an asset of medium sensitivity, is thought to follow the modern course of the A702 road where the Western Access track begins. Groundworks for the access track, likely to include the removal of topsoil and landscaping, may expose remains associated with the road.
- 5.5.11 It is assessed that there is potential for a direct **low** magnitude impact, resulting in an effect of **Minor** significance (**Not Significant** in EIA terms).
- 5.5.12 With the standard/best practice mitigation outlined in **Table 5.3** (e.g., mitigation ref: CH06/CH07), any predicted residual effects would be **Negligible (Not Significant)** in EIA terms), and the impacts are not considered further within the EIAR.

Coom Burn Enclosures, Buildings, and Burnt Mound (50861)

- 5.5.13 The remains of a 17th-century settlement (50861) containing a rectangular platform, structures, and field banks, in addition to a prehistoric burnt mound located at the same site. The southernmost area of the asset, which is of medium sensitivity, extends to within 10 m of a proposed track which would divert the Southern Upland Way (SUW). Groundworks for the diversion, likely to include removal of topsoil and minimal landscaping, may expose peripheral remains associated with the settlement site or burnt mound.
- 5.5.14 It is assessed that there is potential for a direct **negligible** magnitude impact, resulting in an effect of **Negligible** significance (**Not Significant** in EIA terms).
- 5.5.15 With the standard/best practice mitigation outlined in **Table 5.3**, including the avoidance of upstanding remains (mitigation ref: CH04/CH05) and recording of below-ground remains where encountered (mitigation ref: CH06/CH07), any predicted residual effects would remain **Negligible (Not Significant)**, and the impacts are not considered further within the EIAR.

²⁵ British Standard (BS) 1993 BS 7385 2:1993 Evaluation and Measurement for Vibration in Buildings.

²⁶ BS 2009 BS 5228-2 2009 Code of Practice for Noises and Vibration Control on Construction and Open Sites

Coom Burn Settlement (50862)

- 5.5.16 The remains of a 17th-century settlement (50862), an asset of low sensitivity, are located approximately 10 m to the north of a proposed track which would divert the SUW. Groundworks for the diversion, likely to include removal of topsoil and landscaping for a new road surface, may expose peripheral remains associated with the settlement.
- 5.5.17 It is assessed that there is potential for a direct **negligible** magnitude impact, resulting in an effect of **Negligible** significance (**Not Significant** in EIA terms).
- 5.5.18 With the standard/best practice mitigation outlined in **Table 5.3**, including the avoidance of upstanding remains (mitigation ref: CH04/CH05) and recording of below-ground remains where encountered (mitigation ref: CH06/CH07), any predicted residual effects would remain **Negligible (Not Significant)**, and the impacts are not considered further within the EIAR.

Hitteril Ring Enclosure (50865)

- 5.5.19 The site of possible ring enclosure (50865) of unknown date and purpose, of low sensitivity, is located on the course of the Eastern Access track. Groundworks for the route, likely to include removal of topsoil and landscaping for a new road surface, have potential to result in a direct **moderate** impact, resulting in an effect of **Minor** significance (**Not Significant** in EIA terms).
- 5.5.20 With the standard/best practice mitigation outlined in **Table 5.3** (e.g., mitigation ref: CH06/CH07), any predicted residual effects would be **Negligible (Not Significant)** in EIA terms), and the impacts are not considered further within the EIAR.

Field Bank, Coom Burn (HA 05)

- 5.5.21 The remains of a field bank (HA05), an asset of low sensitivity, is located approximately 8 m to the southwest of a proposed access track, on an alignment that, should the field bank continue, would cross the trackway. Groundworks for the track, likely to include removal of topsoil and landscaping for a new road surface, may expose below-ground remains associated with the field bank, but would be unlikely to compromise the overall integrity of the linear feature (such as it may survive below ground).
- 5.5.22 It is assessed that the groundworks have potential to result in a direct **negligible** impact, resulting in an effect of **Negligible** significance (**Not significant** in EIA terms). No mitigation is required in respect to the predicted effect on this asset.

Possible Standing Stone (HA14) and Ordnance Survey Benchmark (HA15)

- 5.5.23 Two additional heritage assets have been identified with potential for direct construction effects resulting from accidental damage or re-siting of Proposed Development elements within the micro-siting allowance:
- A possible standing stone (HA14), an asset of low sensitivity, is located to the immediate south of an access track, between Turbine 10 and Turbine 11. Direct effects arising from the accidental movement of construction traffic and/or machinery have potential to result in a direct **moderate** impact, resulting in an effect of **Minor** significance (**Not Significant** in EIA terms).
 - An Ordnance Survey triangulation station (HA15), an asset of low sensitivity, is recorded to the immediate west of Turbine 9. Direct effects arising from the accidental movement of construction traffic and/or machinery have potential to result in a direct **moderate** impact, resulting in an effect of **Minor** significance (**Not Significant** in EIA terms).

- 5.5.24 The adoption of standard/best practice mitigation (e.g., mitigation ref: CH04/CH05) makes provision for the identification, marking out, and hence avoidance of upstanding archaeological remains, thereby ensuring preservation in situ of any remains which could be accidentally impacted during groundworks.

Archaeological Potential

- 5.5.25 In addition to the potential impacts identified above, there is a possibility that any ground-disturbing works required for the construction of the Proposed Development could disturb or destroy hitherto unrecorded, buried archaeological remains present within the Site. It has been assessed that there is a **moderate potential** for such remains to be encountered within the Site.
- 5.5.26 Standard/best practice mitigation (mitigation ref: CH06/CH07) makes provision for a watching brief and a programme of archaeological works to investigate and record any previously unidentified archaeological remains, mitigating potential effects to a **Negligible** level of significance (**Not Significant** in EIA terms).

Potential Operational Effects

- 5.5.27 The Proposed Development could result in adverse effects on the setting of cultural heritage assets within the Inner and Outer Study Areas, although such effects would diminish with increasing distance from the Site. At distances greater than 10 km, it is considered that, in most instances, the Proposed Development would not appreciably alter the settings of heritage assets, or the contributions which setting makes to an asset's cultural significance. Neither would it appreciably alter how a heritage asset is experienced, appreciated, and understood.
- 5.5.28 The following heritage assets within and beyond, where required, the Inner and Outer Study Areas were identified during the scoping stage, and during post-scoping consultation with HES, to require consideration for potential setting effects arising from the Proposed Development:
- Smithwood Bastle House (SM 5647) Scheduled Monument;
 - Category A Listed Drumlanrig Castle (LB3886); and
 - The Drumlanrig Castle Inventory and Designed Landscape (GDL 00143).
- 5.5.29 These assets are discussed in detail below. Other designated heritage assets from which there is some degree of predicted visibility of the Proposed Development, but for which there is no specific setting impact concern, are assessed in tabulated form in **Technical Appendix 5.3 (EIAR Volume 4)**.
- 5.5.30 Assets with no predicted visibility of the Proposed Development, and for which no views towards or across the assets have been identified as important elements of an asset's setting, are listed in **Technical Appendix 5.4 (EIAR Volume 4)**.
- 5.5.31 With the exception of Drumlanrig Castle (LB3886), no heritage assets beyond the Outer Study Area have been identified to require assessment for potential setting impacts.
- 5.5.32 The assessment of operational effects has been carried out with reference to the layout of the Proposed Development and location of heritage assets, considered alongside theoretical visibility indicated by the blade-tip ZTV (**Figure 5.2, EIAR Volume 3a**). The criteria detailed in **Technical Appendix 5.1 (EIAR Volume 4)** has been used to assess the nature and magnitude of effects.
- 5.5.33 Visualisations (**EIAR Volume 3b**) have been provided to inform the assessment of heritage assets identified with potential for operational effects. These are listed in **Table 5.4**.

Visualisations have been selected based on an asset's proximity to the Proposed Development, considered alongside an initial appraisal of the blade-tip ZTV, and have been agreed with HES.

Table 5.4: Cultural Heritage Visualisations

Asset No.	Asset Name and Type	Figure (EIAR Volume 3b) and Cultural Heritage (CH) Viewpoint.
SM5647	Smithwood Bastle House (Scheduled Monument)	Figure 5.4.1 to 5.4.7 (CHVP1)
LB3886	Drumlanrig Castle (Category A Listed Building)	Figure 5.5.1 to 5.5.6 (CHVP2)
GDL00143	Drumlanrig Castle Gardens (Inventory Garden and Designed Landscape)	Figure 5.6.1 to 5.6.6 (CHVP3)

Smithwood Bastle House (SM 5647)

- 5.5.34 The monument comprises the ruined remains of a narrow rectangular bastle house, a fortified 'all-in-one' farmhouse occupied during the Anglo-Scottish border raids of the late 16th and early 17th centuries. Bastle houses were designed as 'vertical longhouses', with livestock secured on the ground floor and the occupants above, on the first floor, from which defence of the property could be undertaken (Harvey 1984, 46).²⁷ The Smithwood Bastle House survives as a distinct, raised rectangular mound measuring approximately 15 m by 7 m, with the rubble remains of the walls and ground floor standing to around a metre high. The upper floor is no longer in evidence. Surrounding field boundaries indicate that the house was previously the centre of a pre-improvement farming settlement. As a Scheduled Monument, the Smithwood Bastle House is of national heritage value and high sensitivity.
- 5.5.35 The bastle house stands to the east of the Old Town Burn, within an area of rough grazing and forestry, with the ground level rising steadily to the south, in a series of hills. Where views are not limited by woodland or topography, the house looks across a moorland landscape dotted with circular sheepfolds, or 'rees', which highlight the historic rough grazing with which the bastle house is associated. Such features are particularly well represented to the northeast, along the valley of the Daer Water. The operational Clyde Wind Farm lies further to the northeast and proves characteristic of such views: effectively overlooking the valley in which the bastle house is located.
- 5.5.36 The key setting element of the Smithwood Bastle House, which most contributes to its cultural significance, is the monument's situation with a relatively isolated landscape historically characterised by pastoral agriculture. While fortified, bastle houses were essentially farmhouses, occupied for agricultural rather than military purposes (Brunskill 1987, 111).²⁸ In consequence, views across the surrounding rough-grazing moorland are especially key to the house's setting, allowing for consideration of the pastoral environment in which the house was fortified. To the northeast, in particular, the bastle house looks along the course of several burns, on the banks of which stand the remains of sheepfolds (52614, HA 02, HA 03) and other pastoral remains such as a keb house (86119), a structure associated with sheep farming. Views in this direction are consequently key for prompting awareness of similar, although possibly later, pastoral activity of the sort undertaken at the bastle house. Indeed, another bastle house, that of Wintercleugh (SM 5279), lies approximately 3 km to the northeast, along the Wintercleugh Burn. Over such distances, a visual relationship between the two fortified farmsteads would have been unlikely; however, recognition of the connection

²⁷ Harvey, N. 1984 A History of Farm Buildings in England and Wales. London: David & Charles.

²⁸ Brunskill, R.W. 1987 Traditional Farm Buildings of Britain. London: Gollancz.

between the two bastle houses, along with other surviving early modern agricultural remains, is beneficial to appreciating the Scheduled Monument within its wider context.

- 5.5.37 The Proposed Development includes the installation of wind turbines to the southwest, with the nearest turbine located approximately 1.5 km away. Visualisations show ten turbines visible from the bastle house, with the Proposed Development introducing a notable change to the hilly landscape to the southwest (**Figure 5.4.1, EIA Volume 3b**). Additionally, the Eastern Access route is proposed approximately 100 m to the southeast of the upstanding remains of the house; however, road use during the operational phase would be restricted to maintenance, amounting only to occasional traffic present at a lower volume than that of the local road network. Furthermore, with respect to possible indirect operational impacts resulting from vibrations, the condition of the road itself would constitute a maintained surface free of the irregularities which most commonly lead to adverse vibrational output during traffic movement²⁴.
- 5.5.38 While making a prominent visual addition to the landscape southwest of the asset, visualisations indicate that the Proposed Development would not fundamentally alter the character of the landscape in this direction as being relatively isolated rough-grazing, with this being discernible in spite of the presence of renewable energy infrastructure (see **Figures 5.4.5 and 5.4.7, EIA Volume 3b**). In addition, key northeastern views (**Figure 5.4.3, EIA Volume 3b**) away from the Proposed Development along the length of the Daer Water Valley, over which the existing Clyde Wind Farm already features prominently, would be unchanged. The integrity of the surviving pastoral landscape, both to the southwest toward the Proposed Development, and to the northeast where associated agricultural fabric is best represented, would in consequence be retained. In turn, the experience, appreciation, and understanding of the cultural significance of the Smithwood Bastle House, such as this is conveyed through the setting of the asset, would therefore also be retained.
- 5.5.39 Overall, the impact of the Proposed Development on the Smithwood Bastle House is assessed to be of medium magnitude. In the context of the NPF4 Policy 7, however, it is considered that the key setting aspects of the Scheduled Monument outlined above, and their capacity to inform and convey cultural significance, would be adequately retained such that the integrity of the setting would not be significantly compromised. In consequence, it is assessed that the resulting adverse effect is of **Moderate** significance (**Significant** in EIA terms).

Category A Listed Drumlanrig Castle (LB3886) and Inventory and Designed Landscape (GDL00143)

- 5.5.40 The designed landscape of Drumlanrig Castle comprises varied parkland, farmland, open and walled gardens, and woodland, the majority dating to the 19th century but with earlier 17th century and 18th-century elements. The Category A Drumlanrig Castle, which is sited within the designed landscape, was remodelled between 1679 and 1689, but is at its core a mid-16th century building. The castle is built around a square courtyard, each corner of which bears a turret, with outbuildings, pavilion blocks, balustrades, walls, and garden urns constituting the wider built fabric of the listing. As a Category A Listed Building set within an Inventory Garden and Designed Landscape, both Drumlanrig Castle and its gardens are of national heritage value and high sensitivity.
- 5.5.41 The castle and gardens are located in the upper reaches of Nithsdale, overlooking the River Nith. Dramatic views are attained up and down the river, and along several scenic drives designed to reveal the picturesque qualities of the landscape. The policies are otherwise enclosed by woodland, limiting outward views save for along intentional sight-lines, while elsewhere the surrounding hills form natural boundaries for the designed landscape. Open

views are attained across the Lowther Hills to the east, and to the south, toward Criffel Hill, on the Solway Firth. Cairnkinna Hill can be seen at shorter distances to the northwest.

- 5.5.42 The key setting element of Drumlanrig Castle and its gardens relates to the scale and diversity of the designed landscape itself. In particular, the contrast between dense woodland, gardens, and open parkland is identified in the listing as being especially important to the overall setting of the castle and gardens. Deliberate sight lines, such as along the river or across one or more internal avenues are also key elements of the setting, as are more long-distance views to the east, south, and northwest. The southern approach to the castle, which travels down a long, tree-lined drive, represents the key vantage from which the castle was intended to be beheld.
- 5.5.43 The Proposed Development includes the installation of wind turbines to the northeast, with the nearest turbines located approximately 7 km from the easternmost extent of the designed landscape, and over 10.5 km from the castle itself. The blade-tip height ZTV (**Figure 5.2, EIAR Volume 3a**) indicates that theoretical visibility would largely be restricted to between seven and nine turbines, with bands of greater and lesser visibility to the east and west of the wider designed landscape, and an area of no visibility where the valley slopes to the River Nith. Where turbines are visible, the hilly topography beyond which the Proposed Development would be located would limit visibility. A visualisation from the castle's horseshoe staircase shows seven visible turbines, four of which are visible at hub height (**Figure 5.5.1-6, EIAR Volume 3b**). Views from the higher ground of the signposted 'Castle View' viewpoint, atop Mount Malloch to the southwest of the castle (**Figure 5.6.1-6, EIAR Volume 3b**), do not show the Proposed Development to a notably greater extent, with seven turbines remaining visible, although more at hub-height. Although turbines are visible in this designed view, their presence does not rival the landscape prominence of the castle itself. Key views within the designed landscape, such as along the tree-lined, north-facing drive of the castle, and over the ornamental gardens and expansive woodland to the south, would be unaffected by the Proposed Development.
- 5.5.44 Overall, the impact of the Proposed Development on Drumlanrig Castle and its gardens is assessed to be of **low** magnitude resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms).

Potential Decommissioning Effects

- 5.5.45 Any ground-breaking or other activities, such as vehicle movement, soil and overburden storage, and landscaping, required as part of the decommissioning of the Proposed Development have the potential to cause direct, permanent, and irreversible effects on the heritage assets. The likelihood of direct effects is similar to or less than that expected during construction, presuming that existing built infrastructure is used to facilitate decommissioning and removal of the components of the Proposed Development from the Site.
- 5.5.46 There are no previously recorded or newly identified assets likely to receive direct impacts arising from the decommissioning of the Proposed Development which would be 'significant' in EIA terms. This is due to the approach adopted in the Proposed Development design (i.e., avoidance of heritage assets), which would remain in effect during the decommissioning phase.
- 5.5.47 Decommissioning of the Proposed Development would likely mitigate all ongoing operational effects on the settings of heritage assets by removing the built components of the Proposed Development.

Potential Cumulative Construction Effects

- 5.5.48 Construction of the Proposed Development would not give rise to any cumulative construction effects on cultural heritage assets.

Potential Cumulative Operational Effects

- 5.5.49 **Figure 5.3 (EIAR Volume 3a)** shows the Proposed Development alongside the locations of other operational/under construction wind farms, as well as those either consented or at the application (in planning) stage.²⁹, together with the heritage assets recorded within the Outer Study Area.
- 5.5.50 Cumulative developments that are operational, and those close to the end of their operational life, or under construction are considered to form part of the baseline setting of the Outer Study Area and are considered (where relevant) above (**Section 5.3**).
- 5.5.51 Developments at the scoping stage have been excluded from consideration due to insufficient detail on the layout and scale of developments in scoping, and an uncertainty over whether such developments would be progressed to a formal application. Scoping schemes (e.g., Ravengill Energy Park, Glensalloch, Clyde South and Kinnelhead) which are located within 10 km of the Proposed Development are shown on **Figure 5.3 (EIAR Volume 3a)**. Where relevant scoping schemes are also shown on the visualisations (**Figures 5.4.1-7, 5.5.1-5 and 5.6.1-6, EIAR Volume 3b**) for reference; however, as noted above only cumulative developments that are consented or in planning are considered for cumulative effects.
- 5.5.52 Based on professional judgment, appraisal of the blade-tip ZTV, and use of cumulative wireline visualisations (**Figures 5.4.1-7, 5.5.1-5 and 5.6.1-6, EIAR Volume 3b**), no cumulative schemes (consented or at the application stage) have been identified to have a possible cumulative effect on heritage assets in combination with the Proposed Development.
- 5.5.53 **Figures 5.4.1, 5.5.1, and 5.6.1 (EIAR Volume 3b)** confirm that, due to topography and distance, no cumulative development (consented or at the application stage) would be visible alongside the Proposed Development in views from the designated heritage assets assessed above for operational effects (**Table 5.4**). Cumulative developments outwith the field of view shared with the Proposed Development are also shown (where visible) on the visualisations. Only one these developments, Lion Hill (Consented) (**Figure 5.4.3, EIAR Volume 3b**), is notable due to proximity to the Smithwood Bastle House – although it lies to the northeast, on the opposite side of the bastle house to the Proposed Development. Given the small scale of the proposed Lion Hill Wind Farm (four turbines), and its situation immediately south of the existing Clyde Wind Farm (**Figure 5.3, EIAR Volume 3a**), the development would appear as part of the existing renewable energy infrastructure already present in this direction when viewed from the bastle house, and would not be visible alongside the Proposed Development. It is consequently unlikely that any cumulative impact would result from the Proposed Development, in combination with the Lion Hill Wind Farm, upon the Smithwood Bastle House.
- 5.5.54 It is considered that the remaining assets within the Outer Study Area with visibility of the Proposed Development (**Technical Appendix 5.3, EIAR Volume 4**) are unlikely to be subject to significant cumulative operational impacts resulting from the Proposed Development in combination with any of the identified cumulative developments. These assets are therefore also not considered further.

²⁹ Cumulative Development status as of 18th December 2025.

5.6 Specific Mitigation

- 5.6.1 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 5.6.2 With regard to the construction of the Proposed Development, no specific mitigation is required as taking into consideration the embedded and standard/best practice mitigation measures outlined above, no significant effects are predicted.
- 5.6.3 No specific mitigation is available to further reduce the setting impacts on cultural heritage assets. The as-built infrastructure would be used to facilitate maintenance, repair, and replacement activities. Therefore, no specific mitigation is proposed/required in relation to cultural heritage during the operational lifetime of the Proposed Development.

5.7 Assessment of Residual Effects

Residual Construction Effects

- 5.7.1 The adoption of the embedded and standard/best practice mitigation measures set out above would avoid, minimise, or offset the loss of any archaeological and/or cultural heritage remains that may occur as a result of the construction of the Proposed Development. Taking this proposed mitigation into account, any residual effects arising from the construction of the Proposed Development in relation to heritage assets would be of no more than **negligible** magnitude (**Not Significant** in EIA terms).

Residual Operational Effects

- 5.7.2 During its operational lifetime, the residual effects of the Proposed Development on the settings of heritage assets would be the same as the predicted effects.
- 5.7.3 One impact of **Moderate** significance (**Significant** in EIA terms) has been identified to affect the setting of the Smithwood Bastle House (SM5647), which lies within the Inner Study Area.
- 5.7.4 No further mitigation is possible to offset the impact on this asset, and the residual effect would remain one of **Moderate** significance (**Significant** in EIA terms). It is, however, considered that the operational effect would not significantly adversely affect the integrity of the Scheduled Monument's setting, as it would remain possible to experience, appreciate, and understand the cultural significance of the monument, albeit in a landscape that contains further renewable energy infrastructure.
- 5.7.5 Any other impacts affecting the settings of heritage assets in the wider area would give rise to effects that are of either **Minor** or **Negligible** significance (**Not Significant** in EIA terms).

Residual Decommissioning Effects

- 5.7.6 Following mitigation, there would be no direct decommissioning effects on cultural heritage assets.
- 5.7.7 All operational effects identified would be fully reversible upon decommissioning of the Proposed Development.

Residual Cumulative Construction Effects

- 5.7.8 No cumulative construction effects are predicted hence there would be no residual cumulative construction effects.

Residual Cumulative Operational Effects

- 5.7.9 No cumulative operational effects are predicted hence there would be no residual cumulative operational effects.

5.8 Monitoring

Construction Phase Monitoring

- 5.8.1 Post-construction monitoring would be carried out to:
- Check that marking out of heritage assets within the Site has been effective and that no heritage assets have been disturbed during construction works; and
 - Check that all markers have been removed from heritage assets following completion of the construction.

Operation Phase Monitoring

- 5.8.2 No monitoring is required for the operational phase of the Proposed Development.

Decommissioning Phase Monitoring

- 5.8.1 Post-decommissioning monitoring would be carried out to:
- Check that marking out of heritage assets within the Site has been effective and that none of the heritage assets have been disturbed during decommissioning works; and
 - Check that all markers have been removed from heritage assets following completion of the decommissioning.

5.9 Summary of Assessment

- 5.9.1 **Table 5.5** provides a summary of the assessment of potential significant effects, inclusive of mitigation and monitoring requirements.

Table 5.5: Summary of Cultural Heritage Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Potential adverse direct and indirect effect on the Smithwood Bastle House (SM 5647) from construction of an access road.	CH01 CH02 CH03	Implementation of CEMP. ACoW to monitor works. A suitable stand-off buffer with protective fencing erected around the scheduled area, with a site-protection plan implemented if required. Fencing would remain in place for the duration of the construction activities on Site.	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW. Stand-off buffers to be agreed with HES/WoSAS in advance of development and set out in a WSI.	No impact (direct and indirect).	Check that marking out of heritage assets within the Site has been effective; and Check that all markers have been removed from heritage assets.
Potential adverse effect of Minor significance on the suggested course of a Roman Road (12130).	CH01 CH02 CH06 CH07	Implementation of CEMP. ACoW to monitor works. Archaeological monitoring and excavation/recording (where required). Approach to discovery of unidentified remains.	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW. Monitoring/excavation/recording and approach to discovery of unidentified remains to be agreed with WoSAS and set out in a WSI.	Negligible Adverse (Not Significant).	N/A
Potential adverse effect of Negligible significance on peripheral remains of a 17th-century settlement and burnt mound (50861).	CH01 CH02 CH04 CH05 CH06 CH07	Implementation of CEMP. ACoW to monitor works. Restriction of construction machinery to defined areas. Avoidance of upstanding heritage remains via fencing. Archaeological monitoring and excavation/recording (where required).	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW. All works, fencing of upstanding remains, monitoring/excavation/recording and approach to discovery of unknown remains to be agreed with WoSAS and set out in a WSI.	Negligible Adverse (Not Significant).	N/A
Potential adverse effect of Negligible significance on peripheral remains of a 17th-century settlement (50862).	CH01 CH02 CH04 CH05 CH06	As above	As above	Negligible Adverse (Not Significant).	N/A

Table 5.5: Summary of Cultural Heritage Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
	CH07				
Potential adverse effect of Minor significance on the Hitteril Ring Enclosure (50865).	CH01 CH02 CH06 CH07	Implementation of CEMP. ACoW to monitor works. Archaeological monitoring and excavation/recording (where required).	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW All works, fencing of upstanding remains, monitoring/ excavation/recording and approach to discovery of unknown remains to be agreed with WoSAS and set out in a WSI.	Negligible Adverse (Not Significant).	N/A
Potential adverse impact of Negligible significance on the remains of a field bank (HA 05).	CH01 CH02	Implementation of CEMP. ACoW to monitor works.	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW	Negligible Adverse (Not Significant).	N/A
Potential accidental adverse effect of Minor significance on a possible standing stone (HA14).	CH01 CH02 CH04 CH05	Implementation of CEMP. ACoW to monitor works. Restriction of construction machinery to defined areas. Avoidance of upstanding heritage remains via fencing.	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW All works to be agreed with WoSAS and set out in a WSI.	No impact.	Check that marking out of heritage assets within the Site has been effective; and Check that all markers have been removed from heritage assets.
Potential accidental adverse effect of Minor significance on an OS triangulation station (HA15).	CH01 CH02 CH04 CH05	As above	As above	No impact.	Check that marking out of heritage assets has been effective; and Check that all markers have been removed from heritage assets.
Potential adverse direct construction effect on previously undiscovered below-ground archaeological remains.	CH01 CH02 CH06 CH07	Implementation of CEMP. Archaeological monitoring and excavation/recording (where required).	CEMP approved by SLC in consultation with HES and WoSAS. Appointment of ACoW	Negligible Adverse (Not Significant).	N/A

Table 5.5: Summary of Cultural Heritage Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
			All works, fencing of upstanding remains, monitoring/ excavation/recording and approach to discovery of unknown remains to be agreed with WoSAS and set out in a WSI.		
Operation					
Moderate adverse effect on the setting of the Smithwood Bastle House (SM 5647).	None proposed	N/A	N/A	Moderate Adverse (Significant)	N/A
Decommissioning					
N/A	N/A	N/A	N/A	N/A	N/A
Cumulative construction					
N/A	N/A	N/A	N/A	N/A	N/A
Cumulative operation					
N/A	None proposed	N/A	N/A	N/A	N/A

6. Ecology

6.1 Introduction

- 6.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects associated with the construction, operation and decommissioning of the Watchman Energy Park (the 'Proposed Development') on Important Ecological Features (IEFs), including designated sites, terrestrial and aquatic habitats, and protected (non-avian) species.
- 6.1.2 The assessment has been carried out by SLR Consulting Limited (formerly MacArthur Green¹). All staff contributing to this Chapter have professional experience in ecological impact assessment (EcIA) and ecological survey, hold professional membership of and/or abide by the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct.
- 6.1.3 The specific objectives of the Chapter are to:
- Describe the existing ecological baseline;
 - Describe the assessment methodology and significance criteria used in completing the EcIA;
 - Describe the potential effects, including direct, indirect and cumulative effects;
 - Describe the mitigation measures proposed to address likely significant effects;
 - Assess how the Proposed Development would contribute to the enhancement of biodiversity; and
 - In the event that the remaining residual effects after mitigation (including enhancement) are assessed to be significant, considering appropriate proposals for compensation.
- 6.1.4 This Chapter is supported by the following figures and technical appendices:
- **Figures (EIAR Volume 3a):**
 - **Figure 6.1: Ecological Designated Sites and Ancient Woodland within 5 km;**
 - **Figure 6.2: Carbon and Peatland Map;**
 - **Figure 6.3: National Vegetation Classification (NVC) Survey Area and Results;**
 - **Figure 6.4: Potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs);**
 - **Figure 6.5: Peatland Condition Assessment (PCA) Survey Area and Results;**
 - **Figure 6.6: Protected Species Survey Area and Results;**
 - **Figure 6.7: Bat Anabat Locations and Preliminary Bat Roost Assessment Survey Area and Results;**
 - **Figure 6.8: Overall Risk Assessment 2023 (May to August) – Common pipistrelle;**
 - **Figure 6.9: Overall Risk Assessment 2023 (May to August) – Soprano pipistrelle;**
 - **Figure 6.10: Overall Risk Assessment 2023 (May to August) – *Nyctalus* species;**

¹ Following acquisition, MacArthur Green became part of SLR Consulting Limited on 1 September 2025.

- **Figure 6.11: Overall Risk Assessment 2024 (April to September) – Common pipistrelle;**
- **Figure 6.12: Overall Risk Assessment 2024 (April to September) – Soprano pipistrelle;**
- **Figure 6.13: Overall Risk Assessment 2024 (April to September) – *Nyctalus* species; and**
- **Figure 6.14: Outline Biodiversity Enhancement Management Plan.**
- **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 6.1: Ecological Impact Assessment Methodology;**
 - **Technical Appendix 6.2a: National Vegetation Classification and Habitats Survey Report;**
 - **Technical Appendix 6.2b: Peatland Condition Assessment Survey Report;**
 - **Technical Appendix 6.3: Protected Species Survey Report;**
 - **Technical Appendix 6.4: Bat Survey Report;**
 - **Technical Appendix 6.5: Fisheries Survey Report;**
 - **Technical Appendix 6.6: Species Protection Plan; and**
 - **Technical Appendix 6.7: Outline Biodiversity Enhancement Management Plan.**

6.2 Assessment Methodology

Overview

- 6.2.1 The EcIA methodology is detailed in **Technical Appendix 6.1 (EIAR Volume 4)** and follows CIEEM guidance², which is in line with the EIA Regulations³.

Scope of Assessment

- 6.2.2 The assessment presented within this Chapter considers the potential effects of construction and operation (including cumulatively) of the Proposed Development upon those ecological features identified during the review of desk-based information and field surveys.
- 6.2.3 The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)** and relevant legislation, best practice guidance, and national and local policy, including the local South Lanarkshire Biodiversity Strategy 2024-2030⁴.
- 6.2.4 This Chapter considers effects (both temporary and permanent) on:
- Designated nature conservation sites – effects include direct (i.e., derived from land take or disturbance to habitats or protected species) and indirect (i.e., habitat fragmentation and modification, including through changes caused by effects to supporting systems such as groundwater or overland flow);
 - Terrestrial habitats – effects include direct (i.e., derived from land take) and indirect (i.e., habitat fragmentation and modification, including through changes caused by effects to supporting systems such as groundwater or overland flow);

² Chartered Institute for Ecology and Environmental Management (CIEEM) (2024). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3.

³ Scottish Government (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>

⁴ South Lanarkshire Council (2024). South Lanarkshire Council Biodiversity Strategy. Available at: https://www.southlanarkshire.gov.uk/downloads/file/16574/biodiversity_strategy_2024_-_2030

- Aquatic habitats – effects are limited to the ecological impacts of changes in water conditions through potential pollution effects (hydrological effects are considered in **Chapter 8: Hydrology, Hydrogeology, Geology and Soils, EIAR Volume 2**); and
- Protected species and other notable species – effects considered include direct (i.e., loss of life, loss of key habitat, displacement from key habitat, barrier effects preventing movement to/from key habitats, and general disturbance) and indirect (i.e., loss/changes of/to food resources, population fragmentation, degradation of key habitat e.g., as a result of pollution).

6.2.5 The Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other developments, which are the subject of a valid planning application. Operational or developments under construction are considered as part of the baseline. Developments close to the end of their operational life are included as part of the baseline to present the 'worst case scenario'.

Features and Potential Effects Scoped Out

6.2.6 On the basis of the professional judgement of the EIA team, experience from other relevant projects, relevant guidance and feedback from consultees, the generally common and widely distributed habitats or species which do not fall within the following categories were scoped out of detailed assessment:

- Habitats listed in Annex I to the Habitats Directive, and species listed in Annex II to the Habitats Directive⁵
- Wild deer population;
- Migratory salmonids and resident fish;
- Biodiversity Action Plan (UKBAP)⁶ or Scottish Biodiversity List (SBL)⁷ Priority Habitats; and,
- Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981⁸, the Habitats Regulations⁹ or The Protection of Badgers Act 1992¹⁰.

6.2.7 Beaver (*Castor fiber*), wildcat (*Felix sylvestris*) and great crested newt (GCN) (*Triturus cristatus*) were scoped out of the assessment due to the absence of suitable habitat (GCN) or the Site being located outwith the known range or distribution (wildcat and beaver).

6.2.8 Based on information provided by the Clyde Rivers Foundation (CRF), freshwater pearl mussel (FWPM) (*Margaritifera margaritifera*) are scoped out of the assessment. CRF confirmed that FWPM are not present in the Site¹¹; they are unlikely to be above the Falls of Clyde, and may not be present any longer in the Clyde catchment (based on 22 years of experience working in the catchment) or within the upper reaches of the Clyde.

6.2.9 Further ecological features and potential effects have been scoped out of the detailed assessment based on the results of the desk-based study and survey work undertaken for the Proposed Development, due to a lack of potential significant effect at a relevant species

⁵ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (consolidated version), [OJ L206, 22 July 1992].

⁶ JNCC (2025). UK BAP Priority Species. Available at: <https://jncc.gov.uk/our-work/uk-bap-priority-species/>

⁷ NatureScot (2025). Scottish Biodiversity List. Available at: <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list>

⁸ Wildlife and Countryside Act 1981, c.69 (UK).

⁹ The Conservation of Habitats and Species Regulations 2017 (SI 2017/1012) (UK).

¹⁰ Protection of Badgers Act 1992, c.51 (UK).

¹¹ W. Yeomans. Pers. Comm. (2024)

population or habitat extent scale. Further details of ecological features and effects scoped out after further data searches and post-survey are provided in **Section 6.4.4**.

Method of Baseline Characterisation

Extent of the Study Area

6.2.10 The area within which the desk-based research and field surveys were undertaken varies depending on the ecological features and sensitivity to impacts. Details of extents are described below as well as within associated Technical Appendices and respective Figures.

6.2.11 Hereafter in this Chapter, the areas covered by field surveys are termed the 'Survey Area' and these same areas which are considered as part of the assessment process are then collectively referred to as the 'Study Area'. The Study Area generally equates to the Site Boundary.

Desk Study

6.2.12 A desk-based assessment was undertaken to collate existing available ecological information in relation to the Site and surrounding environment.

6.2.13 The following data sources were considered as part of the determination of scope of baseline surveys and subsequent assessment:

- NatureScot Sitelink¹² for designated site information within 5 km of the Site;
- Ancient Woodland Inventory (AWI) Scotland¹³ for ancient woodland sites within 5 km of the Site;
- Carbon and Peatland Map¹⁴ for predicted peatland classes within the Site;
- National Biodiversity Network (NBN) Atlas Scotland¹⁵ for protected or notable species records within 5 km of the Site, extended to 10 km for records of bat species, from the last 15 years (i.e., 2010 and onwards);
- South Lanarkshire Council Biodiversity Strategy 2024 – 2030⁴;
- Deer Distribution Survey (2023)¹⁶;
- Saving Scotland's Red Squirrels¹⁷ for recorded sightings of red squirrels within 5 km of the Site;
- SEPA Water Environment Hub¹⁸ for watercourse classification;
- EIA documents for nearby developments (Lion Hill¹⁹, Rivox Wind Energy Hub²⁰ and Daer Wind Farm²¹, and scoping documents for Kinnelhead Wind Farm²² and Clyde South²³) for further records within 5 km of the Site;
- Relevant scientific literature on protected species' distribution, habitats distribution and conservation status etc.

¹² NatureScot (2025). Sitelink. Available at: <https://sitelink.nature.scot/home>

¹³ Ancient Woodland Inventory (Scotland). Available at: <https://www.spatialdata.gov.scot/geonetwork/srv/api/records/A091F945-F744-4C8F-95B3-A09E6EF6AE33>

¹⁴ Scottish Natural Heritage (SNH) (2016). Carbon and peatland map 2016. Available at: <https://opendata.nature.scot/datasets/snh::carbon-and-peatland-2016-map/explore>

¹⁵ NBN Atlas Scotland (2025). Online. Available at: <https://nbnatlas.org/>. Citations for individual records are noted in Technical Appendices 6.3 and 6.4 (EIA Volume 4).

¹⁶ The British Deer Society (2023). Deer Distribution Survey Results. Available at: <https://bds.org.uk/science-research/deer-surveys/deer-distribution-survey/>

¹⁷ Scottish Squirrels (2025). Saving Scotland's Red Squirrels. Available at: <https://scottishsquirrels.org.uk/>

¹⁸ SEPA (2023). Water Environment Hub. Available at: <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>

¹⁹ Lion Hill Wind Farm Limited (2013). Environmental Statement: Lion Hill Wind Farm.

²⁰ LUC (2023). Rivox Wind Energy Hub EIA. Appendix 7.3 Protected Species Survey Report.

²¹ RWE (2021). Daer Wind Farm EIA. Chapter 6: Ecology.

²² RES (2025). Kinnelhead Wind Farm Scoping Report.

²³ Clyde South Energy Park Limited (2025). EIA Scoping Report

Field Survey

- 6.2.14 The following field surveys were undertaken to further establish the baseline ecological conditions at the Proposed Development (including appropriate buffers where relevant) to inform the assessment, in line with standard methodologies and best practice guidance:
- National Vegetation Classification (NVC) surveys, incorporating Phase 1 habitat characterisation and potential Groundwater Dependent Terrestrial Ecosystem (GWDTE) habitats (surveys carried out in June 2023, September 2024, June 2025 and July 2025);
 - Peatland Condition Assessment (PCA) surveys, following completion of the NVC surveys and the identification of priority peatland communities on-site (July 2025);
 - Protected species surveys (carried out June 2023, May 2024, June 2025 and July 2025), focusing on otter (*Lutra lutra*), water vole (*Arvicola amphibius*), badger (*Meles meles*), red squirrel (*Sciurus vulgaris*) and pine marten (*Martes martes*);
 - Preliminary bat roost assessments (PRA) to identify potential roost features (PRFs) (June 2023), with further PRA (comprising daytime bat walkover (DBW) and ground-level tree assessment (GLTA) in line with updated guidance) undertaken June 2023, May 2024, June 2025 and July 2025;
 - Bat activity surveys (May to August 2023 and April to September 2024);
 - Fisheries surveys, including electrofishing and habitat surveys (June 2023, June 2024 and August 2025).
- 6.2.15 Incidental records of other protected/notable species (such as sightings, signs or features of particular importance) e.g., mountain and brown hare (*Lepus spp.*) and reptile species (adder (*Vipera berus*), common or viviparous lizard (*Zootoca vivipara*), and slow worm (*Anguis fragilis*), or invasive non-native species (INNS) (e.g., grey squirrel (*Sciurus carolinensis*) and American mink (*Neovison vison*), were also recorded during field surveys.
- 6.2.16 Full details of field survey methods, species-specific legislation and guidance, and results are provided within **Technical Appendices 6.2 to 6.5 (EIAR Volume 4)**. Respective survey areas are provided in **Figures 6.3 to 6.7 (EIAR Volume 3a)**.

Method of Assessment

- 6.2.17 The assessment methodology, including criteria for identifying and assessing sensitivity of IEFs, magnitude of change and cumulative effects, as well as overall significance criteria, is detailed in **Technical Appendix 6.1 (EIAR Volume 4)**.

Limitations

- 6.2.18 Limitations exist regarding the knowledge base on how some species, and the populations to which they belong, react to impacts. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.
- 6.2.19 Ecological surveys are limited by factors which affect the presence of plants and animals, such as the time of year, migration patterns, and behaviour. The ecological surveys undertaken to inform the assessment of the Proposed Development have not therefore produced a complete list of plants and animals, and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it would not be present in the future.
- 6.2.20 Static bat activity surveys were undertaken over two years; 13 detectors were deployed between May and August 2023 in locations suitable for assessing bat activity based on the

design as it was at the time. In 2024, design iterations meant that five additional locations were required to be surveyed within the previously surveyed area. As such, a further five detectors were deployed between April to September 2024 in order to provide full spatial coverage of the Proposed Development. Due to unforeseen errors with the detectors, microphones or batteries, 14 consecutive nights of recordings were not achieved at all detectors during deployments; however, the resulting data compiled for the Site was in line with guidance²⁴ and therefore is not considered to be a limitation to the assessment. Refer to **Technical Appendix 6.4 (EIAR Volume 4)** for further details on the bat survey limitations.

- 6.2.21 For electrofishing surveys, fully quantitative data should ideally be collected from a closed population, one isolated by stop nets at the upstream and downstream margins of the sampling site. Stop nets were not used during surveys in 2024, as signal crayfish (*Pacifastacus leniusculus*), an INNS from North America, were known to be present within the watercourses and stop nets are difficult to disinfect; this reduced the risk of potential transfer of the INNS to different areas. Further details are provided in **Technical Appendix 6.5 (EIAR Volume 4)**.
- 6.2.22 There is a small section within the Site Boundary that has not been covered by NVC surveys (approximately 500 m in length) (refer to **Figure 6.3.4, EIAR Volume 3a**); this is along the Western Access track, where a temporary diversion of up to approximately 800 m for the Core Path is proposed along an existing forestry track within conifer plantation. No works are anticipated within this area, and the lack of survey data here is not considered to be a limitation to the assessment.
- 6.2.23 No notable limitations were experienced with regards to habitats or protected species field surveys (**Technical Appendices 6.2 and 6.3, EIAR Volume 4**).
- 6.2.24 Whilst some general limitations have been identified, it is considered that there is sufficient information to enable a robust assessment to be taken in relation to the identification and assessment of potential effects on ecological features.

Assumptions

- 6.2.25 The following assumptions are included in the assessment of otherwise unmitigated effects on IEFs:
- Work on the Proposed Development, including vegetation clearance and construction of new access tracks, turbine hardstandings and other ancillary infrastructure, erection of turbines and site restoration is predicted to last for approximately 18 months, as set out in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**;
 - All electrical cabling between turbines and the associated infrastructure would be underground in shallow trenches which would be reinstated post-construction and, in all cases, follow the access tracks;
 - The construction compound and any temporary laydown areas would be temporary infrastructure. Any disturbance or earthworks around permanent infrastructure during construction would be temporary and areas reinstated or restored before the construction phase ends;
 - The standard pre-construction and construction phase mitigation described in **Table 6.4** would be fully applied, e.g., the presence of an Ecological Clerk of Works (ECoW),

²⁴ NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation. Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation>

adherence to the agreed Species Protection Plan (SPP) and Construction Environmental Management Plan (CEMP); and

- Maintenance of the Proposed Development would involve occasional vehicular access along the access tracks only, with works undertaken being of small scale. This is unlikely to result in any operational effects on any species or habitats recorded at and around the Proposed Development.

6.3 Baseline Conditions

Desk-Based Study

Designated Sites

- 6.3.1 Shiel Dod Site of Special Scientific Interest (SSSI), designated for its assemblage of upland vegetation communities representative of the Southern Uplands, lies immediately adjacent to the south of the Site (refer to **Figure 6.1, EIAR Volume 3a**). The latest assessed condition of the SSSI was 'favourable maintained' as of 6 October 2009. The most important habitats included within the upland assemblage are: blanket bog; subalpine dry dwarf-shrub heath; and calcareous types of spring-head, rill and flush²⁵.
- 6.3.2 There are no Local Nature Conservation Sites (LNCS) within 5 km of the Site.

Ancient Woodland

- 6.3.3 There are several stands of ancient woodland within 5 km of the Site; most lie to the west of the Site, and one to the north (refer to **Figure 6.1, EIAR Volume 3a**). The majority of ancient woodland within 5 km of the Site are categorised as Long-Established (of plantation origin), with a few small patches categorised as Ancient (of semi-natural origin). There is no ancient woodland within 4 km of the Site.

Habitats

TERRESTRIAL HABITATS

- 6.3.4 The Carbon and Peatland Map 2016¹⁴ was consulted to determine likely peatland classes present. The map is a predictive tool that provides an indication of the likely presence of peat. The map has been developed as "*a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities*". It identifies areas of "*nationally important carbon-rich soils, deep peat and priority peatland habitat*"²⁶ as Class 1²⁷ and Class 2²⁸ peatlands. Class 1 peatlands are also "*likely to be of high conservation value*" and Class 2 "*of potentially high conservation value and restoration potential*".
- 6.3.5 The predictive tool and map indicate that there are areas of Class 1 peatland across the Site, predominantly located in the southern portion. A very limited area of Class 2 peatland is present in the west of the Site. The rest of the Site is composed of mainly Class 3²⁹ and

²⁵ SNH (2010). Shiel Dod Site of Special Scientific Interest Site Management Statement. Available at:

<https://www.nature.scot/sites/default/files/site-special-scientific-interest/1422/site-management-statement.pdf>

²⁶ Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

²⁷ Class 1: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value

²⁸ Class 2: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential

²⁹ Class 3: Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.

Class 0³⁰ (mineral) soils, with some smaller scattered patches of Class 4³¹ and Class 5³² soils (refer to **Figure 6.2, EIAR Volume 3a**).

- 6.3.6 As the Carbon and Peatland Map is a high-level tool, detailed habitat and peat depth surveys have been carried out across the Site to inform siting, design and mitigation and the detailed assessment on peatland and associated habitats. The results of the habitat surveys are discussed in **Technical Appendix 6.2a (EIAR Volume 4)**, and the results of the peat depth surveys are presented and discussed in **Chapter 8: Hydrology, Hydrogeology, Geology and Soils (EIAR Volume 2)** and associated Technical Appendices.

AQUATIC HABITATS

- 6.3.7 The south of the Site drains into the section of Daer Water, upstream of Daer Reservoir which lies to the east of the Site. The central area of the Site drains into Kirkhope Cleuch, which feeds directly into Daer Reservoir. The north of the Site drains, via the Meikle and Calf Burns, into Daer Water, downstream of Daer Reservoir. A small part of the Site (the western access track) is within the Potrail Water catchment, draining to the northwest. All watercourses lie within the wider Clyde catchment.
- 6.3.8 Upstream of Daer Reservoir, Daer Water is classified by SEPA's Water Classification Hub as having good overall status¹⁸.
- 6.3.9 Daer Reservoir is a drinking water reservoir and is classed as a heavily modified water body, with the overall status of the reservoir as having good ecological potential¹⁸.
- 6.3.10 Downstream of Daer Reservoir, Daer water is classified as a heavily modified water body with moderate ecological potential¹⁸.
- 6.3.11 Potrail Water is classified as having good overall status¹⁸.

Protected Species

- 6.3.12 A search of the NBN Atlas Scotland¹⁵ covering a 5 km buffer from the Site in the past 15 years (i.e., from 2010 onwards)³³ identified records of the following protected or notable species:
- Adder;
 - Brown hare (*Lepus europaeus*);
 - Common lizard;
 - Common pipistrelle (*Pipistrellus pipistrellus*);
 - Mountain hare (*Lepus timidus*);
 - Natterer's bat (*Myotis nattereri*);
 - Red squirrel;
 - Soprano pipistrelle (*Pipistrellus pygmaeus*); and
 - Water vole.
- 6.3.13 A further search covering a 10 km buffer from the Site over the same time period identified records of the following bat species in addition to those detailed above:
- Brown long-eared bat (*Plecotus auritus*);
 - Daubenton's bat (*Myotis daubentonii*);

³⁰ Class 0: Mineral Soil

³¹ Class 4: Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils

³² Class 5: Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat

³³ Data licences and providers are detailed in **Technical Appendices 6.3 and 6.4 (EIAR Volume 4)**

- Leisler's bat (*Nyctalus leisleri*);
 - Noctule (*Nyctalus noctula*); and
 - Whiskered/Brandt's bat (*Myotis mystacinus*).
- 6.3.14 Single sightings of red squirrels were recorded by Saving Scotland's Red Squirrels within 5 km of the Site in 2021 and 2012¹⁷.
- 6.3.15 The Deer Distribution Survey results¹⁶ indicated the presence of the following deer species in the general area of the Site:
- Roe deer (*Capreolus capreolus*);
 - Red deer (*Cervus elaphus*);
 - Sika deer (*Cervus nippon*); and
 - Fallow deer (*Dama dama*).
- 6.3.16 The application documents for Rivox Wind Energy Hub²⁰, a wind farm development at the application stage of planning that lies approximately 3 km to the east of the Proposed Development, were consulted for information on nearby ecological features. Field surveys undertaken in support of the application recorded presence of otter, badger, common lizard, and bats (common pipistrelle, soprano pipistrelle, noctule, Leisler's bat, Daubenton's bat, *Myotis* spp., and brown long-eared bat). Rivox Wind Energy Hub lies within the catchment of the Annan; Atlantic salmon were recorded, but as it is hydrologically separated from the Site, this does not reflect on the likely presence of migratory salmonids in close proximity to the Proposed Development.
- 6.3.17 The application documents for Daer Wind Farm²¹, a wind farm development at the application stage of planning which lies between Rivox Wind Energy Hub and Daer Reservoir, recorded presence of otter, badger and bats (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), noctule, Leisler's bat, *Myotis* spp., and brown long eared bat) during field surveys. Fisheries surveys were not carried out, but an incidental finding of signal crayfish remains was made in one of the otter spraints identified.
- 6.3.18 Scoping documents submitted for Kinnelhead Wind Farm notes presence of badger and otter within their survey area²².
- 6.3.19 The scoping documents for Clyde South wind farm, which lies to the north-east of the Proposed Development, and includes the sites of the consented Lion Hill and Crookedstane wind farms³⁴, recorded presence of bats (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Daubenton's, Natterer's and brown long-eared bat), otter, common lizard and brown trout, as well as signal crayfish (INNS)²³. The Environmental Statement for Lion Hill Wind Farm had recorded presence of otter¹⁹.
- 6.3.20 The Site is located in the upper River Clyde catchment. Based on the presence of natural fish barriers downstream on the River Clyde, migratory Atlantic salmon (*Salmo salar*) and European eel (*Anguilla Anguilla*) are known not to be present in the upper River Clyde.
- 6.3.21 Vendace (*Coregonus albula*), Britain's rarest freshwater fish, were translocated to Daer Reservoir over three introductions between 1998 and 2008 in an attempt to form conservation refuge populations of the species³⁵. Prior to this translocation, the status of vendace within Daer Reservoir was unknown. Survey efforts in 2017 found one vendace in Daer Reservoir,

³⁴ Renewco (2025). Clyde South Energy Park, Website. Available at: <https://www.renewcopower.com/portfolio/united-kingdom/uk-projects/clyde-south-energy-park>

³⁵ Lyle, A.A., Bean, C.W., Honkanen, H.M., Koene, J.P. and Adams, C.E., (2019). The establishment of Scotland's rarest freshwater fish, the vendace (*Coregonus albula*), in conservation refuge sites. The Glasgow Naturalist, Volume 27, Part 1, 27-31.

which had recently spawned. Vendace require a habitat with cold water, relatively high oxygen concentration, and coarse substrates without surface siltation³⁶.

Invasive Non-Native Species (INNS)

- 6.3.22 The NBN Atlas Scotland¹⁵ search returned records of the INNS grey squirrel (*Sciurus carolinensis*) and signal crayfish.

Field Surveys

Habitats

NATIONAL VEGETATION CLASSIFICATION (NVC) AND PHASE 1

- 6.3.23 **Technical Appendix 6.2a (EIAR Volume 4)** sets out detailed descriptions of habitats identified and vegetation recorded during habitat surveys. The NVC data collected were cross-referenced to the Phase 1 Habitat Survey Classification³⁷ to allow a broader characterisation of habitats. The extent of Phase 1 habitat types within the Site was calculated using the correlation of NVC communities to their respective Phase 1 types specific to the Site and their extents mapped within ArcGIS software, including within mosaic areas.
- 6.3.24 Thirty-four NVC communities and 18 non-NVC communities were recorded within the Site and wider study area, which corresponded to 33 Phase 1 habitat types. These communities and habitat types, and their respective Site-specific correlations are detailed in **Technical Appendix 6.2a (EIAR Volume 4)** and shown on **Figure 6.3 (EIAR Volume 3a)**.
- 6.3.25 The extents of NVC communities and non-NVC types recorded within the Site are provided in **Annex A** (included at the end of this Chapter) and include proportions of particular habitat types that are found within the Site, including those within mosaic habitats.
- 6.3.26 The Site predominantly supports a mixture of marshy grassland, unimproved acid grassland, wet dwarf shrub heath and blanket bog, as summarised in **Diagram 6.1**. Other habitat types distributed across the Site include wet modified bog, acid neutral flush, acid dry dwarf shrub heath, improved and semi-improved grassland, broad-leaved plantation woodland and coniferous plantation woodland. All other habitats recorded cover less than 1% of the study area.

³⁶ Natural England (2021). Definition of Favourable Conservation Status for Vendace *Coregonus albula*. Report number RP2958.

³⁷ JNCC (2010). Handbook for phase 1 habitat survey – a technique for environmental audit.

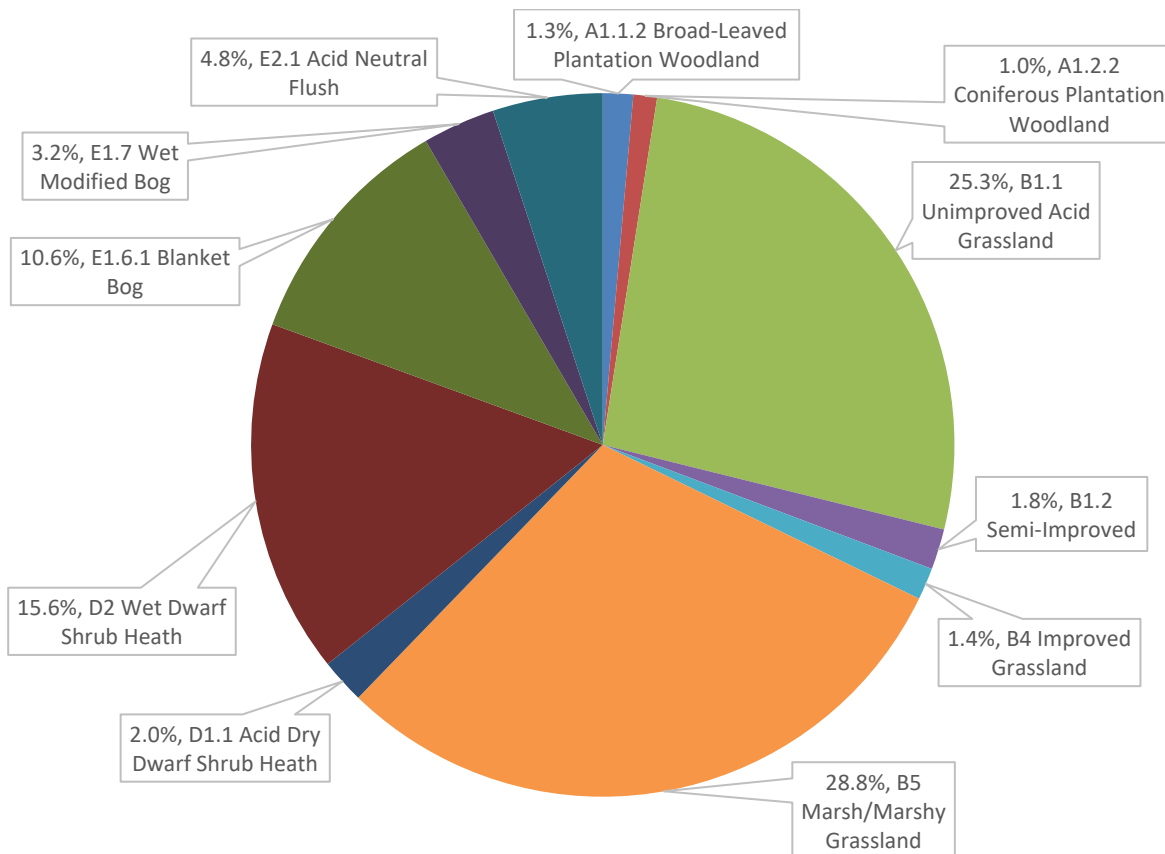


Diagram 6.1: Predominant Phase 1 Habitat Types Recorded within the Site (habitat types making up <1% of the Site are not included).

- 6.3.27 Blanket bog and wet modified bog have subsequently been scoped into the assessment of effects due to their extent and nature conservation value (as detailed in **Technical Appendix 6.2a, EIAR Volume 4**).
- 6.3.28 The blanket bog within the Site is mainly composed of the M17 *Tricophorum germanicum* – *Eriophorum vaginatum* blanket mire community and M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire communities, with M2 *Sphagnum cuspidatum/fallax* bog and M3 *Eriodophorum angustifolium* bog pool communities also infrequently noted. These habitats are associated with Scottish Biodiversity List (SBL)⁷ blanket bog habitat with some areas also corresponding to Annex 1 type 7130 blanket bog habitat. The blanket bog within the Site is in relatively poor condition through historical and ongoing practices; livestock grazing, agricultural improvement, and drainage. As a result some hagg and gully features were identified, and some patches of M17 blanket bog were noted to be in the process of transitioning to M19 and/or M15 blanket bog, representative of a lower-quality resource.
- 6.3.29 Wet modified bog within the Site is mainly composed of M25a^ *Molinia caerulea* – *Potentilla erecta* mire *Erica tetralix* sub-community, with smaller areas of M20 *Eriophorum vaginatum* blanket mire community. Wet modified bog was found often in mosaics with other blanket bog and acid grassland communities. It mainly appears to have been derived from blanket bog through a long history of grazing that has led to the scarcity or absence of *Calluna vulgaris* in the sward.

PEATLAND CONDITION

- 6.3.30 The PCA study area covered areas in a 300 m buffer around all proposed infrastructure and tracks where the NVC surveys recorded habitat as E1.6.1 blanket bog, E1.7 wet modified bog, D2 wet dwarf shrub heath, E4 bare peat, and mosaics containing these same habitat types.
- 6.3.31 PCA surveys recorded the peatland within the Study Area (as defined on **Figure 6.5, EIAR Volume 3a**) to comprise a patchwork of modified and degraded bog along with areas of actively eroding peatland. Detailed discussion is included in **Technical Appendix 6.2b (EIAR Volume 4)** with results shown on **Figure 6.5 (EIAR Volume 3a)**. Of the 87 sample locations taken within peatland habitat, the following Peatland Action Condition Categories were recorded:
- Modified (67/87)
 - Actively eroding: Hagg/gully (14/87)
 - Drained (artificial) (4/87)
 - Actively eroding (1/87)
 - Forested/Previously Forested (1/87)
- 6.3.32 These results indicate much of the peatland within the Study Area is degraded or actively eroding, with bare peat recorded at 19 sample locations (see also Photographs in **Annex C of Technical Appendix 6.2b (EIAR Volume 4)**). Peat hags and/or gully was recorded at 15 sample locations (four samples are through to underlying substrate). The samples were clustered in the severely eroding and deeper peatland south and southeast of Hirstane Rig (**Photo 6.1** below); see **Figure 6.5 (EIAR Volume 3a)**. No 'Near-natural' peatland was recorded³⁸.
- 6.3.33 Sphagna-rich ridges were considered present at only 15 of the 87 peatland samples. However, when present they were neither abundant nor extensive, but were often comprised of patches of a single common species (further discussed in **Technical Appendix 6.2b, EIAR Volume 4**).
- 6.3.34 Evidence of grazing, trampling or poaching by large herbivores (i.e., deer, cattle and sheep) was present throughout the study area, with this impact recorded at all 87 peatland sample locations. Given the abundance, distribution, height and character of the dwarf shrubs present, it is likely the Site has a long history of intensive upland grazing and which may have been higher in the past, which has resulted in the current baseline of relatively sparse and low growing dwarf shrub cover.
- 6.3.35 The peatland on-site lacks many of the key positive or desirable indicators that would suggest the priority peatland communities present are of national interest, as per NatureScot's template for assessment of peatland³⁹. Whilst there are variable amounts of peatland with peat forming species present, there are various indicators of negative impact as well, including the levels of peat hagg/gullying present and active erosion, grazing, and areas of bare peat.

³⁸ NatureScot (2025). Peatland ACTION - Peat depth and peat condition survey guidance and recording form guidance. Available at: <https://www.nature.scot/doc/peatland-action-peat-depth-and-peat-condition-survey-guidance-and-recording-form-guidance>

³⁹ NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>

Photo 6.1: Peat hag and gully erosion present south of Hirstane Rig



GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEMS (GWDTEs)

- 6.3.36 NVC communities recorded within the survey area were referenced against SEPA guidance⁴⁰ to identify those habitats which may be classified, depending on the hydrogeological setting, as being potentially groundwater dependent.
- 6.3.37 Potential GWDTE NVC communities recorded within the survey area are detailed in **Technical Appendix 6.2a (EIAR Volume 4)** and their distribution shown on **Figure 6.4 (EIAR Volume 3a)**.
- 6.3.38 GWDTE sensitivity has been assigned solely on the SEPA listings. However, many of the NVC communities on the list are common habitat types across Scotland and generally of low Nature Conservation Value (NCV). Furthermore, depending on several factors such as geology, superficial geology, presence of peat, and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependent on groundwater. Because designation as a potential GWDTE is related to groundwater dependency and not NCV, GWDTE status has not been used as a criteria to determine a habitat's NCV and similarly does not factor in the identification of IEFs within ecological impact assessments. There is however a requirement to consider GWDTEs, and the data gathered during the NVC surveys has been used to inform this assessment which is included in **Chapter 8: Hydrology, Hydrogeology, Geology and Soils (EIAR Volume 2)**.

ANNEX I HABITATS

- 6.3.39 A number of NVC communities can also correlate to various Annex I habitat types. However, the fact that an NVC community can be attributed to an Annex I type does not necessarily mean all instances of that NVC community constitute Annex I habitat. Its Annex I status can

⁴⁰ SEPA (2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems. Available at: <https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

depend on various factors such as quality, extent, species assemblages, geographical setting and substrates.

- 6.3.40 Joint Nature Conservation Committee (JNCC) Annex I habitat listing and descriptions⁴¹ have been compared with survey results and field observations. Those habitats within the Site which could be considered Annex I habitats are detailed in **Technical Appendix 6.2a (EIAR Volume 4)**.

SCOTTISH BIODIVERSITY LIST (SBL) HABITATS

- 6.3.41 The SBL⁷ is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.
- 6.3.42 The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland; these are termed 'priority habitats'. Some of the priority habitats are quite broad and can be correlated to many NVC types.
- 6.3.43 Relevant SBL priority habitat types and corresponding associated NVC types recorded within the survey area are detailed in **Technical Appendix 6.2a (EIAR Volume 4)**.
- 6.3.44 The SBL priority habitats present correspond with the UKBAP Priority Habitats⁴².

Protected Species (Non-avian)

- 6.3.45 This section outlines the results from the protected species surveys.
- 6.3.46 Detailed methodologies, survey timings, and results, including the legal status of each species, are included within **Technical Appendices 6.3 to 6.5 (EIAR Volume 4)** and their associated annexes. Results are presented in **Figures 6.6 and 6.7 (EIAR Volume 3a)**.

BADGER

- 6.3.47 No evidence of badger was recorded during the surveys. The Site is largely open with areas of peaty soils that are generally not preferred for sett building. The northern portion of the Site abuts and includes areas of forestry which might provide more suitable setting habitat, with the wider site offering foraging opportunities (**Technical Appendix 6.3, EIAR Volume 4** and **Figure 6.6, EIAR Volume 3a**).

BATS

- 6.3.48 This section provides a summary of the field surveys and associated results for bats. Full details are contained within **Technical Appendix 6.4 (EIAR Volume 4)**. Results are presented on **Figure 6.7 (EIAR Volume 3a)**.

PRELIMINARY ROOST ASSESSMENT

- 6.3.49 Preliminary bat roost assessments were carried out in line with the guidance that was applicable at the time of the survey. As a result, the suitability of trees was classified as Low, Moderate or High for surveys undertaken in 2023 (Collins 2016⁴³) and as Further Assessment Required (FAR), PRF-Individual or PRF-Multiple for surveys undertaken in 2024 (Collins 2023⁴⁴).
- 6.3.50 In total, 21 features with the potential to support roosting bats were identified in the course of survey work. Thirteen trees with suitability ranging from FAR (unable to be inspected closely enough to classify) to Moderate were recorded. Eight structures, three of which were assessed

⁴¹ JNCC (2025) Habitat List. Available at: <https://sac.jncc.gov.uk/habitat/>

⁴² JNCC (2008) List of UK BAP Priority Habitats. Available at: <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/>

⁴³ Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition).

⁴⁴ Collins, J. (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition).

to offer High suitability and two to offer Moderate suitability, were also identified. The High and Moderate suitability structures comprised disused farm buildings/houses and occupied properties.

- 6.3.51 No features with moderate or high potential for roosting bats were recorded within 200 m plus rotor radius of a proposed wind turbine location. One building with high potential suitability for roosting bats, an occupied farmhouse with loose slates and gaps around the gable end, was recorded within approximately 23 m of the eastern access track. Three trees with low potential for roosting suitability are approximately 20 to 30 m from the western access track. Refer to **Figure 6.7 (EIAR Volume 3a)**.

AUTOMATED GROUND LEVEL ACTIVITY SURVEYS

- 6.3.52 Two periods of automated activity surveys were carried out, in 2023 and 2024, each following standard guidance⁴⁴. In 2023, 13 detectors were deployed across the Site from May to August over a total of 43 days, with 544 complete recording nights of data obtained. In 2024, five detectors were deployed from April to September over a total period of 42 days, resulting in 183 complete recording nights of data. Detector locations are shown on **Figure 6.7 (EIAR Volume 3a)**.
- 6.3.53 Bats were detected on 37 of 43 nights in 2023, and 10 of 42 nights in 2024. Across both deployments, a total of five bat species and one bat genus were recorded, as detailed in **Table 6.1** and **Table 6.2**. Soprano and common pipistrelle combined accounted for 87.33% (n=1841) of all registrations in 2023 and for 85.37% (n=35) of registrations in 2024.

Table 6.1: Total number of bat passes for each species across all locations 2023

Species/Species Group	Number of Registrations	Percentage of Total
Common pipistrelle	1101	52.23
Soprano pipistrelle	740	35.10
Nyctalus spp ⁴⁵ .	134	6.4
Daubenton's	110	5.22
Natterer's	8	0.38
Brown long-eared	15	0.71
Total	2108	100

Table 6.2: Total number of bat passes for each species across all locations 2024

Species/Species Group	Number of Registrations	Percentage of Total
Common pipistrelle	15	36.59
Soprano pipistrelle	20	48.78
Nyctalus spp	3	7.3
Daubenton's	1	2.44
Natterer's	2	4.88
Total	41	100

⁴⁵ The Ecobat report only records to genus level for *Nyctalus* spp – refer to **Technical Appendix 6.4 (EIAR Volume 4)**.

QUANTIFYING ACTIVITY

- 6.3.54 The data from 2023 and 2024 were analysed using the Ecobat tool⁴⁶ to gain a measure of relative bat activity at the Proposed Development. The data was then evaluated in accordance with NatureScot *et al.* guidance tables²⁴ to determine overall Site risk level for each species. The guidance explains that: “*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year...Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*”. Data from the Proposed Development Study Area were compared with data within a range of 100 km and within 30 days of the survey date from all years. Further information is provided in **Technical Appendix 6.4 (EIAR Volume 4)**.
- 6.3.55 The Ecobat analysis provides a measure of average annual Site activity based on the median (most frequent activity category and representative of the ‘typical’ bat activity levels in the Study Area) and maximum (unusually high levels or important peaks of bat activity) percentiles⁴⁷. A reference range representing the number of nights for each species that the data was compared to was also generated. In general, a reference range of more than 200 nights is recommended for confidence in the activity level stated by the Ecobat report. Results are shown in **Table 6.3**.

Table 6.3: Average Annual Site Activity Levels						
Species/ Species Group	Site Activity					
	2023			2024		
	Median	Max	Ref. range	Median	Max	Ref. range
Common pipistrelle	Low	Low	38093	Low	Low	37585
Soprano pipistrelle	Low	Low	40805	Low	Low	40479
Nyctalus spp.	Low	Moderate	3835	Low	Low	3704
Daubenton’s	Low	Moderate	796	Low	Low	687
Natterer’s	Low	Low	202	Low-Moderate	Low-Moderate	196
Brown long-eared	Moderate	High	130	Not recorded		

- 6.3.56 The reference range for Natterer’s bat in 2024 and brown long-eared bat in 2023 fell below the minimum threshold for confidence; the attributed activity levels for these records should be treated with caution.

ASSESSING POTENTIAL RISK

- 6.3.57 As detailed in **Technical Appendix 6.4 (EIAR Volume 4)**, the Proposed Development risk level was determined to be Low/Lowest, based on having a medium project size and low habitat risk level.
- 6.3.58 As per NatureScot *et al.* guidance²⁴, common pipistrelle, soprano pipistrelle and *Nyctalus* spp. are the species recorded which are considered to have a high collision risk. *Myotis* spp. and brown long-eared bat are classified as having a low collision risk.
- 6.3.59 The Ecobat activity levels calculated for high collision risk species and the Proposed Development risk level were used to calculate an overall risk assessment score. The overall

⁴⁶ Mammal Society (2017). Ecobat. Available at: <https://mammal.org.uk/current-research/bat-survey-tools>

⁴⁷ The percentile rank is attributed to one of the following five bat activity categories as defined within relevant guidance: Low (0 to 20%), Low-Moderate (21 to 40%), Moderate (41 to 60%), Moderate-High (61 to 80%) and High (81 to 100%).

risk assessment scores for all high collision risk species at both median and maximum percentiles and both years were all Low with the exception of *Nyctalus* spp. in 2023 which had a maximum percentile score of Medium.

- 6.3.60 The median monthly risk assessment scores for high collision risk species are shown on **Figure 6.8 to 6.13 (EIAR Volume 3a)**. No high-risk maximum assessment scores were recorded across the Site per month in 2023; one medium-risk score based on maximum percentiles was recorded in August for *Nyctalus* spp., at Location 9. No high- or medium-risk median or maximum percentile assessment scores were recorded across the Site in any month in 2024.
- 6.3.61 Analysis of the bat activity data referenced against known emergence times for high-collision risk species was undertaken to indicate the likelihood of a bat roost being close to the Proposed Development.
- 6.3.62 In 2023, bat activity at Locations 1 and 9 indicated the potential for nearby roost sites, recording *Pipistrellus* spp. during their known emergence time ranges. These registrations were recorded in August, outwith the maternity roost season (15 June to 30 July). Only one call per pipistrelle species per date was noted within the known emergence times.
- 6.3.63 In 2024, bat activity at Location 1 indicated the potential for nearby *Pipistrellus* spp. roost sites; registrations were recorded outwith the maternity roost season, with a maximum of four calls recorded on any one night.

OTTER

- 6.3.64 Otter spraints were recorded on various watercourses during surveys in all years, with the spraints found to vary in age. The watercourses on Site are generally open with little shelter, making them more suitable for foraging and commuting rather than for holts and couches, although the steep riverbanks may offer some sheltering opportunities. Where existing watercourse crossings exist, the bridging structures may provide some opportunities for long-term use (**Technical Appendix 6.3, EIAR Volume 4**).

PINE MARTEN

- 6.3.65 Three potential scats were recorded, all close to areas of forestry in the north of the Site. The main area of the Site is generally open with few trees, and as such offers hunting and foraging opportunities, but limited habitat for potential denning. The northern area of the Site and Western Access track pass close to or through areas of forestry, and as such these areas may provide suitable habitat for pine marten to use for denning (**Technical Appendix 6.3, EIAR Volume 4**).

RED SQUIRREL

- 6.3.66 No evidence of red squirrel was recorded during the surveys. The Site, with the exception of access routes, does not incorporate areas of forestry and as such there is very little suitable habitat for red squirrel. The Site is adjacent to areas of forestry, and the Western Access passes through commercial plantation, where red squirrel habitat is more likely to be present, and as such individuals may utilise the northern portion of the Site to move between areas of forestry (**Technical Appendix 6.3, EIAR Volume 4**).

REPTILES

- 6.3.67 Five sightings of common lizard were recorded across the Site. The open habitat and vegetation present across the Site provide good habitat for reptile foraging. The Site also has numerous stone structures, including drystone dykes, cairns and rock piles, which may be suitable for use as hibernacula (**Technical Appendix 6.3, EIAR Volume 4**).

WATER VOLE

- 6.3.68 Signs of water vole, including burrows, feeding signs and runways, were recorded along Kirkhope Cleuch and Carsehope Burn in the southern extent of the Site. The steep-sided channels and rushy/grassy vegetation present on the Site provide good suitability for water vole (**Technical Appendix 6.3, EIAR Volume 4**).

MOUNTAIN HARE

- 6.3.69 A mountain hare sighting was noted incidentally during an ornithology survey (**Technical Appendix 6.3, EIAR Volume 4**). This was south of the Site Boundary on Mid Height.

FISH

- 6.3.70 The electrofishing surveys (fully detailed in **Technical Appendix 6.5, EIAR Volume 4**) caught no migratory fish species. The fish community was dominated by brown trout (*Salmo trutta*), with minnow (*Phoxinus phoxinus*), stone loach (*Barbatula barbatula*) and brook lamprey (*Lampetra planeri*) also noted. Of 15 sampled sites, brown trout were only absent from three.

OTHER SPECIES AND INNS

- 6.3.71 A number of mammal holes which could not be attributed with confidence to a particular species were identified across the Site. Most of these holes were of a size suitable for use by water vole, but lacked definitive field signs. Two larger mammal holes were noted near Carsehope Burn, which appeared of a size that may be suitable for otter. However, no signs of active use were present (**Technical Appendix 6.3, EIAR Volume 4**).
- 6.3.72 Signal crayfish, an INNS, were recorded on Coom Burn, Calf Burn, Old Town Burn, Meikle Burn, Potrail Water and Daer Water during the electrofishing surveys (**Technical Appendix 6.5, EIAR Volume 4**).

Cumulative Baseline

- 6.3.73 There is one existing wind farm site within 5 km of the Proposed Development; Clyde Wind Farm is a 206-turbine development with 152 turbines becoming operational in 2012 and a further 54 turbines becoming operational in 2017. It should be noted that the full extent of the wind farm extends beyond 5 km and as such not all turbines are located within 5 km.
- 6.3.74 Within 10 km of the Proposed Development there are two further existing wind farm developments. Harestanes Windfarm has 68 turbines and has been operational since 2014. Minnygap Wind Farm has 10 turbines and became operational in 2017. It should be noted that the full extent of the wind farms extend beyond 10 km and as such not all turbines are located within 10 km.
- 6.3.75 There are several further existing wind farm developments between 10 and 20 km of the Proposed Development.

Future Baseline

- 6.3.76 In the absence of the Proposed Development, it is likely that the IEFs would generally remain as they are at present, although numbers and distribution of species may fluctuate naturally. The conifer plantation forestry would continue to mature but would be subject to a future felling plan, which may create temporary localised habitat changes until replanting and canopy closure. Vegetation and habitat composition and extents within the Site may fluctuate marginally in the long-term in line with increasing or decreasing livestock grazing and fluctuations in deer browsing.

6.3.77 Signal crayfish may continue to disperse along watercourses within the Site through natural colonisation.

6.4 Mitigation

6.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

- Embedded mitigation - design stage mitigation as outlined in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and the design evolution narrative (refer to **Chapter 3: Design Evolution and Alternatives, EIAR Volume 2**).
- Standard/Best Practice mitigation – standard/best practice mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness.
- Specific mitigation - bespoke mitigation determined as a result of the EIA and as detailed in **Section 6.7**.

6.4.2 As part of the design process the following design principles (i.e., embedded mitigation) were considered:

- Application of a minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where a minimum number of watercourse crossings are required.
- A minimum of a 75 m buffer for any infrastructure or construction activity from the Shiel Dod SSSI;
- Alignment of the track has been designed to minimise the extent of new track and number of watercourse crossings required, where feasible, considering the topography of the Site and other environmental Site constraints.
- Alignment of the track has been designed to reduce the extent of new track crossing blanket bog and wet heath, where feasible, considering the topography of the Site.
- Design process aimed, as far as practicable, to avoid areas of deeper peatland (>1.0 m), blanket bog and wet modified bog, and potential high GWDTEs for the location of turbines and other infrastructure.
- Positioning of turbines to ensure potential bat roosts (moderate or high potential) lie outwith the 285 m protection buffer (200 m + rotor radius) to minimise potential collision/barotrauma mortality to bat species emerging from roost features; and
- Establishing a minimum 50 m buffer from turbine blade tips to important edge habitats for bats across the Site to reduce collision risk of bats.

6.4.3 A summary of the standard/best practice mitigation considered for the EcIA is set out in **Table 6.4**.

Table 6.4: Summary of Standard/Best Practice Mitigation			
ID	Phase	Description	Purpose of Mitigation
EC01	Pre-Construction Construction	A Species Protection Plan (SPP) would be implemented as part of a Construction Environmental Management Plan (CEMP) or similar during the construction phase to ensure that all reasonable precautions are taken to adhere to the relevant wildlife legislation. The SPP would include preconstruction surveys and good practice measures during construction. Pre-construction surveys would	Ensure the safeguarding of protected species known or likely to be in the area.

Table 6.4: Summary of Standard/Best Practice Mitigation

ID	Phase	Description	Purpose of Mitigation
		be used to update the outline SPP ahead of construction starting. The SPP would remain a live document to be updated as required and in agreement with the ECoW where changes to the distribution and status of protected species and features are recorded Outline SPP provided in Technical Appendix 6.6 (EIAR Volume 4).	
EC02	Pre-Construction Construction	A suitably qualified Ecological Clerk of Works (ECoW) would be appointed prior to the commencement of construction to advise the Applicant and the appointed Contractor on all ecological matters. The ECoW would be required to be present on-site during the construction phase and would carry out monitoring of works and briefings with regards to any ecological sensitivities on the Site to the relevant staff of the appointed Contractor and sub-contractors.	Ensure the appropriate implementation of ecological mitigation measures.
EC03	Pre-Construction Construction	Pre- and during-construction surveys carried out by an ECoW or suitably qualified ecologist would take place as part of the SPP.	Ensure the safeguarding of protected species known or likely to be in the area.
EC04	Pre-Construction; Construction	Any micro-siting of infrastructure would be based on a review of existing ecological data and the completion of pre-construction surveys, to take into consideration the potential for direct encroachment onto protected species features, sensitive habitats or GWDTEs, or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micro-siting would also take consideration of any buffer distances on protected features identified, as detailed within the SPP.	To ensure any micro-siting does not adversely affect any sensitive ecological features.
EC05	Pre-Construction; Construction	Construction works to proceed in accordance with the measures set out in the CEMP in relation to how the appointed Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIAR, the SPP, statutory consents and authorisations, and good industry practice and guidance for environmental management, including implementation of appropriate pollution prevention and biosecurity (particularly in relation to watercourses). Outline CEMP provided in Technical Appendix 2.1 (EIAR Volume 4).	Minimise impacts on habitats/protected species.
EC06	Construction	Biosecurity methods would be put in place to ensure there is no spread or release of signal crayfish including: - Boundaries should be clearly marked with appropriate signage for the catchment of water that flows into watercourses where signal crayfish are present versus those watercourses where signal crayfish are absent. - Separate plant should be used for operations in one catchment or another, or plant washed down if moved between these catchments.	To comply with legislation; prevent the introduction of signal crayfish into watercourses where the species is not currently known to have reached, and restrict the spread of the species across the Site.

Table 6.4: Summary of Standard/Best Practice Mitigation

ID	Phase	Description	Purpose of Mitigation
		• A drive through wheel wash should be set up at key sites to prevent potential spread between catchments. • Personnel working on or between watercourses should ensure their clothing and footwear are cleaned where appropriate to prevent spread. • All vehicles leaving the infested area must be thoroughly pressure-washed in a designated wash-down area before being used for other work. • Material/water left after vehicles have been pressure-washed must be contained, collected and disposed of appropriately.	
EC07	Operation	In line with best practice guidance on bats ²⁴ , the proposed Development would utilise the method of reduced rotation speed whilst idling by feathering for all turbines, to reduce collision risks to bats during the bat active period (April to October). The guidance notes that, " <i>The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50%</i> ". Given the known presence of high collision risk bat species on-site, this measure would be put in place from the start of the operational period of the Proposed Development. This mitigation measure does not result in any loss of turbine output.	To mitigate potential collision risks to bats during the bat active period.
EC08	Operation	Operational phase environmental management plans following relevant best practice and guidance would be in place during operation of the Proposed Development, these would for example include provisions for, but not limited to, ongoing pollution prevention control measures.	To ensure operational activities are carried out in a such a manner to reduce impacts on the environment.
EC09	Decommissioning	Based on the time between construction and decommissioning, the mitigation required at decommissioning cannot be accurately identified at this stage. However, it would include decommissioning surveys, adherence to the Decommissioning Environmental Management Plan (DEMP), presence of an ECoW and adherence to a SPP.	To minimise risks to habitats and species during the decommissioning phase of the Proposed Development.

6.4.4 As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented.

6.5 Summary of Sensitive Receptors

Scoped Out Receptors

6.5.1 In addition to those ecological features and effects already scoped out as detailed within **Section 6.2**, based on survey findings combined with the iterative design, standard mitigation measures and project assumptions, several potential effects on IEFs can be scoped out of further assessment based on the professional judgement of the EIA team and experience from

other relevant projects and policy guidance or standards. This includes effects from the construction and operational phases of the Proposed Development, as well as cumulative effects. The following sections detail the ecological features and effects that have been scoped out following desk-based assessment and Site surveys.

DESIGNATED SITES

- 6.5.2 Shiel Dod SSSI lies 160 m from the closest point of the proposed works footprint and as such no direct impacts are expected during construction. The potential for indirect impacts on the qualifying features of Shiel Dod SSSI are also scoped out of detailed assessment as the SSSI lies upstream of the planned works, and also on the basis of good practice measures to be implemented through a CEMP (mitigation ref: EC05) which would include measures for pollution prevention, the main indirect risk to the SSSI. Areas of highly eroded peatland habitat within Shiel Dod SSSI are included as part of restoration proposals within the Outline Biodiversity Enhancement Management Plan (OBEMP), **Technical Appendix 6.7 (EIAR Volume 4)** and therefore beneficial direct impacts are expected during operation and are scoped into the assessment.
- 6.5.3 The Site is considered to be sufficiently spatially separated from any other designated site with ecological qualifying features to preclude the potential for likely effects.

ANCIENT WOODLAND

- 6.5.4 No woodland removal or fragmentation would occur to any site listed on the AWI as a result of the Proposed Development. The closest stand of ancient woodland to the Site is 4.1 km; as a result of this distance, indirect effects are also scoped out. With standard/best practice mitigation in place through the CEMP (mitigation ref: EC05), which would include measures for pollution prevention, no pollution effects are anticipated. Effects on ancient woodland are therefore scoped out of the assessment.

TERRESTRIAL HABITATS

- 6.5.5 The following habitats (using Phase 1 Habitat terminology and codes)³⁷ are considered of less than 'Local' ecological value in the context of the Proposed Development as they are features which are relatively common and/or widespread locally and/or regionally (i.e., of low conservation value), which are, in some instances, present only in a very small area:
- Coniferous Plantation Woodland (A1.2.2);
 - Dense/Continuous Scrub (A2.1);
 - Scattered Coniferous Tree (A3.2);
 - Recently Felled Coniferous Woodland (A4.2);
 - Unimproved Acid Grassland and Semi-Improved Acid Grassland (B1.1 and B1.2 respectively);
 - Unimproved Neutral Grassland (B2.1);
 - Unimproved Calcareous Grassland (B3.1);
 - Improved Grassland (B4);
 - Marsh/Marshy Grassland (B5);
 - Tall Ruderal and Non-Ruderal (C3.1 and C3.2 respectively);
 - Bare Peat (E4);
 - Acid/Neutral Exposure (I1.4.1);
 - Arable (J1.1);

- Amenity Grassland (J1.2);
- Building (J3.6); and
- Bare Ground (J4).

6.5.6 Marsh/marshy grassland and wet heath are also scoped out of the assessment.

6.5.7 Marshy grassland covers 313.23 ha (28.8%) of the Site, and comprises MG10, M23, M25 and M27 communities in addition to non-NVC types *Carex*. spp. neutral sedge mire (Mx), *Juncus effuse* (Je) and *Juncus acutiflorus* (Ja) acid grassland communities.

6.5.8 Wet heath covers 169.77 ha (15.6%) of the Site, and is made up of the M15 community, sometimes as mosaics of M15 and acid grassland/blanket bog/acid neutral flush/wet modified bog. Many areas of the wet heath on Site were in a fairly poor and degraded condition, with poaching and intensive grazing noted (**Technical Appendix 6.2a, EIA Volume 4**).

6.5.9 The range of marshy grassland and wet heath communities within the Site are common habitat types locally, regionally and nationally, and the relatively small direct and indirect losses predicted, as per **Annex A** (included at the end of this Chapter), are of minor significance, particularly when noting the degraded condition. Many of the NVC communities underpinning these marshy grassland and wet heath communities are considered potential GWDTEs in line with SEPA guidance⁴⁰. However, designation as a GWDTE does not infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine conservation value in the ecology assessment. There is however a statutory requirement to consider GWDTEs, and the data gathered during the NVC surveys has been used to inform this assessment (see **Chapter 8: Hydrology, Hydrogeology, Geology and Soils, EIA Volume 2**).

6.5.10 A number of other habitats recorded within the Study Area are of local importance, some due to their listing as Annex I habitats or SBL Priority Habitats (see **Technical Appendix 6.2a (EIA Volume 4)**). However, as they occupy such small areas within the Study Area, they are species-poor examples, and/or any direct or indirect effects on the habitat would not occur or would be negligible in magnitude (see **Annex A**), all effects on them are scoped out of the assessment. These habitats include:

- Broad-Leaved Semi-Natural Woodland (A1.1.1);
- Broad-Leaved Plantation Woodland (A1.1.2);
- Scattered Broad-Leaved Tree (A3.1);
- Acid Dry Dwarf Shrub Heath (D1.1);
- Lichen/Bryophyte Heath (D3);
- Acid Neutral Flush (E2.1);
- Basic Flush (E2.2);
- Swamp (F1); and
- Standing Water and Running Water (G1 and G2 respectively).

AQUATIC HABITATS AND SPECIES

6.5.11 Effects on aquatic habitats including standing water, running water and fisheries interests are scoped out of the assessment, on the basis of sensitive scheme design and implementation of standard mitigation (e.g., the through the measures detailed in the CEMP (mitigation ref: EC05)).

- 6.5.12 Migratory salmonids are unable to access the Site as a result of natural barriers to migration identified downstream of the Proposed Development. The fish communities on the Site are dominated by low densities of trout, with 0+ fish indicating successful spawning in the vicinity of sampling sites (**Technical Appendix 6.5, EIAR Volume 4**).
- 6.5.13 The Proposed Development has the potential to impact adversely on water quality and hydrogeomorphology in the absence of mitigation. However, to avoid direct or indirect impacts on these features, a minimum 50 m buffer distance between infrastructure and watercourses has been maintained where possible, except where an access track watercourse crossing and/or other design constraints cannot be avoided to maintain this buffer.
- 6.5.14 Up to 11 watercourse crossings would be required (refer to **Technical Appendix 8.2, EIAR Volume 4**); these are all in the north of the Site where the watercourses feed either into Daer Water, upstream of the reservoir, or into Potrail Water. The design of access track watercourse crossings would comply with guidance⁴⁸ to minimise impacts on fish and their habitat.
- 6.5.15 As detailed previously, the standard/best practice mitigation includes that construction work would comply with a CEMP (mitigation ref: EC05) developed by the Principal Contractor, which would be monitored by a suitably experienced ECoW (mitigation ref: EC02) (outline CEMP provided in **Technical Appendix 2.1, EIAR Volume 4**). The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with best practice guidance⁴⁸. With this standard mitigation in place, potential water pollution impacts and associated effects from with the Proposed Development on watercourses, aquatic ecology and fish are considered unlikely, and therefore these pollution impacts are scoped out of further assessment. Further assessment of watercourses are provided in **Chapter 8: Hydrology, Hydrogeology, Geology and Soils (EIAR Volume 2)**. Implementation and monitoring of measures within the CEMP would be undertaken via a Water Quality and Fish Monitoring Plan (WQFMP) in line with Marine Scotland Science (MSS) guidelines⁴⁹.
- 6.5.16 The watercourse crossings proposed include watercourses where INNS signal crayfish are known to be present. Biosecurity methods (mitigation ref: EC06) would be in place to ensure there is no spread or release of signal crayfish. Mitigation in line with SEPA guidance⁵⁰ is detailed fully within **Technical Appendix 2.1** and **Technical Appendix 6.6 (EIAR Volume 4)**, including, among others:
- Signage should be erected to indicate watercourses where crayfish may be present;
 - Boundaries should be clearly marked with appropriate signage for the catchment of water that flows into watercourses where signal crayfish are present versus those watercourses where signal crayfish are absent;
 - Separate plant should be used for operations in one catchment or another, or plant washed down if moved between these catchments;
 - A drive through wheel wash should be set up at key sites to prevent potential spread between catchments;
 - Personnel working on or between watercourses should ensure their clothing and footwear are cleaned where appropriate to prevent spread;
 - All vehicles leaving the infested area must be thoroughly pressure-washed in a designated wash-down area before being used for other work; and

⁴⁸ NatureScot (2024). Good practice during wind farm construction.

⁴⁹ Scottish Government (2021). Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines.

⁵⁰ Available at: <https://www.sepa.org.uk/environment/biodiversity/invasive-non-native-species/>

- Material/water left after vehicles have been pressure-washed must be contained, collected and disposed of appropriately. All wash facilities including wastewater from washing vehicles, equipment or personnel should be managed in a responsible way so as not to not cause harm to the environment.

6.5.17 Vendace is the rarest freshwater fish in Britain, only present in three places in Scotland: Daer Reservoir, Loch Skeen and Loch Earn. Surveys of the Daer Reservoir suggest that a small, self-sustaining population may be present⁵¹. As a result of the extremely limited distribution of the species in the UK and the proportion of this that is potentially present within Daer Reservoir, a NCV of National is considered appropriate. However, it is considered that the CEMP (mitigation ref: EC05), including good practice mitigation for effective silt and pollution prevention and adhering to best practice guidance⁴⁸, renders significant effects on the characteristics of the Daer Reservoir unlikely. Furthermore, adherence to biosecurity measures (mitigation ref: EC06) to avoid the introduction of signal crayfish into watercourses upstream of Daer Reservoir, further reduces the likelihood of any effect on vendace as a result of the Proposed Development, and the species is therefore scoped out of further assessment.

PROTECTED SPECIES

- 6.5.18 Effects on badger and red squirrel are scoped out of the assessment due to the absence of protected features, lack of suitable habitat, limited desk-based assessment or field evidence within the Site, and/or lack of potential effects from the Proposed Development.
- 6.5.19 Effects on mountain and brown hare are scoped out of the assessment. One instance of mountain hare was recorded in the Survey Area, but implementation of the measures detailed in the standing guidance⁵¹ in combination with the species' mobile nature and ability to avoid disturbance, and the inclusion of hares in the Species Protection Plan (mitigation ref: EC01) (**Technical Appendix 6.5, EIAR Volume 4**) mean that there is no likelihood for significant impacts on hare species' and they are scoped out of the assessment.
- 6.5.20 Several common lizard sightings were noted within the Site, with potential hibernacula also identified. Reptiles are mobile species capable of avoiding disturbance, except during hibernation. Features identified as having potential as hibernacula for reptiles all lie outwith the footprint of the Proposed Development. However, if any feature deemed to have potential to shelter hibernating reptiles requires to be removed at any point in the construction process, it would be dismantled by hand under ECoW supervision (mitigation ref: EC02). Furthermore, reptiles are included in the SPP (mitigation ref: EC01) (**Technical Appendix 6.5, EIAR Volume 4**). There is no likelihood for significant impacts on the reptile populations and they are scoped out of the assessment.
- 6.5.21 Signs of water vole were recorded along two watercourses, with further mammal holes without diagnostic signs found within habitat potentially suitable for water vole. No water vole signs were found in the vicinity of any planned watercourse crossing, and elsewhere all infrastructure maintains a 50 m buffer from watercourses which exceeds the 10 m exclusion zone required by the standing advice⁵². The SPP (mitigation ref: EC01) (**Technical Appendix 6.5, EIAR Volume 4**) would include a requirement for pre-construction surveys (mitigation ref: EC03) to be carried out in any area where construction activities are planned near or across a watercourse to ensure that the species has not created new protected features. As

⁵¹ NatureScot (2024). Standing advice for planning consultations – Mountain Hare. Available at:

<https://www.nature.scot/doc/standing-advice-planning-consultations-mountain-hare>

⁵² NatureScot (2024). Standing advice for planning consultations – Water Voles. Available at: <https://www.nature.scot/doc/standing-advice-planning-consultations-water-voles>

such, there is no likelihood for significant impacts on water vole populations, and water vole are scoped out of the assessment.

- 6.5.22 Effects on otter are scoped out of the assessment. Numerous otter spraints were recorded along watercourses within the Site, but no protected features such as holts or couches were recorded, with limited suitable stretches of watercourse for such features to be created. The number of watercourse crossings is minimised, and sensitive design of crossings would allow free passage of otter. Otter would be included in the SPP (mitigation ref: EC01) (**Technical Appendix 6.5, EIAR Volume 4**). It is considered that with the application of standard mitigation during construction and operation, including pre-commencement surveys (mitigation ref: EC03), good practice measures to prevent breaches of legislation, there is no likelihood for significant impacts to otter populations arising from disturbance, displacement or accidental mortality during construction or operation of the Proposed Development. Otter is therefore scoped out of further assessment.
- 6.5.23 Effects on roosting bats are scoped out of the assessment. No potential maternity roosts and/or hibernation/swarming sites have been identified within at least 200 m plus rotor radius (i.e., 285 m). Low levels of bat activity were recorded during automated surveys, and the timing of calls, indicative of a potential nearby roost, were outwith the maternity roost season and comprised very low numbers of bats. One feature with high potential suitability for roosting bats, an occupied farmhouse with loose slates and gaps around the gable end, was recorded approximately 23 m of the planned Eastern Access track (this feature falls outwith the Site). As this feature exists within an occupied building directly adjacent to an existing road and farm track, it is considered unlikely that the construction and use of the access track would cause undue disturbance to any roosting bats occupying the feature. Three trees with low roosting suitability were recorded within 30 m of the Western Access track where upgrades to the existing track are proposed; due to current levels of disturbance, compliance with the SPP (mitigation ref: EC01), and distance from works, it is considered unlikely that the Proposed Development would cause disturbance to roosting bats were they to be present. As such, the risk of disturbance to and displacement of roosting bats, and damage to roosts, or removal of roosts is considered to be low and roosting bats are therefore scoped out of the assessment.
- 6.5.24 Construction would mainly take place during daylight hours during the season when bats are active (April to October inclusive), therefore any disturbance for foraging and commuting bats of any species is unlikely to occur or would likely be negligible in magnitude, and is therefore scoped out.
- 6.5.25 Bat activity for high collision risk bat species (common pipistrelle, soprano pipistrelle and *Nyctalus* spp.) recorded at the Site ranged from Low (median percentile) and Low to Medium (maximum percentile). This together with an overall Low/Lowest site risk assessment results in the overall risk to bats from collision with, or barotrauma from, moving turbine blades being classified as Low for these species. With the standard mitigation in place during operation, of reducing rotation speed at all wind turbines while idling during the bat active period (mitigation ref: EC07), it is considered that there are no likely significant operational or cumulative effects on high collision risk bat species, and as such these are scoped out.
- 6.5.26 A SPP (mitigation ref: EC01) (outline provided in **Technical Appendix 6.5, EIAR Volume 4**) would be implemented to enforce suitable mitigation measures to ensure compliance with protected species legislation during construction.
- 6.5.27 Adverse effects on all IEFs during operation of the Proposed Development have been scoped out. Maintenance of the Proposed Development would involve vehicular access along the

access tracks only, and any maintenance of turbines would be occasional, typically carried out by a small number of maintenance staff inside the turbines during normal working hours. This is unlikely to result in any operational effects on any species or habitats recorded at and around the Proposed Development.

OTHER SPECIES

DEER

- 6.5.28 Effects on deer are scoped out of the assessment. Roe, red, sika and fallow deer may be present in the locality of the Site. The main area of the Site, where the wind turbine array sits, is open and lacks stands of woodland. Both the Western and Eastern accesses pass through forested areas, and the substation lies close to the edge of a forestry block. Whilst it is possible that nearby forestry blocks may support populations of deer, it is considered that habitat within the Site has the potential to only support low numbers. Operational effects are not anticipated as there is no deer fencing around the Site and therefore deer may use and pass through uninhibited. Due to the extensive amount of similar suitable habitat in the surrounding land, and its accessibility, the small loss of grazing habitat associated with the Proposed Development is expected to be negligible to such a wide-ranging species. The size of the Proposed Development is not considered to pose a significant barrier to any local movements or migrations of deer.
- 6.5.29 Construction effects are expected to be minimal due to the timing of works (i.e., primarily during the day, outwith the period when deer are known to be more active), and the short-term nature of the construction period (approximately 18 months). If individuals are displaced during construction, there are suitable routes around the Site and deer would not be forced into areas of risk, including the A702, or into built up areas. As a result of the size and location of the Proposed Development, temporary construction period, the retention of woodland, minimal habitat loss and the extensive suitable habitat and commuting corridors locally within the Site and beyond, no adverse effects on deer are predicted. Due to minimal displacement expected outwith the Site during construction and operation, no adverse effects, through increased browsing/trampling on surrounding habitats are expected.

DECOMMISSIONING EFFECTS

- 6.5.30 Due to the distant time frame until their occurrence (>40 years), decommissioning effects are difficult to predict with confidence as the future baseline conditions of the Site and surrounding area, on which to base the assessment, is not yet known, and the proposals for decommissioning or repowering is not yet determined or known. In general, decommissioning effects are usually considered for the purposes of assessment to be similar to (or likely less than) those of construction effects (see **Section 6.6**) in nature and are likely to be of shorter duration.
- 6.5.31 Prior to decommissioning, a Decommissioning Plan would be prepared and submitted to the relevant statutory consultees, which would include the need for pre-works surveys to determine, for example, the status of any protected features which may have been created in the interim period.
- 6.5.32 Decommissioning of the Proposed Development would involve removal of all the aboveground infrastructure and restoration of the associated ground. Restoration would seek to return areas to their pre-construction habitat type, or as similar as feasible depending on local substrates, topography, hydrology etc. As a result, decommissioning would not lead to any further direct or indirect habitat losses above those already occurring during construction,

rather, it is predicted that due to restoration of habitats in these areas, there would be a net positive effect. Therefore, on this basis, decommissioning effects are not assessed further.

Scoped In Receptors

- 6.5.33 A summary of the remaining IEFs considered likely to be affected by the Proposed Development, and therefore scoped into the assessment, are set out in **Table 6.5** together with their associated nature conservation value (refer to **Technical Appendix 6.1 (EIAR Volume 4)**) and justification for inclusion.

Table 6.5: Nature Conservation Value (NCV) and Justification of Scoped in IEFs	
IEF (NCV)	Relevant Legislation/Guidance and Justification
Shiel Dod SSSI (National)	The Proposed Development would result in direct and potentially indirect habitat enhancement within the Shiel Dod SSSI through habitat enhancement proposed as part of the OBEMP (Technical Appendix 6.7, EIAR Volume 4). The SSSI is designated for its assemblage of upland vegetation communities representative of the Southern Uplands. The latest assessed condition of the SSSI was 'favourable maintained' as of 6 October 2009. The most important habitats included within the upland assemblage are: blanket bog; subalpine dry dwarf-shrub heath; and calcareous types of spring head, rill and flush²⁵.
Blanket Bog and Wet Modified Bog (Local)	The Proposed Development would result in direct and potentially indirect habitat loss for blanket bog and wet modified bog habitats. Blanket bog covers 115.06 ha (10.6%) of the Study Area, with wet modified bog covering a further 34.81 ha (3.2%) (Annex A). Both habitats are also present outwith the Site Boundary, including within Shiel Dod SSSI which lies immediately to the south. Blanket bog is widespread throughout the Study Area, with more contiguous areas at higher elevations and watershed plateaus in the west and south of the Study Area, and smaller scattered patches at lower elevations in the east and north where it commonly transitions and mosaics with wet modified bog. The priority peatland blanket bog communities present include M17 and M19 both as pure stands and within mosaics. Infrequent records of M2 and M3 bog pool communities were also made. These communities within the Site are in relatively poor condition, having been impacted through grazing and drainage. Wet modified bog communities represented within the Study Area were mainly M25a⁺, with smaller areas of M20 noted. Wet modified bog appears to have been derived from blanket bog through a long history of grazing. These habitats are associated with SBL blanket bog and Annex I type 7130 blanket bog habitat, however these mire habitats within the Study Area are generally considered modified/degraded due to effects such as drainage, grazing and self-seeded conifer invasion (see Technical Appendix 6.2a and 6.2b, EIAR Volume 4) for further details). The Carbon and Peatland Map 2016¹⁴ (Figure 6.2, EIAR Volume 3a) shows that there are some areas of Class 1 and Class 2 peatland within the Site which suggests that potentially nationally important peatlands could be present. The survey has confirmed the presence of peatland. However, it is recognised that this definition is not solely for nature conservation and so not directly applicable to evaluating the value of a peatland. Despite some of these communities being associated with Annex I and SBL blanket bog classifications, the habitat within the Study Area is a degraded resource in relatively poor condition that has been impacted over time in several ways. As a result of its condition in addition to size, distribution and fragmented nature, the habitat within the Study Area is not considered to be Nationally or Regionally important. Therefore, assigning a Nature Conservation Value higher than Local is not deemed appropriate. In addition, mire habitat of this quality and greater is relatively widespread across the local area, which further reduced the relative value of this habitat within the Site.

6.6 Assessment of Likely Effects

Potential Construction Effects

- 6.6.1 This section provides an assessment of the likely effects of the construction of the Proposed Development upon the scoped in IEFs.

Habitats

- 6.6.2 The most tangible effect during construction of the Proposed Development would be direct habitat loss due to the construction of infrastructure, such as new tracks, turbines, hardstandings, laydown areas, compounds, borrow pits, substation and BESS. Much of this infrastructure would be permanent, however the construction compound, temporary crane hardstandings and borrow pits would be restored at the end of construction.
- 6.6.3 There may also be some indirect habitat losses to wetland habitats due to localised drainage effects. For the purposes of this assessment, it is assumed that wetland habitat losses due to indirect drainage effects may extend out to 10 m from the proposed infrastructure (i.e., in keeping with precautionary indirect drainage assumptions within SEPA carbon calculator guidance (SEPA, 2011⁵³). It is expected that any indirect drainage effects would only impact wetland habitats (estimated losses presented in **Annex A**).
- 6.6.4 Temporary habitat losses due to the creation of temporary infrastructure and two proposed borrow pit excavation areas (the full search area extents of which are unlikely to be used or required) have been calculated separately. These have been considered separately to permanent infrastructure as although these areas would be restored at the end of the construction period and therefore would not show a loss in habitat extent, the habitat type resulting after restoration may not be the same as the original due to changes in topographical or hydrological conditions. In particular, areas of landtake for this temporary infrastructure may represent permanent losses for certain wetland habitat types due to the effects on the structure and function of the habitat type, and the complexities and long timescales involved in restoring or re-creating these particular habitat types.
- 6.6.5 **Table 6.6** details the estimated relative losses expected to occur to scoped in habitats (i.e., blanket bog and wet modified bog) for all new permanent and temporary infrastructure, with habitat loss estimated for all habitat types presented in **Annex A**.

⁵³ Scottish Government (2011). User Guidance: Windfarm Carbon Calculator Web Tool.

Table 6.6: Estimated Loss of IEF Habitats and study area for Permanent and Temporary Infrastructure

Habitat Type	Extent in Site (ha)	NVC Community or Habitat Type ⁵⁴	Direct Habitat Loss (ha) in study area	Direct Habitat Loss as a % of Habitat Type	Indirect Habitat Loss (ha) in study area	Indirect Habitat Loss as a % of Habitat Type in study area
Permanent						
Blanket Bog	115.06	M2, M3, M17a-c, M19a	2.68	2.3%	5.07	4.4%
Wet Modified Bog	34.81	M20, M25a^	0.31	0.9%	0.66	1.9%
Temporary						
Blanket Bog	115.06	M2, M3, M17a-c, M19a	3.40	3.0%	N/A	N/A
Wet Modified Bog	34.81	M20, M25a^	0.32	0.9%	N/A	N/A
Totals	149.88		6.71	4.48	5.73	3.82

BLANKET BOG/WET MODIFIED BOG

- 6.6.6 **Effect:** Impacts upon blanket bog and wet modified habitats would be direct (through permanent and temporary habitat loss) and indirect (through potential drying effects upon neighbouring bog habitats) occurring from the construction phase into the operational phase. Direct loss would occur in areas where permanent infrastructure such as tracks, wind turbine foundations, and permanent hardstandings are sited on these habitat types. The excavation of these habitat types for temporary infrastructure would also likely lead to the losses of blanket bog and wet modified bog due to the long-term effect on the ecological and hydrological structure and function of these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure (precautionarily around 10 m from infrastructure is assumed⁵³).
- 6.6.7 Fragmentation could involve the creation of smaller areas of habitat which in turn could impair the functioning and reduce the resilience of essential hydrological processes. This could make the impacted habitat more vulnerable to future decline in condition and potentially lead to a transition to a different habitat type such as blanket bog to wet modified bog/wet heath or wet modified bog to dry modified bog/wet heath, or more subtle sub-community shifts.
- 6.6.8 For blanket bog and wet modified bog, fragmentation effects are a function of the extent of the hydrological unit, location of impact within the unit and magnitude of direct and indirect impact in the context of the hydrological unit. **Figure 6.3 (EIAR Volume 3a)** shows that blanket bog and wet modified bog habitats have for the most part been avoided through design and exist together and with other wetland habitats (e.g., mires, flushes and marshy grasslands) in large expansive hydrologically connected mosaics across the Study Area and in the wider local area. The large scale of these wetland habitat mosaics reduces the likelihood that small, fragmented habitat patches would be created. No small-scale habitat fragments

⁵⁴ Only specific IEF habitats, communities or features subject to habitat losses are presented within this table. Any IEF communities not listed here are not subject to any predicted direct or indirect habitat losses. Full details of habitat losses for all habitat types are presented in **Annex A**.

appear to be created by the location of tracks and other infrastructure, and where some wetland habitats are subject to infrastructure there are good practice construction methods that would allow the maintenance of sub-surface hydrological connectivity between areas. It is therefore unlikely that the potential effects of fragmentation would lead to further loss of blanket bog and wet modified bog in addition to that predicted to occur as a result of direct loss and precautionary indirect loss figures detailed above.

- 6.6.9 Nature Conservation Value: Local (as detailed in **Table 6.5**).
- 6.6.10 **Conservation Status:** Conservation Status of this habitat as assessed in the 2019 JNCC report by the UK on blanket bog is 'Unfavourable Bad' and 'Stable' at the UK level⁵⁵.
- 6.6.11 **Magnitude of Effect:** The UK has an estimated 2,182,200 ha of blanket bog⁵⁵ of which around 1,759,000 to 1,800,000 ha is in Scotland⁵⁶ (approximately 23% of the land area).
- 6.6.12 Blanket bog covers 115.06 ha (10.6 %) of the Study Area, with M2, M3, M17 and M19 (mostly M17) NVC communities comprising the bulk of the blanket bog vegetation (see **Annex A**). As per **Table 6.6**, the direct habitat loss for blanket bog is predicted to be 2.68 ha due to permanent infrastructure with up to an additional 3.4 ha due to temporary works areas and proposed borrow pit excavation areas. This results in a potential total direct loss of 6.08 ha, equivalent to 5.30% of the blanket bog within the Study Area (i.e., within the Site Boundary).
- 6.6.13 Wet modified bog covers 34.81 ha (3.2%) of the Study Area and is comprised of lower quality M25a^ and M20. As per **Table 6.6**, the direct habitat loss for wet modified bog is predicted to be 0.31 ha due to permanent infrastructure with up to an additional 0.32 ha due to the temporary works areas and borrow pit excavation areas. This results in a potential total direct loss of 0.63 ha, equivalent to 1.80% of the wet modified bog within the Study Area.
- 6.6.14 For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog, direct losses amount to 2.99 ha for permanent infrastructure and 3.72 ha for temporary works areas and borrow pit excavation areas: a total of 6.71 ha, or 4.48%, of the combined resource within the Study Area.
- 6.6.15 In addition, there may be some indirect losses because of the zone of drainage around infrastructure. The actual distance of the effects of drainage on a peatland is highly variable and depends on various factors such as the type of peatland and its characteristics and properties of the peat; the type, size distribution and frequency of drainage feature; and whether the drainage affects the acrotelm, penetrates the catotelm, or both. Consequently, drainage effects can be restricted to just a few metres around the feature or extend out to tens of metres, or further (e.g., see review within Landry & Rochefort (2012)⁵⁷). The hydraulic conductivity of the peatland is one of the key variables which affect the extent of drainage. In general, less decomposed more fibric peatlands (which tend to be found commonly in fen type habitats) generally have a higher hydraulic conductivity and drainage effects can extend to around 50 m, whilst in more decomposed (less fibrous) peat drainage effects may only extend to around 2 m. Blanket bog habitats commonly are associated with more highly decomposed peats (Nayak et al. 2008⁵⁸). As detailed in **Technical Appendix 8.4 (EIAR Volume 4)**, the peat coring data for the Site confirmed predominantly low coarse fibre content

⁵⁵ JNCC (2019). Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019. H7130 - Blanket bogs, United Kingdom.

⁵⁶ JNCC (2019). Article 17 Habitats Directive Report 2019: Species Conservation Status Assessments 2019. H7130 - Blanket bogs, Scotland.

⁵⁷ Landry, J. & Rochefort, L. (2012). The Drainage of Peatlands: Impacts and Rewetting Techniques. Peatland Ecology Research Group, Université Laval, Quebec

⁵⁸ Nayak, R.A., Miller, D., Nolan, A., Smith, P., Smith, J. (2008). Calculating carbon savings from wind farms on Scottish peat lands - A New Approach.

and therefore low hydraulic conductivity. For this assessment, indirect effects are precautionarily assumed to extend out to 10 m from infrastructure⁵³.

- 6.6.16 As per **Table 6.6**, if indirect drainage effects are fully realised out to 10 m around permanent infrastructure in all blanket bog and wet modified bog areas, then the total predicted potential habitat modification or losses increase for blanket bog by 5.07 ha and 0.66 ha for wet modified bog.
- 6.6.17 This worst-case scenario of direct and indirect habitat loss for permanent and temporary works areas is an overall total of 11.15 ha or 9.69% of the Study Area's blanket bog, and 1.29 ha or 3.71% of the Study Area's wet modified bog. For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog, direct and potential indirect losses for permanent and temporary works areas overall amount to 12.44 ha, or 8.30% of the combined resource within the Study Area.
- 6.6.18 It is considered highly unlikely that indirect drainage effects of this scale (i.e., out to 10 m either side of all permanent infrastructure) would occur or would have such an effect on the habitat as to result in any notable effect on the type of bog present or shifts to a lower conservation value habitat type (such as acid grassland for example). For instance, Stewart & Lance (1991)⁵⁹ in their study found that a lowering of the water table next to drains was slight and confined to just a few metres either side of the drain, on sloping ground the uphill zone of drawdown was even narrower. Subtle variations in plant species abundance were noted, with species dependent on high water-tables having a lower cover-abundance near to drains, and species with drier heathland affinities having higher cover than at places farther away. However, there were no wholesale changes in vegetation or the species assemblage; for instance, declines in *Sphagna* cover were highly localised and took nearly 20 years to achieve statistical significance. Anecdotal observations from wind farms around Scotland also suggest that bog habitats readily persist around infrastructure and within this 10 m zone of possible influence.
- 6.6.19 It should also be noted that the predicted indirect losses due to drainage are calculated in GIS and based on the habitat survey mapping, there may be small-scale local specific factors such as those relating to natural breaks in habitat type, hydrology, geology or topography, or the presence of non-wetland habitats that act as a barrier or buffer, that would prevent the full predicted indirect drainage effects from materialising.
- 6.6.20 Overall, evidence suggests that if some drainage effects materialise locally around infrastructure due to the Proposed Development the most likely effect would not be a major change in overall bog habitat type, but rather a potential small scale near-zone change in vegetation micro-topography, certain species cover, or abundance that may result in a subtle NVC community or sub-community shift, and which may only be apparent in the long term. If severe indirect drying effects are observed long term, then wet modified bog/blanket bog may transition to wet heath (e.g., NVC type M15), dry modified bog, or dry heath. Wet and dry heaths are still habitats of conservation interest, being Annex I, UKBAP and SBL Priority Habitats also.
- 6.6.21 The largest area where infrastructure impacts are predicted on blanket bog correlates with the severely eroding peatland south and south-east of Hirstane Rig, where the peatland was recorded as being in a degraded state with numerous peat hags and/or gullies during PCA surveys (refer to **Technical Appendix 6.2b, EIAR Volume 4** and **Figure 6.5, EIAR Volume**

⁵⁹ Stewart, A. J. A. and Lance, A. N. 1991: Effects of moor-draining on the hydrology and vegetation of northern Pennine blanket bog. *Journal of Applied Ecology* 28, 1105-1117.

3a). With the peatland in this eroded and modified state it is considered even less likely that indirect effects would occur out to 10 m from infrastructure.

- 6.6.22 When considering the scale of the above worst-case habitat losses for the Proposed Development (i.e., direct and precautionary indirect effects on up to 8.30% of the combined blanket bog and wet modified bog within the Study Area) and accounting for the relative abundance, distribution and quality of the blanket bog and wet modified bog within the Study Area and locally to the Site, an impact magnitude of low spatial and long-term temporal is appropriate.
- 6.6.23 **Significance of Effect:** Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Impact, the effect significance is considered to be **Minor** adverse and **Not Significant** under the EIA Regulations.

Potential Operational Effects

- 6.6.24 All likely direct and indirect effects on habitats have been considered in the Predicted Construction Effects section above.
- 6.6.25 Although the majority of habitat loss is associated with infrastructure required for the operation of the Proposed Development (rather than temporary construction infrastructure), the physical loss of habitat would occur during the construction stage and is therefore considered above.
- 6.6.26 Potential indirect effects on wetland habitats, if realised, would largely occur during the operational phase as potential drying effects become established. However, for ease and clarity assessing effects on habitats, these are considered together within Predicted Construction Effects.

Shiel Dod SSSI

- 6.6.27 **Effect:** Impacts upon the Shiel Dod SSSI would be direct (through habitat restoration) and indirect (through potential wetting effects upon neighbouring bog habitats) occurring from habitat enhancement works proposed as part of the OBEMP (**Technical Appendix 6.7, EIAR Volume 4**).
- 6.6.28 The OBEMP aims to restore the most eroded/degraded peatland habitat where there has been historical draining, including areas within the Shiel Dod SSSI⁶⁰ and away from operational infrastructure, and where haggling and drainage are present (as confirmed provided by NatureScot)⁶¹. A wider area for more general moorland habitat management, through grazing management, is also proposed within the SSSI.
- 6.6.29 The management objective for the SSSI is to maintain and where possible, enhance the extent of the upland habitat assemblage²⁵. The proposed habitat enhancement works have been designed to align with this by supporting the long-term recovery and resilience of the notified upland communities. With sensitive implementation and adherence to best-practice management, the works are expected to contribute positively to the SSSI's conservation outcomes while avoiding adverse effects on its notified features.
- 6.6.30 Nature Conservation Value: National (as detailed in **Table 6.5**).

⁶⁰ Within the Land Ownership Boundary of the Applicant as shown on Figure 6.15, EIAR Volume 3a.

⁶¹ Macmillan, S. NatureScot Operations Officer – West Central Scotland. Email to Robinson, N., 19 June 2025.

- 6.6.31 **Conservation Status:** The latest assessed condition of the SSSI was 'favourable maintained' as of 6 October 2009. However, aerial imagery shows clear areas of erosion/hagging as well as drainage ditches within the site.
- 6.6.32 **Magnitude of Effect:** The SSSI covers an area of 1185.77 ha. The OBEMP (**Technical Appendix 6.7, EIAR Volume 4**) proposes an area of 40.57 ha for peatland restoration (increasing to 46.93 ha if indirect impacts up to 10 m are considered) within the Shiel Dod SSSI (approximately 3.42%, or 3.96% considering indirect, of the area of the SSSI). The moorland habitat management area covers a further 226 ha (totalling approximately 22.48% or 23.02% of the SSSI area). Areas included within the final BEMP would be based on additional survey work and consultation and therefore may differ from these numbers.
- 6.6.33 **Significance of Effect:** Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Impact, the effect significance is considered to be **Minor** beneficial and **Not Significant** under the EIA Regulations.

Potential Cumulative Effects

- 6.6.34 The primary concern regarding the assessment of cumulative effects is to identify situations where effects on habitats or species populations that may be non-significant from individual developments, are judged to be significant when combined with nearby existing or proposed projects. In the interests of focusing on the potential for similar significant effects, this assessment considers the potential for cumulative effects with other wind farm developments that are consented or at application submitted stage (as those sites that are operational or under construction are considered part of the baseline) within 5 km of the Site. Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.
- 6.6.35 Small projects with three or fewer turbines have also been excluded from the cumulative assessment as often these projects are not subject to the same level of detail of assessment, and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IEFs assessed.
- 6.6.36 Three relevant wind farm developments were identified within 5 km of the Site: Rivox Wind Energy Hub (29 turbines, application submitted July 2023, with Additional Information submitted February 2025), Daer Wind farm (up to 17 turbines, application submitted May 2021, with Additional Information submitted December 2025) and Lion Hill Wind Farm (up to 4 turbines, application submitted June 2020). No other consented or application developments fulfilling the above criteria are present within 5 km of the Proposed Development.
- 6.6.37 In general, for most wind farm developments that are operational or consented, mitigation and/or additional management/restoration/enhancement/creation of habitats is usually proposed to compensate and offset any effects on IEFs. These management areas tend to be much larger than the area of predicted loss. National Planning Framework (NPF) 4⁶² Policy 3 states that major developments should demonstrate significant biodiversity enhancement in addition to mitigation. In addition, NatureScot guidance³⁹ specifically relating to developments on peatland advises significant compensation and enhancement for impacts on peatland habitats.

⁶² Scottish Government (2023). National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

- 6.6.38 Giving consideration to the IEFs scoped in for the Proposed Development (blanket bog/wet modified bog), it is noted that the RivoX application²⁰ includes standard mitigation and the Outline Restoration and Enhancement Plan includes peatland restoration and enhancement, including plantation woodland to bog creation, creation of woodland fringe/bog habitat mosaic, and heath to bog habitat creation, through drain blocking and supplementary planting where required. The Daer application²¹ concludes a low negative (not significant) effect on blanket and modified bog, with a Habitat Management Plan proposed, aiming to restore areas of modified and damaged bog habitats within the Proposed Development Area; this is considered to reduce the magnitude of the residual impacts to peatland habitats to low beneficial, not significant. The Lion Hill application¹⁹ notes a very small proportion (less than 1%, 0.048 ha) of blanket bog habitat loss as a result of the project.
- 6.6.39 Based on the above, it is considered unlikely that any significant cumulative effects at a local or regional level would arise as a consequence of the Proposed Development adding to habitat loss associated with other projects. This is due to the small scale and not significant levels of habitat losses associated with the Proposed Development and the Applicant's commitment to the delivery of a BEMP, which would include provisions for the maintenance, restoration and enhancement of bog habitats (amongst a suite of other biodiversity enhancement proposals in line with NPF4, as per **Technical Appendix 6.7, EIAR Volume 4** and **Figure 6.14, EIAR Volume 3a**). This ensures the Proposed Development would not contribute to long-term adverse effects on the scoped in IEFs of blanket bog and wet modified bog locally or regionally.
- 6.6.40 Based on the commitment of the Applicant to implement the BEMP over the operational phase of the Proposed Development, as well as similar requirements for other wind farm projects, the long-term cumulative effect significance is considered likely to be **Negligible-Minor** beneficial and **Not Significant** under the EIA Regulations.

6.7 Specific Mitigation

- 6.7.1 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 6.7.2 No specific mitigation is required as the embedded and standard mitigation measures result in no significant effects as a result of the Proposed Development. However, additional compensation and enhancement measures, such as peatland restoration, are proposed for the operational phase as part of the Proposed Development's Outline BEMP (mitigation ref: EC10) as detailed in **Technical Appendix 6.7 (EIAR Volume 4)** and outlined below.

6.8 Enhancement

- 6.8.1 Enhancement and restoration of habitats through the delivery of a BEMP during the operational phase would reduce effects on habitats further. Overall, the BEMP would aim to achieve significant biodiversity enhancement at the Proposed Development, in line with objectives outlined in NPF4 Policy 3⁶² (further discussed in Scottish Government planning guidance for biodiversity⁶³), the Onshore Wind Policy Statement⁶⁴, and the Scottish Biodiversity Strategy to 2045⁶⁵.
- 6.8.2 The BEMP would include provisions for the protection, maintenance, restoration and/or enhancement of blanket bog and peatland and upland habitats locally (including within the

⁶³ Scottish Government (2025). Planning guidance: biodiversity. Available at: <https://www.gov.scot/publications/scottish-government-planning-guidance-biodiversity/documents>

⁶⁴ Scottish Government (2022). Onshore Wind Policy Statement.

⁶⁵ Scottish Government (2024). Scottish Biodiversity Strategy to 2045.

Shiel Dod SSSI) and within the Site. Furthermore, the BEMP would deliver additional proposals including native broadleaved woodland and riparian corridor creation, and grassland enhancement to benefit waders and biodiversity in general. The Outline BEMP is provided in **Technical Appendix 6.7 (EIAR Volume 4)** and shown on **Figure 6.14 (EIAR Volume 3a)**.

- 6.8.3 The Outline BEMP is based on several land parcels or areas for each respective habitat management and biodiversity enhancement proposal. Specifically, with respect to blanket bog/wet modified bog, the Outline BEMP includes for a scheme of peatland restoration within Habitat Management Unit (HMU) B, targeting the most eroded/degraded peatland habitat, with a wider area, HMU A, proposed for further moorland habitat management for enhancement. HMU A includes 181.70 ha of blanket bog/wet modified bog and bare peat habitat, including mosaics of these with other habitats; with HMU B including 92.12 ha of these habitats (habitat breakdowns detailed in **Technical Appendix 6.7, EIAR Volume 4**).

6.9 Assessment of Residual Effects

- 6.9.1 No significant residual effects are identified, with all scoped in IEFs assessed as having **Minor** adverse effects, or less, and which are **Not Significant** (as per the assessment sections above), and prior to the implementation of additional enhancement presented in the Outline BEMP within **Technical Appendix 6.7 (EIAR Volume 4)**.
- 6.9.2 Whilst no significant adverse effects are concluded upon the IEFs scoped into assessment, the implementation of the BEMP in relation to specific peatland restoration and wider moorland management would likely result in operational **Minor beneficial** effects for scoped in IEFs (blanket bog/wet modified bog).

6.10 Monitoring

- 6.10.1 No significant residual effects are predicted; however, likely further future survey requirements and monitoring are noted here.
- 6.10.2 Pre-construction surveys would be undertaken to check for any new protected species or features in the vicinity of the construction works. The results of the pre-construction surveys would be used to update the outline SPP ahead of construction starting (**Technical Appendix 6.6, EIAR Volume 4**). The SPP would remain a live document to be updated as required and in agreement with the ECoW where changes to the distribution and status of protected species and features are recorded.
- 6.10.3 Operational phase monitoring for certain habitats and species would be undertaken as part of the final BEMP; see outline proposals within **Technical Appendix 6.7 (EIAR Volume 4)**.
- 6.10.4 An integrated water quality and fish population monitoring programme would be implemented pre-construction, during construction, and post-construction on relevant watercourses in line with prevailing relevant guidance⁴⁹.
- 6.10.5 Further survey and monitoring effort may be implemented by Scottish Ministers, if consent is granted.

6.11 Summary of Assessment

- 6.11.1 A summary of the assessment for the potential significant effects on blanket bog/wet modified bog and the Shiel Dod SSSI is included in **Table 6.7** below.

Table 6.7: Summary of Assessment

Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Direct and Indirect Loss and Modification of Blanket Bog/Wet Modified Bog Habitat	EC02 EC04 EC05 No specific mitigation required as with embedded/standard mitigation measures no significant effects.	Standard mitigation includes presence of an ECoW, micro siting of infrastructure, and adherence to a CEMP. Additional compensation and enhancement measures, such as peatland restoration, are proposed for the operational phase as part of the Outline BEMP (Technical Appendix 6.7, EIAR Volume 4) .	Planning condition. Appointment of ECoW. CEMP submitted to and approved by SLC in consultation with NatureScot. Delivery of a BEMP Technical Appendix 6.7 (EIAR Volume 4) .	Minor adverse Not Significant	NA
Operation					
Shiel Dod SSSI – Restoration and Enhancement of Peatland Habitat	No specific mitigation is required as no significant effects.	No specific mitigation is required. Peatland restoration and enhancement within the SSSI are proposed as part of the Outline BEMP (Technical Appendix 6.7, EIAR Volume 4) .	Planning condition. Delivery of a BEMP Technical Appendix 6.7 (EIAR Volume 4) .	Minor beneficial Not Significant	Operational phase monitoring for certain habitats and species would be undertaken as part of the final BEMP.
Decommissioning					
N/A					
Cumulative					
Direct and Indirect Loss and Modification of Blanket Bog/Wet Modified Bog Habitat	EC02 EC04 EC05 No specific mitigation required as with embedded/standard mitigation measures no significant effects.	Standard mitigation includes presence of an ECoW, micro siting of infrastructure, and adherence to DEMP. Additional compensation and enhancement measures, such as peatland restoration, are proposed for the operational phase as part of the Outline BEMP (Technical Appendix 6.7 (EIAR Volume 4)) .	Planning condition. Appointment of ECoW. CEMP submitted to and approved by SLC in consultation with NatureScot. Delivery of a BEMP Technical Appendix 6.7 (EIAR Volume 4) .	Minor adverse Not Significant	Operational phase monitoring for certain habitats and species would be undertaken as part of the final BEMP.

Annex A: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations

Table 6.8: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations

Po		Site Boundary / Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats) ⁶⁶	Temporary Direct Loss
Phase 1 Description (Code)	NVC	Phase 1 Area (ha)	Phase 1 % of Study Area	NVC Area (ha)	% of NVC Type within Study Area	NVC Area (ha)	NVC Area (ha)	NVC Area (ha)
Totals		1088.06	100	1088.06	100	17.08	17.86	23.88
Broad-Leaved Semi-Natural Woodland (A1.1.1)	W7	1.05	0.1%	0.98	0.1%	0.00	0.0%	0.00
	W11			0.01	0.0%	0.00	0.0%	0.00
	W11a			0.02	0.0%	0.00	0.0%	0.00
	W4a			0.03	0.0%	0.00	0.0%	0.00
Broad-Leaved Plantation Woodland (A1.1.2)	YBP	14.49	1.3%	0.24	0.0%	0.00	0.0%	0.00
	W7(p)			0.73	0.1%	0.00	0.0%	0.00
	W4(p)			13.52	1.2%	0.14	0.0%	0.07
Coniferous Plantation Woodland (A1.2.2)	CP	11.33	1.0%	7.35	0.7%	0.23	0.0%	0.06
	YCP			3.98	0.4%	0.11	0.00	0.01
Dense/Continuous Scrub (A2.1)	W21	0.01	0.0%	0.01	0.0%	0.00	0.00	0.00
Scattered Broad-Leaved Tree (A3.1)	SBT	0.67	0.1%	0.67	0.1%	0.03	0.00	0.01
Scattered Coniferous Tree (A3.2)	SCT	0.44	0.0%	0.44	0.0%	0.02	0.00	0.01
Recently Felled Coniferous Woodland (A4.2)	CF>W4	0.34	0.1%	0.00	0.0%	0.00	0.00	0.00
	CF>M25a			0.00	0.0%	0.00	0.00	0.00
	CF>M15b			0.04	0.0%	0.00	0.00	0.00
	CF>Je			0.10	0.0%	0.00	0.00	0.00

⁶⁶ Based upon the precautionary 10 m indirect drainage assumption (SEPA, undated).

Table 6.8: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations

Po		Site Boundary / Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats) ⁶⁶	Temporary Direct Loss
	CF>H9			0.09	0.0%	0.00	0.00	0.00
	CF>U4a			0.11	0.0%	0.00	0.00	0.00
	CF>U2			0.00	0.0%	0.00	0.00	0.00
Unimproved Acid Grassland (B1.1)	U4a	275.27	25.3%	5.64	0.5%	0.09	0.00	0.03
	U4			75.06	6.9%	1.18	0.00	2.60
	U5			136.28	12.5%	2.28	0.00	4.68
	U6a			3.69	0.3%	0.07	0.16	0.08
	U5b			6.68	0.6%	0.12	0.00	0.09
	U6			20.30	1.9%	0.44	0.60	0.89
	U5a			27.62	2.5%	0.39	0.00	0.54
Semi-Improved Acid Grassland (B1.2)	U4b	19.43	1.8%	19.43	1.8%	0.36	0.00	0.07
Unimproved Neutral Grassland (B2.1)	MG9	4.02	0.4%	2.65	0.2%	0.08	0.10	0.05
	MG1c			1.37	0.1%	0.01	0.00	0.01
Unimproved Calcareous Grassland (B3.1)	CG10a	9.78	0.9%	9.60	0.9%	0.01	0.02	0.01
	CG10			0.18	0.0%	0.00	0.00	0.00
Improved Grassland (B4)	MG6	15.34	1.4%	15.34	1.4%	0.00	0.00	0.00
Marsh/Marshy Grassland (B5)	M25a	313.23	28.8%	159.28	14.6%	2.27	3.28	4.17
	Mx			0.07	0.0%	0.00	0.00	0.00
	MG10a			10.11	0.9%	0.08	0.31	0.01
	MG10(Ja)			0.07	0.0%	0.00	0.02	0.00
	M25b			35.46	3.3%	0.00	0.00	0.00
	M23b			8.62	0.8%	0.01	0.06	0.01
	M27			0.84	0.1%	0.00	0.01	0.00

Table 6.8: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations

Po		Site Boundary / Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats) ⁶⁶	Temporary Direct Loss
	JaN			0.34	0.0%	0.00	0.00	0.00
	Je			12.54	1.2%	0.20	0.48	0.25
	M23a			45.81	4.2%	0.09	0.26	0.19
	Ja			40.11	3.7%	2.05	2.55	1.87
Tall Ruderal (C3.1)	OV25	1.77	0.2%	1.64	0.2%	0.03	0.00	0.02
	OV27			0.13	0.0%	0.00	0.00	0.00
Non-Ruderal (C3.2)	U16c	9.93	0.9%	6.05	0.6%	0.17	0.28	0.40
	U16			3.87	0.4%	0.16	0.06	0.48
Acid Dry Dwarf Shrub Heath (D1.1)	H18b	21.48	2.0%	5.71	0.5%	0.00	0.00	0.00
	H18a			13.21	1.2%	0.07	0.00	0.11
	H18			2.51	0.2%	0.05	0.00	0.04
	H9			0.05	0.0%	0.00	0.00	0.00
Wet Dwarf Shrub Heath (D2)	M15a	169.77	15.6%	61.35	5.6%	0.06	0.12	0.07
	M15b			96.72	8.9%	1.21	2.16	2.24
	M15d			9.77	0.9%	0.00	0.00	0.00
	M15c			1.93	0.2%	0.07	0.05	0.13
Lichen/Bryophyte Heath (D3)	H14	0.21	0.0%	0.21	0.0%	0.00	0.00	0.00
Blanket Bog (E1.6.1)	M19a	115.06	10.6%	0.35	0.0%	0.01	0.04	0.01
	M19			0.15	0.0%	0.00	0.00	0.00
	M17c			86.35	7.9%	2.25	3.90	3.14
	M17b			12.83	1.2%	0.18	0.41	0.18
	M17a			12.08	1.1%	0.20	0.60	0.07
	M17			0.86	0.1%	0.00	0.00	0.00
	M2			1.36	0.1%	0.02	0.06	0.01
	M19b			0.00	0.0%	0.00	0.00	0.00

Table 6.8: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations

Po		Site Boundary / Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats) ⁶⁶	Temporary Direct Loss
	M2b			0.03	0.0%	0.00	0.00	0.00
	M3			1.05	0.1%	0.02	0.06	0.01
Wet Modified Bog (E1.7)	M25a^	34.81	3.2%	32.95	3.0%	0.30	0.55	0.30
	M20			1.86	0.2%	0.01	0.11	0.02
Acid Neutral Flush (E2.1)	M32a	52.74	4.8%	0.00	0.0%	0.00	0.00	0.00
	M4			1.38	0.1%	0.00	0.00	0.00
	M6c			8.97	0.8%	0.02	0.13	0.01
	M6d			42.32	3.9%	0.91	1.47	0.80
	M32			0.07	0.0%	0.00	0.00	0.00
Basic Flush (E2.2)	M10a	0.82	0.1%	0.12	0.0%	0.00	0.00	0.00
	M10			0.12	0.0%	0.00	0.00	0.00
	M9b			0.58	0.1%	0.00	0.00	0.00
Bare Peat (E4)	ExP	4.88	0.4%	4.88	0.4%	0.07	0.00	0.02
Swamp (F1)	S10	0.19	0.0%	0.03	0.0%	0.00	0.00	0.00
	S9			0.16	0.0%	0.00	0.00	0.00
Standing Water (G1)	SW	0.07	0.0%	0.07	0.0%	0.00	0.00	0.00
Running Water (G2)	RW	3.28	0.3%	3.28	0.3%	0.02	0.00	0.01
Acid/Neutral Exposure (I1.4.1)	RK	1.19	0.1%	1.19	0.1%	0.01	0.03	0.00
Arable (J1.1)	AR	2.36	0.2%	2.36	0.2%	0.00	0.00	0.00
Amenity Grassland (J1.2)	PG	0.01	0.0%	0.01	0.0%	0.00	0.00	0.00
Building (J3.6)	BD	0.04	0.0%	0.04	0.0%	0.00	0.00	0.00
Bare Ground (J4)	BG	4.04	0.4%	4.04	0.4%	0.97	0.00	0.13

7. Ornithology

7.1 Introduction

7.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the potential for significant effects on important ornithological features (IOFs) associated with the construction, operation and decommissioning of the Proposed Development.

7.1.2 The specific objectives of the Chapter are to:

- Describe the existing ornithological baseline conditions;
- Describe the assessment methodology, assumptions and significance criteria used in undertaking the assessment;
- Identify the potential impacts associated with the Proposed Development, including direct, indirect and cumulative impacts;
- Assess the resultant likely significant effects;
- Describe any additional mitigation measures proposed to address any likely significant effects;
- Assess the residual effects remaining following the implementation of mitigation; and
- Outline those measures included as part of the Proposed Development that would conserve, restore and enhance biodiversity in accordance with National Planning Policy 4 (NPF4).

7.1.3 The assessment has been carried out by SLR Consulting. All staff contributing to this Chapter have undergraduate and/or postgraduate degrees in relevant subjects, have extensive professional ornithological impact assessment experience, hold professional membership of the and/or abide by the Chartered Institute of Ecology and Environmental (CIEEM) Code of Professional Conduct.

7.1.4 This Chapter is supported by the following Figures and Technical Appendices:

- **Figures (EIAR Volume 3a):**
 - **Figure 7.1: Ornithological Designated Sites;**
 - **Figure 7.2: Vantage Point (VP) and Viewshed Coverage (2022/2023 Non-breeding and 2023 Breeding Seasons);**
 - **Figure 7.3: Vantage Point (VP) and Viewshed Coverage (2023/2024 and 2024/2025 Non-breeding and 2024 and 2025 Breeding Seasons);**
 - **Figure 7.4: Scarce Breeding Bird Study and Survey Areas;**
 - **Figure 7.5: Black Grouse Study and Survey Areas;**
 - **Figure 7.6: Breeding and Wintering Bird Study and Survey Areas;**
 - **Figure 7.7: Nightjar Study and Survey Areas;**
 - **Figure 7.8: Flight Activity - Golden Eagle;**
 - **Figure 7.9: Flight Activity - Other Raptors and Owls;**
 - **Figure 7.10: Flight Activity - Red Kite;**
 - **Figure 7.11: Flight Activity - Waders;**
 - **Figure 7.12: Flight Activity - Wildfowl;**
 - **Figure 7.13: Flight Activity - Gulls;**
 - **Figure 7.14: Golden Eagle Activity;**
 - **Figure 7.15: Other Raptor and Owl Activity;**
 - **Figure 7.16: Red Kite Activity;**
 - **Figure 7.17: Curlew Activity;**

- **Figure 7.18: Wader Activity;**
 - **Figure 7.19: Wildfowl Activity;** and
 - **Figure 7.20: Gull Activity.**
 - **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 7.1: Ornithology Surveys (with Annexes A to E);**
 - **Technical Appendix 7.3: Ornithology Assessment Methodology;** and
 - **Technical Appendix 7.4: Red Kite Population Modelling.**
- 7.1.5 Information relating to breeding, roosting and/or lekking sites of sensitive species (as defined in SNH¹, 2016a² and NatureScot, 2025a³) is summarised to an appropriate level within this Chapter, and further detailed within:
- **Confidential Appendices (EIAR Volume 5):**
 - **Technical Appendix 7.2: Confidential Ornithology;**
 - **Figure 7.2.1: Black Grouse Activity (Confidential);**
 - **Figure 7.2.2: Golden Eagle Range Boundary Analysis (Confidential);**
 - **Figure 7.2.3: Golden Eagle Topographical Model (Confidential);** and
 - **Figure 7.2.4: Other Raptor and Owl Activity (Confidential).**
- 7.1.6 This confidential information will not be made publicly available but will be provided to the Scottish Government, South Lanarkshire Council (SLC), NatureScot and RSPB Scotland, to inform their own appraisals of the Proposed Development.
- 7.1.7 Figures and Technical Appendices are referenced in the text where relevant.

7.2 Assessment Methodology

Overview

- 7.2.1 The ornithology assessment methodology is detailed in **Technical Appendix 7.3 (EIAR Volume 4)** and follows the principles of CIEEM guidelines (2018⁴) and NatureScot guidance (2025b⁵ and 2025c⁶).
- 7.2.2 Effects upon IOFS that are considered to be significant in the context of the EIA Regulations⁷, are those classified as being of '**Major**' or '**Moderate**' significance.

Scope of Assessment

- 7.2.3 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and has been informed by consultation responses detailed in **Technical Appendix 1.2: Consultation Register (EIAR Volume 4)**, NatureScot guidance (2025b⁵) and the findings of baseline studies.

¹ Scottish Natural Heritage, the former operating name of NatureScot.

² SNH (2016a) Environmental Statements and Annexes of Environmentally Sensitive Bird Information. Scottish Natural Heritage (SNH). Available at: <https://www.nature.scot/doc/environmental-statements-and-annexes-environmentally-sensitive-bird-information>

³ NatureScot (2025a) Sensitive Species of Scotland List. Available at: <https://www.nature.scot/doc/sensitive-species-scotland-list>

⁴ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3, September 2024. Chartered Institute of Ecology and Environmental Management (CIEEM), Winchester.

⁵ NatureScot (2025b) Guidance note - Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas. Available at: <https://www.nature.scot/doc/guidance-note-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect#cumulative-impacts-and-their-effects>

⁶ NatureScot (2025c) Assessing the cumulative impacts of onshore wind farms on birds. Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-impacts-onshore-wind-farms-birds>

⁷ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Potential Effects Scoped In

- 7.2.4 The scope of the ornithology assessment is set out in **Table 7.1**.
- 7.2.5 The potential for significant effects upon IOFs is considered as a result of the construction and operation of the Proposed Development alone and, where appropriate and sufficient information is available, cumulatively with other wind farm developments that are operational, under construction, consented or at application stage (and subject to a valid planning application).
- 7.2.6 Impacts are principally assessed both alone for the Proposed Development and (where data is available) cumulatively at the regional Natural Heritage Zone (NHZ) 19 'Western Southern Uplands and Inner Solway' population level, within which the Proposed Development is located. This is unless another geographical population level is considered to be more appropriate for a particular species, and is justified within this Chapter.
- 7.2.7 To inform the cumulative assessment for the Proposed Development NatureScot were consulted to obtain recent estimates of regional collision mortality and displacement effects for IOFs within NHZ 19 (see **Technical Appendix 1.2: Consultation Register, EIAR Volume 4**).
- 7.2.8 In relation to decommissioning and as noted in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**, a decision to refurbish, remove, or replace the turbines would be made at the end of the Proposed Development's operational lifetime. Whilst future ornithological baseline conditions cannot be accurately known at this stage, given the nature of decommissioning works, potential effects on ornithological features associated with the decommissioning the Proposed Development can be reasonably concluded as being of equal or lesser significance to construction disturbance/displacement effects, but over a reduced timeframe. Decommissioning is therefore not assessed exclusively within this Chapter, but effect significance concluded as being consistent with construction phase effects.

Table 7.1: Effects considered within the ornithology assessment			
Effects	Phase*		
	C	O/M	D
Construction disturbance and operational displacement (including barrier effects) – the avoidance of birds from the area occupied by development infrastructure and working areas and therefore an indirect loss of habitats. Impacting on breeding success, productivity and/or survival rates.	Yes	Yes	Yes
Collision mortality risk – the risk of mortality resulting from collision with turbine blades increasing mortality rates.	No	Yes	No

*C=construction, O=operation and maintenance and D=decommissioning.

Potential Effects Scoped Out

- 7.2.9 The assessment focusses on impacts that are likely to result in significant effects on potential IOFs. Impacts that are not likely to result in significant effects (at the species relevant reference population scale) have therefore been scoped out of the assessment.
- 7.2.10 A summary of the impacts scoped out is presented in **Table 7.2**.

Table 7.2: Impacts scoped out of the ornithology assessment

Impact	Reasoning
Direct habitat loss.	Overall direct habitat losses arising from the built footprint of the Proposed Development are small, relative to the extent of remaining habitat within the Site and surrounding area and which would otherwise be available for bird species. Providing the implementation of measures set out in the Construction and Environmental Management Plan (CEMP) (Technical Appendix 2.1, EIAR Volume 4) and a Biodiversity Enhancement Management Plan (BEMP) for the Proposed Development finalised in consultation with relevant consultees, see Section 7.7 and Technical Appendix 6.7 (EIAR Volume 4), direct habitat losses would be relatively localised, sufficiently offset and not significant for any potential Important Ornithological Feature (IOF).
Access Routes.	Along the Access Routes within the Site, relatively small linear extents of habitat loss would arise from the creation of new access track lengths, and predominantly occur along Eastern Access track. The Western Access track, largely passes through commercial plantation forestry and which is generally of low important to ornithological features. Construction work along the on-site Access Routes would also be of a short-term nature and operational access would be only occasional. On the basis of the implementation of industry good practice mitigation (refer to Section 7.4) and the BEMP for the Proposed Development, the potential for significant effects upon any potential IOF as a result of construction and operation of this component of the Proposed Development is considered unlikely and therefore this is not assessed specifically within this Chapter.
Artificial lighting.	NatureScot (2020a⁸) advises that an assessment of the possible effects of lighting on birds may be required in the following three situations, where the risk of impact is greater: ▪ Wind turbines on or adjacent to a seabird colony that hosts burrow nesting species; ▪ Wind turbines that are on or adjacent to protected areas that host large concentrations of wintering waterbirds, where such sites are located within open country away from other sources of artificial light; and ▪ Where wind farms are located on migratory corridors or bottlenecks for nocturnally migrating passerines. As the location of the Proposed Development does not fall into any of the above greater risk scenarios an assessment is not required.

Method of Baseline Characterisation

Extent of the Study Areas

- 7.2.11 The ornithology assessment considers the following study areas which are based on the final turbine layout and associated infrastructure, and maximum zones of influence for species referenced in industry standard guidance (including within SNH, 2016b⁹, Goodship and Furness, 2022¹⁰ and NatureScot, 2024a¹¹ and 2025d¹²):

⁸ NatureScot (2020a) Information Note: The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures. Available at: <https://www.nature.scot/doc/information-note-effect-aviation-obstruction-lighting-birds-wind-turbines-communication-towers-and>

⁹ SNH (2016b) Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage (SNH). Available at: <https://www.nature.scot/doc/assessing-connectivity-special-protection-areas>

¹⁰ Goodship, N.M. and Furness, R.W. (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

¹¹ NatureScot (2024a) Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms. Available at: <https://www.nature.scot/doc/guidance-using-updated-collision-risk-model-assess-bird-collision-risk-onshore-wind-farms>

¹² NatureScot (2025d) Recommended bird survey methods to inform impact assessment of onshore wind farms. Available at: <https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms>

- Designated sites – a 20 km Study Area from the Wind Turbine Array as shown in **Figure 7.1 (EIAR Volume 3a)**, and based on the greatest foraging range for any species as set out in NatureScot guidance (SNH, 2016b⁹).
- Collision risk modelling (CRM) – in the estimation of collision mortality risks for the Proposed Development, and with reference to the results of the flight activity surveys, a 500 m buffer around the Wind Turbine Array, plus rotor radius, has been used to create a Collision Risk Analysis Area (CRAA) as recommended in NatureScot guidance (2024a¹¹) and shown in **Figure 7.2** and **Figure 7.3 (EIAR Volume 3a)**.
- Scarce breeding birds¹³ – a 2 km and 800 m Study Area buffer from the Wind Turbine Array and Access Routes respectively, extended to 6 km from the Wind Turbine Array and 1 km from the Access Routes for eagle species, as shown in **Figure 7.4 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022¹⁰) and NatureScot guidance (2025d¹²);
- Black grouse – a 1.5 km and 750 m Study Area buffer from the Wind Turbine Array and Access Routes respectively as shown in **Figure 7.5 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022¹⁰) and NatureScot guidance (2025d¹²);
- Breeding and wintering birds – a 500 m Study Area buffer around all infrastructure, as shown in **Figure 7.6 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022¹⁰) and NatureScot guidance (2025d¹²); and
- Nightjar – a 500 m Study Area buffer around Access Routes and adjacent suitable habitats as shown in **Figure 7.7 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022¹⁰) and NatureScot guidance (2025d¹²).

Desk Study

- 7.2.12 The following key sources have been consulted for existing ornithological information within proximity to the Proposed Development to inform the assessment:
- NatureScot's SiteLink¹⁴;
 - South Strathclyde Raptor Study Group (SSRSG);
 - Dumfries and Galloway Raptor Study Group (DGRSG);
 - South of Scotland Golden Eagle Project (SSGEP);
 - Southern Upland Partnership (SUP); and
 - Royal Society for the Protection of Birds (RSPB) Data Unit.
- 7.2.13 For consultations regarding existing ornithological information, the search area requested included at least a 2 km buffer from the Site for records of all '*Priority bird for assessment when considering the development on onshore wind farms in Scotland*' (as per Annex 1 of NatureScot guidance, 2025b⁵), extended to at least 6 km for eagle species.
- 7.2.14 EIA documentation for the nearby Daer Wind Farm^{15,16} and Rivox Wind Energy Hub¹⁷ developments have also been specifically reviewed, together with peer-reviewed literature that is referenced where relevant.

¹³ Scarce breeding birds are those listed on Annex 1 of the EU Birds Directive and/or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and in the case of the locality of the Proposed Development consists of any raptor and owl species listed in Annex 1 and/or Schedule 1.

¹⁴ Available at: <https://sitelink.nature.scot/>

¹⁵ RWE (2021) Daer Wind Farm Environmental Impact Assessment Report. Available at: <https://uk.rwe.com/project-proposals/daer/>

¹⁶ RWE (2025) Daer Wind Farm Further Environmental Information Report. Available at: <https://uk.rwe.com/project-proposals/daer/>

¹⁷ Belltown Power (2023) Rivox Wind Energy Hub Environmental Impact Assessment Report. Available at: <https://rivoxwindenergyhub.com/>

Field Surveys

- 7.2.15 Baseline ornithological field surveys to inform the design and assessment of the Proposed Development were undertaken between September 2022 and August 2025.
- 7.2.16 All field surveys were undertaken in line with appropriate industry standard guidance and species-specific methodologies (Gilbert *et al.*, 1998¹⁸, Hardey *et al.*, 2013¹⁹ and NatureScot, 2025d¹²), with the following specific surveys completed:
- Flight activity surveys – September 2022 to August 2025 (three breeding seasons and three non-breeding seasons);
 - Black grouse surveys – 2023, 2024 and 2025 lekking seasons;
 - Scarce breeding bird surveys – 2023, 2024 and 2025 breeding seasons;
 - Moorland breeding bird surveys – 2023, 2024 and 2025 breeding seasons;
 - Nightjar surveys – 2025 breeding season; and
 - Winter walkover surveys – 2022/2023, 2023/2024 and 2024/2025 non-breeding seasons.
- 7.2.17 Field survey areas were defined with reference to NatureScot guidance (2025d¹²), on the basis of the maximum developable area at the time of survey commencement, and in review of suitable habitats (such as for nightjar).
- 7.2.18 Discussion on the changes in survey coverage is set out in '**Limitations and Assumptions**' section below.
- 7.2.19 Full details of baseline surveys including methodologies, survey conditions and survey areas are presented in **Technical Appendix 7.1 (EIAR Volume 4)** and on **Figures 7.2 to 7.7 (EIAR Volume 3a)**.

Method of Assessment

Overview

- 7.2.20 The assessment methodology, including the criteria for assessing sensitivity of ornithological features, magnitude of change and overall significance criteria, is detailed in **Technical Appendix 7.3 (EIAR Volume 4)**.
- 7.2.21 **Technical Appendix 7.3 (EIAR Volume 4)** also sets out the list of other wind farm developments considered for potentially significant cumulative effects.

Limitations and Assumptions

- 7.2.22 The assessment presented within this Chapter is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**, and the adoption of embedded and standard mitigation set out in **Section 7.4**.
- 7.2.23 There are considered to be no substantial limitations to the baseline studies or assessment presented within this Chapter however, for completeness a discussion of minor constraints and uncertainties is provided below.

SPECIES CONSERVATION STATUS AND SENSITIVITY

- 7.2.24 Some limitations do exist within the knowledge base for how some species, and the populations to which they belong, react to impacts associated with onshore wind farms

¹⁸ Gilbert, G., Gibbons, D.W., & Evans, J. (1998) *Bird Monitoring Methods: A Manual of Techniques for UK Key Species*. Royal Society for the protection of Birds (RSPB), Sandy, Bedfordshire, England.

¹⁹ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) *Raptors: A field guide to survey and monitoring*. 3rd Edition. The Stationery Office, Edinburgh.

developments and construction activities. A precautionary approach is therefore taken in these circumstances, and as such, it is considered that these limitations do not affect the robustness of the assessment.

- 7.2.25 Following the completion of two years of baseline ornithological surveys, Stanbury *et. al* (2021²⁰) issued an addendum to the Birds of Conservation Concern (BoCC) list in September 2024 (5th edition) (Stanbury *et al.*, 2024²¹). This addendum has reclassified common gull and great black-backed gull as Red list species (previously Amber list species) and which would now include them as target species for recording during onshore wind farm surveys as recommended in NatureScot guidance (2025a³ and 2025c⁶). These gull species were however only infrequently noted during baseline surveys (as secondary species) and so would not have been scoped into the assessment due to the low activity rates within the breeding and wintering bird study area and the absence of potentially significant effects.

BASELINE SURVEY COVERAGE

- 7.2.26 Baseline field survey effort is considered to have met minimum requirements stipulated in NatureScot guidance (2025c⁶). In general, weather conditions were appropriate for the surveys, but where they were not, surveys were suspended and rescheduled (or additional surveys were undertaken) (refer to **Technical Appendix 7.1, EIAR Volume 4**).
- 7.2.27 Baseline survey coverage is also considered to adequately covered the final Wind Turbine Array and associated infrastructure out to suitable buffers recommended in NatureScot guidance (2025d¹²), enabling a comprehensive list of ornithological features to be drawn and inform the design and assessment of the Proposed Development.
- 7.2.28 With reference to flight activity survey effort, NatureScot guidance (2025d¹²) recommends “a minimum of 72 hours per VP location divided between seasons (36 hours breeding and 36 hours non-breeding) per year”. It is noted that during the 2023 breeding season, only 35 valid survey hours were gathered at Vantage Point (VP) 4. This is however not considered a limitation on account of recommended survey effort being obtained for two subsequent years of survey i.e., between the 2023/2024 non-breeding season and 2025 breeding season.
- 7.2.29 With reference to flight activity survey coverage, NatureScot guidance (2025d¹²) states that “It is very important that VPs are chosen to achieve maximum visibility with the minimum number of points” and this was achieved for coverage of the Proposed Development and the CRAA (**Figures 7.2 and 7.3, EIAR Volume 3a**) used in the estimation of collision mortality risks.
- 7.2.30 Due to changes in wind turbine layouts, a total of eight VP locations were adopted over the course of flight activity surveys; five (VPs 1 to 5) between September 2022 and March 2023 (2022/2023 non-breeding season), four (VPs 1 to 4) between March and August 2023 (2023 breeding season) and three (VPs 6 to 8) between September 2023 and August 2025 (2023/2024 and 2024/2025 non-breeding season and 2024 and 2025 breeding season). VP locations and viewshed coverage of the Wind Turbine Array at 20 m above the ground from each VP location are shown in **Figures 7.2 and 7.3 (EIAR Volume 3a)**.

²⁰ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win, I. (2021) Birds of Conservation Concern 5: The population status of birds in the UK, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, **114**, pp. 723-747.

²¹ Stanbury, A.J., Burns, F., Aebischer, N.J., Baker, H., Balmer, D.E., Brown, A., Dunn, T., Lindley, P., Murphy, M., Noble, D.G., Owen, R. and Quinn, L. (2024) The status of the UK's breeding seabirds: an addendum to the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds*, **117**, pp. 471-487.

- 7.2.31 The subsequent change to VP locations has resulted result in full coverage of the Wind Turbine Array over a two-year period, which is consistent with recommendations set out in NatureScot guidance (2025d¹²). The assessment has considered the collision mortality risk estimates for the whole baseline survey period, but has selected the appropriate data to determine a worst-case collision risk scenario for all species. It should however also be noted, that as the viewshed of VP 5 does not provide any coverage of the Wind Turbine Array or CRAA used in the estimation of collision mortality risks, flight activity data observed from this VPs has been excluded from analysis. Details of all flight lines recorded are however presented within **Technical Appendix 7.1 (EIAR Volume 4)** and **Figures 7.8 to 7.13 (EIAR Volume 3a)** for completeness.
- 7.2.32 Scarce breeding bird, black grouse and breeding and wintering bird survey coverage are considered to have adequately covered all infrastructure and appropriate buffers, with the coverage of the Wind Turbine Array provided over a total of three years.
- 7.2.33 There are some small gaps in providing two years of survey coverage in areas adjacent to the Access Routes. However, given the nature of works proposed in relation to these development components, receipt and review of third-party records for the Study Area (indicating the absence of likely key sensitivities, such as Schedule 1 breeding raptors), the absence of coverage is not considered a substantial limitation to assessment conclusions presented herein.
- 7.2.34 In relation to nightjar survey coverage, this was refined to include areas of suitable habitats in the locale (clearfell and young forestry plantations) within and adjacent to the Study Area, and which are considered limited to the Access Routes. No limitations therefore arise from the findings of such surveys and assessment conclusions presented herein.

7.3 Baseline Conditions

Current Baseline

Designated Sites

- 7.3.1 **Study Area:** 20 km from the Wind Turbine Array (see **Figure 7.1, EIAR Volume 3a**).
- 7.3.2 The Proposed Development is located within 20 km of two statutory designated sites for nature conservation with ornithological qualifying features, as illustrated in **Figure 7.1 (EIAR Volume 3a)** and summarised in **Table 7.3**.
- 7.3.3 In review of NatureScot guidance (SNH, 2016b⁹) relating to connectivity between Special Protection Areas (SPAs) and development proposals, and having regard to the core foraging ranges of relevant qualifying species i.e., hen harrier (2 km), merlin (5 km), peregrine falcon (2 km), short-eared owl (2 km) and golden plover (3 km), the Proposed Development is not considered to have any potential connectivity between the Muirkirk and North Lowther Uplands SPA and underpinning North Lowther Uplands Site of Special Scientific Interest (SSSI).
- 7.3.4 The spatial separation between the Proposed Development and the SPA precludes any realistic pathway for impact upon its qualifying features. As such, in the absence of a possible pathway for impact upon the designations qualifying features or supporting their habitats, no likely significant effects upon the SPA can be concluded, either alone or in-combination with any other project or plan.
- 7.3.5 Effects on the Muirkirk and North Lowther Uplands SPA (and underpinning North Lowther Uplands SSSI) can therefore be screened out from the requirement for further consideration

under the Habitats Regulations²² (and assessment within this chapter), and an Appropriate Assessment is not required.

- 7.3.6 The potential for adverse effects on the qualifying features of any other designated site for ornithological interests is also scoped out of the assessment and further consideration within this Chapter, on account of spatial separation.

Table 7.3: Ornithological designated sites within 20 km		
Designation	Distance²³	Qualifying Features
Muirkirk and North Lowther Uplands SPA	13.12 km	Golden plover (breeding) Hen harrier (breeding) Hen harrier (non-breeding) Merlin (breeding) Peregrine (breeding) Short-eared owl (breeding)
North Lowther Uplands SSSI	13.12 km	Hen harrier (breeding) Hen harrier (non-breeding) Short-eared owl (breeding) Breeding bird assemblage ²⁴ .

Flight Activity

- 7.3.7 **Study Area:** CRAA, a 500 m buffer around the Wind Turbine Array, plus rotor radius (see **Figures 7.2 and 7.3, EIAR Volume 3a**).
- 7.3.8 A total of 17 target species were recorded during flight activity surveys as summarised in **Table 7.4**. Full details of flight activity are presented in **Technical Appendix 7.1 (Annex D) (EIAR Volume 4)**, with flight lines illustrated in **Figures 7.8 to 7.13 (EIAR Volume 3a)**.
- 7.3.9 A summary of collision mortality risk estimates for those target species with 'at collision risk' flight activity recorded is presented in **Table 7.5**. Detailed analysis is presented in **Technical Appendix 7.1 (Annex E) (EIAR Volume 4)**.
- 7.3.10 For some species, no 'at collision risk' flight activity was recorded over the course of baseline surveys and therefore collision mortality risks are not estimated. For others, 'at collision risk' flight activity was recorded during Year 1 (2022-23) only (from VPs 1 to 5) and so a mean collision rate for Years 2 and 3 (2023-25, from VPs 6 to 8) was not estimated. Worst-case collision mortality risks have been shaded grey in **Table 7.5**, based on dataset used.

²² The Conservation (Natural Habitats, &c.) Regulations 1994, which transposes the EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) into Scottish Law.

²³ From the Site Boundary to the designation boundary at its nearest point.

²⁴ Which includes hen harrier, short-eared owl, merlin, peregrine, golden plover, red grouse, raven, dunlin, snipe, teal, curlew, redshank, whinchat and wheatear.

Table 7.4: Flight activity survey results

Species	Total Flights Recorded	Total Individuals Recorded	Total Bird Seconds
Common gull	9	28	2,504
Curlew	133	170	8,346
Golden eagle	11	11	768
Golden plover	4	34	2,065
Goshawk	1	1	31
Greylag goose	9	93	4,930
Hen harrier	26	27	2,926
Herring gull	3	4	147
Lapwing	9	10	424
Marsh harrier	2	2	104
Merlin	7	7	132
Osprey	3	4	290
Peregrine falcon	2	2	72
Pink-footed goose	8	448	54,730
Red kite	248	320	42,151
Short-eared owl	1	1	35
White-fronted goose	2	136	7,297

Table 7.5: Collision mortality risks (worst-case results shaded grey.)

Species	Mean Annual Collision rate		Mean Years per Collision	
	Survey Years 1 to 3	Survey Years 2 to 3	Survey Years 1 to 3	Survey Years 2 to 3
Curlew	0.111	0.119	9.0	8.4
Golden eagle	0.007	0.011	137.2	91.5
Goshawk	0.0002	0	4,389.6	-
Greylag goose	0.007	0.010	140.4	98.3
Hen harrier	0.003	0.00001	341.7	127,409
Osprey	0.001	0	706.3	-
Pink-footed goose	0.024	0	40.8	-
Red kite	0.248	0.263	4.0	3.8

Black Grouse

7.3.11 Study Area: 1.5 km and 750 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.5, EIAR Volume 3a**).

7.3.12 A total of three black grouse lekking locations were recorded over the three-year survey period, all in 2025. These are summarised in **Table 7.6** below and shown on **Confidential Figure 7.2.1 (EIAR Volume 5)**. All lekking locations were outside of the Site and black grouse Study Area and supported one or two males.

- 7.3.13 No confirmed lekking locations were recorded in 2023 or 2024, although a single possible lekking call was recorded in 2023. No black grouse flight activity was recorded over the baseline survey period.
- 7.3.14 Additionally, no observations of nests or fledged broods were recorded, although these are generally difficult to observe, and nesting may occur within suitable moorland and woodland plantations in the black grouse Study Area.
- 7.3.15 The RSPB Data Unit provided 33 records of calling or displaying male black grouse (from a search area within at least 2 km of the Site). Of these, a single record of two lekking males (from 2018) is located within the Site (see RSPB_1, **Confidential Figure 7.2.1, EIAR Volume 5**). The location does not coincide with any of the lek locations identified during baseline surveys, but broadly accords with historical observations of lekking birds made during baseline surveys for the Daer Wind Farm²⁵. All other records obtained from the RSPB data unit occur outside of the black grouse Study Area.
- 7.3.16 The SUP were also consulted for black grouse records in proximity to the Site however, as the search area (and black grouse Study Area) is outside of the SUP monitoring area for black grouse no additional records were provided by the organisation.
- 7.3.17 In accordance with NatureScot's standard advice (2024b²⁶) a buffer of at least 500 m between black grouse lek locations and proposed turbine locations and other key infrastructure has been adopted for scheme design purposes (see **Section 7.4**).
- 7.3.18 Additionally, and also on the basis of NatureScot's standard advice (2024b²⁶), the Proposed Development would as part of industry standard good practice, include for the implementation of a Bird Disturbance Management Plan (BDMP; see **Section 7.4**). This would contain specific measures to avoid the potential for disturbance of black grouse at their lek sites during construction works (including along the proposed access track route) and where relevant during operational maintenance works (see **Section 7.4**).
- 7.3.19 Whilst such mitigation is likely to sufficiently minimise potentially significant construction and operational effects upon black grouse, impacts upon the species are scoped-into assessment, on the basis of NatureScot site-specific advice (see **Technical Appendix 1.2, EIAR Volume 4**).

Table 7.6: Black grouse lek status – male attendance counts						
Lek	Distance to nearest turbine	Distance to nearest infrastructure	2018	2023	2024	2025
1	3.33 km	1.1 km (new access track)	-	0	0	2
2	3.06 km	2.37 km (new access track)	-	0	0	1
3	3.69 km	2.69 km (new access track)	-	0	0	1
RSPB_1	703 m	718 m (new access track)	2	0	0	0

Schedule 1 / Annex I Raptors and Owls

GOLDEN EAGLE

- 7.3.20 Study Area:** 6 km and 1 km buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).

²⁵ In April 2018 and 2019.

²⁶ NatureScot (2024b) General pre-application and scoping advice for onshore wind farms. Available at: <https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms>

- 7.3.21 A total of 11 golden eagle flights were recorded during flight activity surveys (see **Technical Appendix 7.1, EIAR Volume 4** and **Figure 7.8, EIAR Volume 3a**). Where age was identifiable, flight activity was of predominantly juvenile, immature or sub-adult birds, and this was mainly the case when observations of golden eagles were made during other survey types completed.
- 7.3.22 As part of consultations, the SSGEP provided information that the Study Area overlaps with a single active golden eagle breeding range. This is the range of female FO2 and male A29, hereafter referred to as the FO2/A29 range. The SSGEP advised it was aware of one nest location for the range, which is located over 3 km from the Site (see **Confidential Figure 7.2.2 and 7.2.3, EIAR Volume 5**). They also provided an overview of key foraging areas and roosting locations. It is understood that no breeding attempt took place in 2024 by the pair, but it is understood a successful breeding attempt subsequently occurred in 2025²⁷. The SSGEP also advised the Study Area is known to support activity of other sub-adult and juvenile birds, prior to settling.
- 7.3.23 A further request was therefore made for satellite tag data from the FO2/A29 range and which was obtained for male A29 for the period 30/10/2023 to 14/11/2024. Kernel density estimation²⁸ of the satellite tag data was then undertaken to identify seasonal and annual range boundaries for the FO2/A29 range, which followed the methodology set out in Fielding *et al.* (2024a²⁹).
- 7.3.24 As the dataset obtained spans at least one year from the male bird, it is considered sufficient to examine range characteristics (as per Fielding *et al.*, 2024a²⁹). In addition, as the pair was not thought to have made a breeding attempt prior to 2025, satellite tag movements during this period may therefore have been much wider than they might be during subsequent breeding years i.e., when the pair may choose to remain closer to adopted nest sites. This is supported through the lack of species observations during the 2025 breeding season indicating much lower levels of activity in the proximity to the Wind Turbine Array (see **Technical Appendix 7.1, EIAR Volume 4**). The satellite tag dataset obtained is therefore considered to provide a robust and possibly precautionary approach in identifying any potential breeding range overlap with the Proposed Development.
- 7.3.25 In review, the analysis of the male A29 satellite tag data identifies that the Proposed Development does not overlap with the annual or breeding season range boundary estimations but overlaps to a small extent with the non-breeding season boundary estimation (see **Confidential Figure 7.2.2 and 7.2.3, EIAR Volume 5**).
- 7.3.26 The analysis also examined the distribution of nighttime records and identified no nighttime roosting locations within the Site, or within 1 km of the Wind Turbine Array (see **Confidential Figure 7.2.2, EIAR Volume 5**).
- 7.3.27 Whilst the known nesting location for the FO2/A29 range is located sufficiently distant from the Proposed Development to preclude the potential for disturbance (1 km, as per Goodship and Furness, 2022¹⁰) and the Proposed Development has very little overlap with the range boundary estimations, the potential for significant effects to both range-holding and non-

²⁷ SSGEP Press Release Available at: <https://www.goldeneaglessouthofscotland.co.uk/blog/great-news-from-the-south-of-scotland-meet-princeling>

²⁸ Satellite tag data was taken and filtered for non-roosting (daylight) times and computed home ranges created using autocorrelated kernel density estimation in R packages 'amt' and 'ctmm'.

²⁹ Fielding, A. H., Anderson, D., Barlow, C., Benn, S., Chandler, C. J., Reid, R., Tingay, R., Weston, E. D., & Whitfield, D. P. (2024a). The Characteristics and Variation of the Golden Eagle *Aquila chrysaetos* Home Range. *Diversity*, **16** (9), pp. 523.

range holding birds is **scoped-in** to assessment in accordance with NatureScot site-specific advice provided through consultation (see **Technical Appendix 1.2, EIAR Volume 4**).

GOSHAWK

- 7.3.28 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.29 A single goshawk breeding location was recorded during baseline surveys in 2025, located adjacent to an Access Route section (see **Confidential Technical Appendix 7.2** and **Confidential Figure 7.2.4, EIAR Volume 5**) and within the upper disturbance distance currently recommended for the species (500 m as per Goodship and Furness, 2022¹⁰).
- 7.3.30 In consultation, the SSRSG advised on one known goshawk nesting location and the DGRSG provided information on three known locations (from a search area within at least 2 km of the Site). All records provided were however, over 2 km from the Proposed Development, and therefore beyond the upper disturbance distance buffer currently recommended for the species (500 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.31 Whilst goshawk will hunt over open moorland, such as that located around the Wind Turbine Array, the majority of activity will generally occur over and in near proximity to forested habitats. A very low level of flight activity was therefore recorded during baseline surveys, with a negligible annual collision mortality risk estimated for the species (less than one collision event over the operational lifetime of the Proposed Development, see **Table 7.5**).
- 7.3.32 Considering the overall low level of species activity recorded (see **Technical Appendix 7.1, EIAR Volume 4** and **Figures 7.9** and **Figure 7.15, EIAR Volume 3a**), distance of known nesting sites (and suitable habitats for such) from the Wind Turbine Array, significant adverse effects upon goshawk are unlikely to occur and can be **scoped out** of assessment.
- 7.3.33 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), standard measures to avoid the potential for disturbance to any possible future breeding birds and enable legislative compliance are set out in **Section 7.4**.

HEN HARRIER

- 7.3.34 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.35 A total of 26 hen harrier flights were recorded during flight activity surveys (**Figure 7.9, EIAR Volume 3a**), with a small number of additional observations made during other surveys (**Figure 7.15, EIAR Volume 3a**).
- 7.3.36 No evidence of breeding hen harrier was recorded within the Study Area during baseline surveys and in review of information provided by the SSRSG and DGRSG (from a search area within at least 2 km of the Site) the nearest known breeding location for the species is over 2 km from the Site and therefore beyond the upper disturbance distance buffer currently recommended for the species (750 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.37 Similarly, no evidence of roosting was recorded and in review of information provided by the SSRSG, the nearest known traditional hen harrier roosting location is considered to be sufficiently distant from the Proposed Development to preclude the potential for disturbance (i.e., over at least 750 m away).
- 7.3.38 Considering the species' limited presence within the Site, absence of known breeding or roosting sites locally and negligible predicted risk of collision (less than one collision event

over the operational lifetime of the Proposed Development, see **Table 7.5**), hen harrier is **scoped out** of assessment.

- 7.3.39 As a species listed on Schedule 1 and 1A of the Wildlife and Countryside Act 1981 (as amended), standard measures to avoid the potential for disturbance to any possible future breeding (and where relevant roosting) birds and enable legislative compliance are set out in **Section 7.4**.

MARSH HARRIER

- 7.3.40 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array / Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.41 Two marsh harrier flights were recorded during flight activity surveys, none of which were identified as being 'at collision risk' (**Figure 7.9, EIAR Volume 3a**).
- 7.3.42 No evidence of breeding marsh harrier was recorded during baseline surveys and the DGRSG and SSRSG held no records of the birds breeding within at least 2 km of the Site.
- 7.3.43 Considering the species' limited presence within the Site, absence of known breeding sites locally and absence of predicted collision risk, marsh harrier is **scoped out** of assessment.
- 7.3.44 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), standard measures to avoid the potential for disturbance to any possible future breeding birds and enable legislative compliance are set out in **Section 7.4**.

MERLIN

- 7.3.45 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array / Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.46 Infrequent observations of single merlin were made mainly during the non-breeding seasons, with a total of seven flights recorded during flight activity surveys, none of which were identified as being 'at collision risk' (**Figure 7.9, EIAR Volume 3a**).
- 7.3.47 No evidence of breeding was recorded. The DGRSG and SSRSG provided data on five historical nesting sites (from a search area within at least 2 km of the Site). One nest site was active in 2023 however, none were located within 2 km of the Site and therefore within the upper disturbance distance buffer currently recommended for the species (500 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.48 Considering the species' limited presence within the Site, absence of breeding sites locally and absence of predicted collision risk, merlin is **scoped out** of assessment.
- 7.3.49 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, standard measures to avoid the potential for disturbance to any future breeding birds and enable legislative compliance are set out in **Section 7.4**.

OSPREY

- 7.3.50 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array / Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.51 Ospreys were infrequently recorded during surveyed breeding seasons, predominantly to the east of the Site with birds noted to be hunting over the Daer Reservoir (see **Technical Appendix 7.1, EIAR Volume 4** and **Figures 7.9 and 7.15, EIAR Volume 3a**). No evidence of breeding was recorded.

- 7.3.52 Consultation with the DGRSG and SSRSG identified no known osprey nest sites within 2 km of the Site and therefore within the upper disturbance distance buffer currently recommended for the species (750 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.53 Considering the very low level of overall activity recorded, absence of breeding sites locally and negligible predicted collision risk (less than one collision over the operational lifetime of the Proposed Development, see **Table 7.5**), osprey is **scoped out** of assessment.
- 7.3.54 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, standard measures to avoid the potential for disturbance to any possibly future breeding birds and enable legislative compliance are set out in **Section 7.4**.

PEREGRINE FALCON

- 7.3.55 **Study area:** 2 km and 800 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.56 No evidence of breeding peregrine falcon was recorded during baseline surveys.
- 7.3.57 In review of data obtained from the DGRSG no peregrine breeding sites are identified within 2 km of the Site, with the closest located over 2 km from the Proposed Development and therefore beyond the upper disturbance distance buffer currently recommended for the species (750 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.58 Over the duration of baseline surveys, only two flights were recorded during flight activity surveys and no further observations of the species were made (**Figure 7.9, EIAR Volume 3a**). This suggests that the Site does not form an important foraging area for the species.
- 7.3.59 Considering the low level of overall activity recorded, absence of breeding sites and absence of predicted collision risk, peregrine falcon is **scoped out** of assessment.
- 7.3.60 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), standard measures to avoid the potential for disturbance to any future breeding birds and enable legislative compliance are set out in **Section 7.4**.

RED KITE

- 7.3.61 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).
- 7.3.62 Two red kite breeding sites were identified within the 2 km Study Area during baseline surveys, one in 2023 (KT_1) and one in 2024 (KT_2). Both locations are known to the SSRSG and are understood to comprise alternative nest locations for a single pair (see **Confidential Technical Appendix 7.2** and **Confidential Figure 7.2.4, EIAR Volume 5**).
- 7.3.63 Neither breeding site was recorded to be in use by red kites in 2025.
- 7.3.64 Both breeding sites are located outside of the Site and over 2 km from the Wind Turbine Array. One site (KT_2) is however located within close proximity to an Access Route section, and within the upper disturbance distance buffer currently recommended for the species (300 m, as per Goodship and Furness, 2022¹⁰).
- 7.3.65 No communal roosting locations were identified within the Study Area over the course of surveys or in review of existing ornithological information obtained from the DGRSG, SSRSG and the RSPB data unit (from a search area within at least 2 km of the Site).

7.3.66 Flight activity surveys recorded a total of 248 red kite flights (see **Technical Appendix 7.1, EIAR Volume 4** and **Figure 7.10, EIAR Volume 3**), with an estimated collision mortality risk of approximately one collision every 3.8 years (**Table 7.5**).

7.3.67 Due to the presence of breeding sites in proximity to the Proposed Development and estimated collision mortality risk for the species, the potential for significant effects upon red kite is **scoped-in** to assessment.

BARN OWL

7.3.68 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array / Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).

7.3.69 During baseline surveys in 2024, a roosting barn owl was recorded to the north of the Site, adjacent to a section of access track (see **Confidential Figure 7.2.4, EIAR Volume 5**). The location was not considered suitable for breeding and likely only occasionally used for roosting.

7.3.70 No barn owl flight activity was recorded during surveys, and the species is generally agreed as being at low risk of collision with onshore wind turbines due to their low-level hunting flights (Barn Owl Trust, 2023³⁰).

7.3.71 In the absence of potential breeding sites in proximity to the Wind Turbine Array and low risk of collision, significant adverse effects upon barn owls are unlikely to occur and can be **scoped out** of assessment.

7.3.72 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), standard measures to avoid the potential for disturbance to any possible future breeding birds and enable legislative compliance are set out in **Section 7.4**.

SHORT-EARED OWL

7.3.73 **Study Area:** 2 km and 800 m buffer from the Wind Turbine Array and Access Routes respectively (see **Figure 7.4, EIAR Volume 3a**).

7.3.74 No evidence of breeding short-eared owl was recorded during baseline surveys.

7.3.75 In review of data obtained from the DGRSG and SSRSG no short-eared owl nest sites (or known roost sites) are further identified within 2 km of the Site and therefore within the upper disturbance distance buffer currently recommended for the species (500 m, as per Goodship and Furness, 2022¹⁰).

7.3.76 Over the duration of surveys, only one flight was recorded during flight activity surveys and one additional observation was made during a scarce breeding bird survey (**Figure 7.15, EIAR Volume 3a**), which suggest that the Site does not form an important area for the species.

7.3.77 Considering the low level of overall activity recorded, absence of breeding sites locally and absence of predicted collision risk, short-eared owl is **scoped out** of assessment.

Waders

7.3.78 **Study Area:** 500 m buffer from the Wind Turbine Array and Access Routes (see **Figure 7.6, EIAR Volume 3a**).

³⁰ Barn Owl Trust (2023) Wind Turbines and Barn Owls. [Online] Available at: <https://www.barnowltrust.org.uk/hazards-solutions/barn-owls-wind-turbines/>

- 7.3.79 Moorland breeding bird surveys recorded an assemblage of breeding waders representative of the open moorland and agricultural grassland habitats present within the Site.
- 7.3.80 The number of estimated breeding wader territories recorded during survey is summarised in **Table 7.7**, with species breeding registrations illustrated on **Figures 7.17** and **7.18 (EIAR Volume 3a)**.
- 7.3.81 Due to the difficulty in accurately estimating territory numbers, a range is provided in some cases.

Table 7.7: Summary of Wader Breeding Territories 2023 to 2025			
Species	No. of Territories (min-max)³¹		
Common sandpiper	5 - 7	6 - 7	4 - 6
Curlew	12 - 19 (8)	12 - 16 (4-6)	16 - 22 (5)
Golden plover	0 - 2 (0-1)	1 - 1 (0-1)	1 - 2 (1-2)
Lapwing	5 - 8 (0)	10 - 12 (0)	2 - 6 (0)
Oystercatcher	5 - 6	4 - 9	5 - 10
Redshank	1 - 1	1 - 2	2 - 5
Ringed plover	4 - 4	2 - 2	3 - 5
Snipe	24 - 30	14 - 18	27 - 28

- 7.3.82 Because of its breeding presence in proximity to the Wind Turbine Array, current conservation status (BoCC Red-list, as per Stanbury *et al.*, 2021²⁰) and listing as a priority species for assessment when considering the development of onshore wind farms in Scotland (as per Annex 1 of NatureScot guidance, 2025b⁵), curlew is **scoped into** the assessment.
- 7.3.83 Whilst of similar conservation interest and priority for assessment when considering onshore wind farm developments, lapwing and golden plover are **scoped out** of assessment due to the relatively low level of breeding activity within proximity to the Wind Turbine Array and absence of predicted collision risk.
- 7.3.84 Some species of lower conservation status and/or which are not listed as priority species for assessment when considering the development of onshore wind farms in Scotland (as per Annex 1 of NatureScot guidance, 2025b⁵), were also recorded breeding within the Study Area, mainly on lower lying ground around the Site. These species comprise common sandpiper, oystercatcher, redshank, ringed plover and snipe, which are **scoped out** of assessment due to lack of likely significant effects at the species regional population levels.
- 7.3.85 Dunlin, greenshank and turnstone were also recorded during surveys but were not identified to be breeding within the Site (see **Figure 7.18, EIAR Volume 3a**). These species are therefore also **scoped out** of assessment.
- 7.3.86 In review of RSPB Scotland's response to EIA Scoping Request (see **Technical Appendix 1.2, EIAR Volume 4**), it is understood that the Proposed Development is located within the monitoring area for the Clyde Valley Breeding Wader Initiative (CVWI). Ornithological data obtained from the RSPB data unit for the Site and immediate surrounding area, shows that the majority of wader monitoring records reported from 2014 to 2024, have occurred to the north of the Site, away from the Wind Turbine Array, along the existing road (Daer Water road) leading from the A702 to the Daer Reservoir.

³¹ Estimated number of breeding territories within 500 m of the Wind Turbine Array is shown in brackets.

Nightjar

- 7.3.87 **Study Area:** 500 m buffer from the Wind Turbine Array and Access Routes (see **Figure 7.7, EIAR Volume 3a**).
- 7.3.88 The RSPB Data Unit returned 10 nightjar records (from a search area within at least 2 km of the Site), nine of which were from 2014, however all records were over 2 km from the Site. Baseline surveys for the Rivox Wind Energy Hub¹⁷ also identify the species presence within the wider area
- 7.3.89 Targeted surveys for breeding nightjar were therefore undertaken during the 2025 breeding season. These were undertaken along and adjacent to the Access Routes, where suitable breeding habitat occurs. No observations of the species were however made.
- 7.3.90 Studies at wind farms in Wales (including the Clocaenog, Pen Y Cymoedd and Brechfa Wind Farms³²) provide evidence that nightjar are not significantly displaced by operational wind farms. The species is also considered to be a low risk of collision, given its generally low flight habit.
- 7.3.91 Due to the absence of species activity recorded within the Site, low risk of displacement and collision, nightjar is **scoped out** of the assessment.

Waterfowl

- 7.3.92 **Study Area:** 500m buffer from the Wind Turbine Array and Access Routes (see **Figure 7.6, EIAR Volume 3a**).
- 7.3.93 No regular notable aggregations of foraging migratory waterfowl (geese and swans) were recorded over the course of surveys and the habitats within the Site are considered unsuitable for such species.
- 7.3.94 The Proposed Development is not located within an area of known importance for foraging greylag or pink-footed goose (as per Mitchell, 2012³³) and is not located within 20 km of any SPA with non-breeding qualifying waterfowl interests, with the potential for connectivity.
- 7.3.95 Over the non-breeding seasons, flight activity surveys recorded small numbers of greylag, pink-footed and white-fronted goose (**Figure 7.12, EIAR Volume 3a**). A single observation of 11 whooper swans was also made in 2025 (**Figure 7.19, EIAR Volume 3a**). No, or negligible collision mortality risks are predicted for these species (see **Table 7.5**).
- 7.3.96 Activity of greylag goose also included observations of birds over the 2023 breeding seasons, which suggests birds recorded locally (at least in part) comprise those associated with the British breeding population (i.e., Amber-listed BoCC, as per Stanbury *et al.*, 2021²⁰ and neither migratory nor listed on Annex 1 of the Birds Directive³⁴).
- 7.3.97 In review of Wetland Bird Survey (WeBS) data for the Daer Reservoir Elvanfoot (Calbrade *et al.*, 2025³⁵), located to the east of the Site, the reservoir is not known to be an important site for migratory waterfowl, but has previously been recorded to support small numbers of common species over the wintering period including cormorant, goosander, goldeneye, tufted duck, teal and mallard.

³² Summarised within Chapter 7 (Ornithology) of the Mynydd Maen Wind Farm Environmental Statement (ES).

³³ Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.

³⁴ EU Directive (2009/147/EC).

³⁵ Calbrade, N.A., Birtles, G.A., Woodward, I.D., Feather, A., Hiza, B., Caulfield, E., Balmer, D.E., Peck, K., Wotton, S.R., Shaw, J.M., and Frost, T.M. (2025). Waterbirds in the UK 2023/24: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO/RSPB/JNCC/NatureScot. Thetford.

- 7.3.98 A small number of goldeneye, a Red-listed Bird of Conservation Concern (as per Stanbury *et al.*, 2021²⁰), were recorded on Daer Reservoir during the 2023 and 2024 breeding seasons (**Figure 7.19, EIAR Volume 3a**). There was however, no evidence of breeding recorded, and the Scottish breeding population is generally confined to parts of the Highlands.
- 7.3.99 Given the small numbers of wintering birds recorded, and likely absence of breeding for higher conservation species, the potential for significant adverse effects upon waterfowl is **scoped out** of assessment.

Gulls

- 7.3.100 **Study Area:** 500m buffer from the Wind Turbine Array and Access Routes (see **Figure 7.6, EIAR Volume 3a**).
- 7.3.101 Common gull was the most frequently recorded gull species over the course of baseline surveys, with all observations occurring in the breeding seasons. These were generally in flight or as part of a colony present at the Daer Reservoir, where a peak of 44 adults and 15 juveniles was recorded in July 2023 (**Figure 7.13, EIAR Volume 3a**). No 'at collision risk' flights were recorded, and no collision mortality risk is predicted (see **Table 7.5**).
- 7.3.102 Observations of black-headed, great black-backed and lesser black-backed gull were also recorded over the surveyed breeding seasons, with occasional observations in the non-breeding seasons (**Figure 7.20, EIAR Volume 3a**).
- 7.3.103 Herring gull flight activity was also low with no regular aggregations of foraging birds recorded within proximity to the Proposed Development, and no 'at collision risk' flight activity recorded.
- 7.3.104 Given the low level of foraging importance within the Site for gull species, as well as the absence of predicted collision mortality risk, the potential for significant adverse effects on gull species is **scoped out** of assessment.

Additional Species

- 7.3.105 Baseline field surveys and existing ornithological information do not identify the Site and immediate surrounding area as being important for any additional breeding bird species or species-groups, and which are identified as being potentially sensitive to onshore renewable energy developments in Scotland and a priority for assessment (as per Annex 1 of NatureScot guidance, 2025b⁵).
- 7.3.106 Observations of more common raptor and owl species including buzzard, kestrel, long-eared owl, sparrowhawk and tawny owl were also made over the course of baseline surveys; however, the potential for significant effects upon these species is **scoped out** of the assessment due to their lower conservation status (Stanbury *et al.*, 2021²⁰) and lower priority for consideration in the assessment of renewable energy developments (NatureScot, 2025b⁵).
- 7.3.107 Observations of common crossbill, fieldfare and redwing, all Schedule 1 listed passerines, were made over the course of the surveys, but breeding within the Site is considered very unlikely for the latter two species, and for common crossbill, the potential exists only within forestry along proposed Access Routes.
- 7.3.108 Industry standard measures as set out in **Section 7.4** would form part of the Proposed Development and would enable legislative compliance with regards to all Schedule 1 breeding species over the construction, decommissioning and operational phases of the Proposed Development (as relevant). The potential for significant adverse effects upon common crossbill, fieldfare and redwing are therefore **scoped out** of the assessment.

Future Baseline

- 7.3.109 In the absence of the Proposed Development, or assuming a gap between baseline surveys and the commencement of the Proposed Development, any noticeable changes in baseline conditions (for example, in the distribution and population of breeding and non-breeding ornithological features) are most likely to result from habitat modifications within or surrounding the Site, or due to widespread land management practices. Such changes are not predicted to happen at least in the foreseeable short or medium-term.
- 7.3.110 The Site is not subject to any other development pressures, which may have the potential to affect habitats and species in such a way as to substantially alter the baseline reported here. In the absence of the Proposed Development, the habitats within the Site are therefore considered most likely to remain under the existing management regime, largely comprising hill grazing for livestock and commercial forestry interests along the proposed Access Routes.

Summary of Important Ornithological Features

- 7.3.111 The assessment considers the potential for significant effects upon those scoped-in ornithological features, hereafter referred to as IOFs, which are considered to be of 'medium' or 'high' Nature Conservation Interest (NCI) (in accordance with the criteria set out in **Technical Appendix 7.3, EIAR Volume 4**), and as confirmed through baseline studies.
- 7.3.112 These IOFs are summarised in **Table 7.8**.

Table 7.8: Summary of scoped-in IOFs		
Feature	NCI	Justification for NCI
Black Grouse	Medium	BoCC Red list (Stanbury <i>et al.</i> , 2021 ²⁰). Priority bird species for assessment (NatureScot, 2025b ⁵).
Golden Eagle	Medium	Schedule 1/A1 and Annex I listed. Priority bird species for assessment (NatureScot, 2025b ⁵).
Red kite	Medium	Schedule 1/1A and Annex I listed. Priority bird species for assessment (NatureScot, 2025b ⁵).
Curlew	Medium	BoCC Red list (Stanbury <i>et al.</i> , 2021 ²⁰). Priority bird species for assessment (NatureScot, 2025b ⁵).

- 7.3.113 The conservation status of each IOF is detailed in **Table 7.9**.

Table 7.9: Conservation status of IOFs Scoped into assessment		
Feature	Conservation Status	Information
Black Grouse	Unfavourable	Black grouse features on the BoCC Red list (Stanbury <i>et al.</i> , 2021 ²⁰) due to historical population declines in the UK, without substantial recent recovery. It also qualifies due to a severe decline in the UK breeding population size of >50% over 25 years. In 2005, Sim <i>et al.</i> (2008 ³⁶) estimated there to be 5,078 male black grouse in the UK, with approximately two-thirds of these occurring in Scotland. Forrester <i>et al.</i> (2012 ³⁷) has subsequently estimated that in Scotland there are around 3,550 to 5,750 lekking males, representing about 71% of the British population.

³⁶ Sim, I.M.W., Eaton, M.A., Setchfield, R.P., Warren, P.K. and Lindley, P. (2008) Abundance of male black grouse *Tetrao tetrix* in Britain in 2005, and changes since 1995-96. *Bird Study*, **55**, pp. 303-313.

³⁷ Forrester, R.W., Andrews, I.J., McNerny, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. and Grundy, D.S. eds (2012). *The Digital Birds of Scotland*. The Scottish Ornithologists' Club, Aberlady.

Table 7.9: Conservation status of IOFs Scoped into assessment		
Feature	Conservation Status	Information
		The most recent Great Britain population published by the Avian Population Estimates Panel (APEP; Woodward <i>et al.</i>, 2020³⁸), was 4,850 males based on a bespoke calculation by N. J. Aebischer for the 2016 population. Assuming Scotland still supports the majority of the British lekking male population (between 60 to 70%), a current estimate for Scottish population may be in the region of 3,395 lekking males. The long-term decline in Scotland (1994 to 2023), as reported within official statistics published by NatureScot in February 2025, is -63%. The rate of decline has also been reported to vary regionally, being higher in southwestern Scotland (-49%) compared to north Scotland (-16%) (Sim <i>et al.</i>, 2008³⁶). The most recently estimated regional NHZ 19 population presented by Wilson <i>et al.</i> (2015³⁹) is 121 displaying males, based on the national survey in 2005. Given suggested rates of decline in the British and Scottish population, such figures may be an overestimate. Current evidence therefore suggests that national and regional (NHZ) black grouse populations are likely in an unfavourable conservation status.
Golden eagle	Unfavourable	The Scottish golden eagle population has been relatively stable over the last few decades and has more recently shown signs of increasing, from a total of 442 breeding pairs estimated at the 2003 Scottish national census (Eaton <i>et al.</i>, 2007⁴⁰) to 508 territories following the 2015 Scottish national census (Hayhow <i>et al.</i>, 2017⁴¹). The latest available Scottish Raptor Monitoring Scheme (SRMS) annual monitoring report (for 2023) states that seven home ranges out of a conservative 11 to 13 pairs estimated by Fielding and Haworth (2014⁴²), were checked in South Scotland in 2023 (Peniche <i>et al.</i>, 2025⁴³). Four of these were in the Scottish Borders and three of these were in Dumfries & Galloway. Of these, four ranges were occupied by pairs, and three by single individuals. Only one pair was however known to have laid eggs in 2023 and was unsuccessful in fledging a chick. In 2025, a further pair (range F02/A29) were also known to successfully fledge a chick²⁷. These results are likely to be reflective of the current situation within the small reintroduced and recovering South Scotland population, which is therefore considered to be in unfavourable condition.
Red kite	Favourable	Woodward <i>et al.</i> (2020³⁸) most recently estimated the red kite UK breeding population to be 4,400 pairs (based on 2017 data), with the species now included on the BoCC Green list (Stanbury <i>et al.</i>, 2021²⁰) indicating that the national population is considered to be in favourable conservation status. Following reintroduction efforts between 1989 and 2009, the Scottish red kite breeding population was estimated by the SRMS to be at least 291⁴⁴ pairs in 2023 (Peniche <i>et al.</i>, 2025⁴³).

³⁸ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds*, **113**, pp. 69–104.

³⁹ Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72.

⁴⁰ Eaton, M.A., Dillon, I.A., Stirling-Aird, P.K. & Whitfield, D.P. (2007). Status of Golden Eagle *Aquila chrysaetos* in Britain in 2003. *Bird Study*, **54**, pp. 212–220.

⁴¹ Hayhow, D. B., Benn, S., Stevenson, A., Stirling-Aird, P. K., & Eaton, M. A. (2017). Status of Golden Eagle *Aquila chrysaetos* in Britain in 2015. *Bird Study*, **64** (3), pp. 281–294.

⁴² Fielding, A.H. and Haworth, P.F. (2014). Golden eagles in the south of Scotland: an overview. Scottish Natural Heritage Commissioned Report No. 626.

⁴³ Peniche, G., Challis, A., Beckmann, B., Wilson, M., Eaton, M., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N. (2025). Scottish Raptor Monitoring Scheme Report 2023. BTO Scotland, Stirling.

⁴⁴ Number of home ranges checked.

Table 7.9: Conservation status of IOFs Scoped into assessment		
Feature	Conservation Status	Information
		with the most recently cited NHZ 19 population estimate being 83 breeding pairs (Wilson <i>et al.</i>, 2015³⁹) based on 2013 monitoring data. The national and regional populations of red kite in Scotland are considered to still remain in their expansion phase. Annual productivity rates remain high (1.5 young fledged/pair laying eggs in 2023, Peniche <i>et al.</i>, 2025⁴³), with the species populations continuing to grow in size and distribution. The most recently cited NHZ 19 population estimate is therefore likely to be conservative. Based on an average annual 3.8% change in the number of pairs reported by the SRMS for NHZ 19 for the period 2008-2018 (Wilson <i>et al.</i>, 2022⁴⁵). In this case, as the NHZ 19 area is largely comparable in extent with the SRMS Dumfries & Galloway (D&G) monitoring area⁴⁶ and for which more contemporary population data is available, a minimum NHZ 19 breeding population of 124 pairs (248 adults, as monitored in 2023), equating to the D&G monitoring area population, can be adopted. The regional NHZ 19 breeding red kite population is consequently assumed to be stable, but growing, and is assigned a favourable conservation status for the purposes of assessment.
Curlew	Unfavourable	The national breeding curlew population estimate was 59,000 pairs in 2016 (Woodward <i>et al.</i>, 2020³⁸), with long-term declines documented across Scotland. The most recently published breeding bird survey report from 2024 suggests a 15% decline in breeding curlew numbers for the period 2013 to 2023 (Heywood <i>et al.</i>, 2025⁴⁷) The NHZ 19 population was most recently estimated by Wilson <i>et al.</i> (2015³⁹) as 4,284 pairs (range 3,851 to 4,717). Based on suggested population trends and a 15% decline in Scotland, the current NHZ 19 population figures may be around 3,641 breeding pairs. The continued inclusion of the species on the BoCC Red list (Stanbury <i>et al.</i>, 2021²⁰) and population declines suggests that the national and regional NHZ populations are in an unfavourable conservation status.

7.4 Mitigation

7.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

- Embedded mitigation - design stage mitigation as outlined in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and the design evolution narrative in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.
- Standard good practice mitigation – mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to its effectiveness; and,
- Specific mitigation - bespoke additional mitigation determined as a result of the conclusions of the EIA (refer to **Section 7.6**).

⁴⁵ Wilson, M., Challis, A. and Wernham, C.V. (2022). Scottish Raptor Monitoring Scheme Trends for 2009-2018: Methods and Analysis of Gaps. A report to the SRMG.

⁴⁶ Albeit the D&G area does include the small NHZ 18: Wigtown Machars & Outer Solway and some of the neighbouring NHZ 20: Border Hills. It does however exclude some of the SRMS South Strathclyde (red) monitoring area.

⁴⁷ Heywood, J.J.N., Massimino, D., Baker, L., Balmer, D.E., Brighton, C.H., Gillings, S., Kelly, L., Noble, D.G., Pearce-Higgins, J.W., White, D.M., Woodcock, P., Workman, E. & Wotton, S. (2025). The Breeding Bird Survey 2024. BTO Research Report 787. British Trust for Ornithology, Thetford.

- 7.4.2 The findings of baseline studies were digitised as GIS data. The layout of the Proposed Development, including the positioning of proposed turbines and other key infrastructure, has then subsequently been designed to avoid or otherwise minimise construction / operational effects upon IOFs through the adherence to disturbance avoidance buffers recommended by NatureScot (2024b²⁶) and Goodship and Furness, (202210), where possible.
- 7.4.3 The following species-specific disturbance avoidance buffers were adopted in the siting of proposed turbine locations (and other key infrastructure):
- Black grouse – 500 m from identified lek sites, and minimisation of all other infrastructure within 750 m;
 - Goshawk – 500 m from identified breeding sites; and
 - Red kite – 500 m from identified breeding sites.
- 7.4.4 The final design of the Proposed Development (including the positioning of proposed turbines and other key infrastructure) has also avoided more sensitive habitats to the lower elevation peripheries of the Site and which were recorded to support higher levels of breeding wader activity. This has therefore minimised the potential for construction/operation effects to such species and also results in the retention of extensive areas within the Site, with the potential to be managed positively as part of the Proposed Development.
- 7.4.5 The under-grounding of all on-site cables would also serve to minimise any additional collision risk for bird species.
- 7.4.6 A summary of standard good practice mitigation and reporting to be implemented and therefore assumed to be in place for the ornithology assessment is set out in **Table 7.10**.

Table 7.10: Summary of Standard Good Practice Mitigation			
ID	Phase*	Description	Purpose of Mitigation
OR01	Pre-construction Construction Operation Decommissioning	Bird Disturbance Management Plan (BDMP)	To enable legislative compliance and safeguarding of all wild and sensitive bird species including those listed on Schedule A1, 1 and 1A of the Wildlife and Countryside Act 1981 (as amended).
OR02	Pre-construction Construction Decommissioning	Appointment of Ecological Clerk of Works (ECOW)	To oversee the implementation of the BDMP and ensure all reasonable precautions are taken to avoid disturbance to birds and comply with environmental legislation.
OR03	Construction Operation Decommissioning	Construction Environmental Management Plan (CEMP)	To ensure construction, decommissioning and operational maintenance works are undertaken in accordance with industry standards and temporary working areas, including borrow pits, are restored.

- 7.4.7 The Bird Disturbance Management Plan (BDMP) (mitigation ref: OR01) would be prepared and implemented for the Proposed Development following consent. The BDMP would detail all good practice and species-specific measures to be implemented during the construction, decommissioning and where relevant during the operation of the Proposed Development, to enable legislative compliance and safeguard all wild and sensitive bird species including those listed on Schedule A1, 1 and 1A of the Wildlife and Countryside Act 1981 (as amended). The BDMP would be informed by information obtained during baseline studies, pre-commencement surveys, consultation with third-party recording groups (as necessary) and would require the

implementation of suitable working restrictions defined in consultation with NatureScot and industry good practice applicable at the time (e.g., the adoption of recommended disturbance avoidance buffers as per Goodship and Furness, 2022¹⁰ controlling the timing, location and nature of construction activities).

- 7.4.8 The BDMP would also include the following additional species-specific measures for black grouse as currently set out in NatureScot standard advice (2024b²⁶) and considered industry good practice. These measures would similarly be informed by pre-commencement surveys:
- a 750 m buffer to be applied around any identified active lek locations, within which suitable working restrictions would be applied before 9am in the months of April and May;
 - installation of markers on any required temporary fencing; and
 - no blasting to be undertaken before 9am in the months of April and May.
- 7.4.9 As the embedded and standard good practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where these mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented.

7.5 Assessment of Likely Effects

- 7.5.1 This section describes the likely impacts and effects during the construction, operation and decommissioning of the Proposed Development on the identified IOFs.
- 7.5.2 For details of the assessment methodology, see **Technical Appendix 7.3 (EIAR Volume 4)**. This outlines the process in which overall significance of an effect is determined, using a combination of sensitivity of feature and impact magnitude.
- 7.5.3 The potential for significant effects is assessed in the context of species' regional NHZ 19 populations, as recommended in NatureScot guidance (2025b⁵) and where it is considered most appropriate to do so. Where alternative geographical populations are considered more appropriate this is justified within the text.

Black Grouse

Construction Phase

- 7.5.4 **Impact:** Disturbance to lekking, breeding and/or foraging black grouse resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.
- 7.5.5 **Sensitivity:** Medium NCI (**Table 7.8**) and likely unfavourable conservation status (**Table 7.9**). Overall, Medium-high sensitivity.
- 7.5.6 **Impact Magnitude:** Goodship & Furness (2022¹⁰) determined black grouse to be of medium sensitivity to disturbance and advised buffer zones of 100 to 150 m around nest sites, and 500 to 750 m around lek locations to avoid potential disturbance impacts.
- 7.5.7 NatureScot's subsequent standard advice in relation to onshore wind farm developments (NatureScot, 2024b²⁶) is that scheme design should incorporate a buffer of at least 500 m between lek and turbine locations, to minimise the potential risk of displacement during operation. Scheme design has therefore incorporated a 500 m turbine set back distance from all lek locations identified during baseline surveys (see **Confidential Figure 7.2.1, EIAR Volume 5**).

- 7.5.8 In accordance with NatureScot's standard advice (2024b²⁶) species-specific measures to avoid the potential for disturbance to lekking black grouse are set out in **Section 7.4** for inclusion within the Proposed Development's BDMP (mitigation ref: OR01). This would include for the implementation of suitable working restrictions within proximity to lek locations during the spring lekking season (March to May). The potential for construction disturbance to the local lekking male population would therefore be avoided.
- 7.5.9 Although females were not recorded during baseline surveys and no evidence of nesting was recorded, research does suggest the importance of habitats within 1.5 to 2 km of lek sites for nesting and brood rearing (e.g., Warren *et al.*, 2012⁴⁸ and White *et al.*, 2013⁴⁹). It is therefore possible that the Site and habitats within proximity to the Wind Turbine Array may be used by some females for these purposes.
- 7.5.10 In this case, use of habitats within close proximity to the Wind Turbine Array would be reasonably limited based on species observations made during baseline surveys, and which were largely restricted to lower altitude areas outside of the Site. The majority of habitats within and around the immediate area of the Wind Turbine Array, range above 500 m AOD, and which is towards the edge of the general altitudinal range for the species in Scotland (e.g., Hancock *et al.*, 1999⁵⁰ and Sim *et al.*, 2008³⁶).**Error! Bookmark not defined.**
- 7.5.11 Where nesting females are found during pre-construction surveys, restrictions would be imposed upon construction activities as part of the BDMP (as for all wild birds), to avoid or otherwise minimise disturbance and enable legislative compliance with the Wildlife and Countryside Act 1981 (see **Section 7.4**).
- 7.5.12 Where black grouse are displaced from potential breeding and foraging habitats within proximity to construction works, impacts would be localised (100 to 150 m, as per Goodship and Furness, 2022¹⁰). Construction activity would also not take place simultaneously across the whole Site and so birds affected may move to adjacent suitable habitats within and outwith the Site, unaffected by construction activities.
- 7.5.13 Overall construction phase impacts to black grouse are therefore considered to be of **short-term** and **negligible** magnitude.
- 7.5.14 **Significance of Effect:** the effect on the regional NHZ 19 black grouse population as a result of construction is concluded as **negligible** and **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER IMPACTS

- 7.5.15 **Impact:** Displacement and therefore indirect habitat loss for lekking, breeding or foraging black grouse due to the presence and operation of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.
- 7.5.16 **Sensitivity:** Medium-high.
- 7.5.17 **Impact Magnitude:** The design of the Proposed Development has incorporated a 500 m turbine set back distance from all lek sites identified during baseline studies in accordance

⁴⁸ Warren, P., Baines, D., & Richardson, M. (2012). Black Grouse *Tetrao tetrix* nest-site habitats and fidelity to breeding areas in northern England. *Bird Study*, **59** (2), pp. 139–143.

⁴⁹ White, P.J.C., Warren, P. and Baines, D. (2013). Spatial and structural habitat requirements of black grouse in Scottish forests. Scottish Natural Heritage Commissioned Report No. 545.

⁵⁰ Hancock, M., Baines, D., Gibbons, D., Etheridge, B., & Shepherd, M. (1999). Status of male Black Grouse *Tetrao tetrix* in Britain in 1995–96. *Bird Study*, **46** (1), pp. 1–15.

with NatureScot guidance (2024b²⁶), and as such has inherently minimised the potential for operational displacement impacts to lekking black grouse.

- 7.5.18 Additionally, for reasoning above, the potential for operational displacement and barrier impacts to nesting and foraging black grouse is also very small, due to the higher altitude location of the Wind Turbine Array and lower sensitivity than lekking birds.
- 7.5.19 The implementation of the BDMP (mitigation ref: OR01) would also continue (as required) throughout the operational period of the Proposed Development, to enable the avoidance of disturbance to lekking males and to minimise disturbance and enable legislative compliance with regards any recorded nesting females (see **Section 7.4**).
- 7.5.20 Overall, within the context of the NHZ 19 population, displacement impacts whilst **long-term** would be of **negligible** magnitude, when taking into account the siting of turbine locations away from lek sites, the implementation of industry standard good practice measures (see **Section 7.4**) and the general sub-optimal suitability of habitats within the Wind Turbine Array for the species.
- 7.5.21 **Significance of Effect:** the effect on the regional NHZ 19 black grouse population as a result of operational displacement is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.
- 7.5.22 Habitat enhancement measures to be included as part of Proposed Development and set out further in **Section 7.7** and the Outline Biodiversity Enhancement Management Plan (OBEMP) (**Technical Appendix 6.7, EIAR Volume 4**) are also likely to provide benefits to black grouse, at least at a local level.

COLLISION MORTALITY RISK

- 7.5.23 **Impact:** Black grouse may be subject to collision mortality risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.
- 7.5.24 **Sensitivity:** Medium-high.
- 7.5.25 **Impact Magnitude:** Due to the absence of flight activity recorded (within the CRAA), no collision mortality risk with rotor blades is predicted for black grouse and the species typically takes short flights, below the rotor sweep height of most modern turbine specifications (mean flight height of 3 m as reviewed by Bright *et al.*, 2009⁵¹). A black grouse collision event with rotor blades during the operational period of the Proposed Development is therefore considered very unlikely.
- 7.5.26 Black grouse are however thought to be susceptible to collision with turbine bases (e.g., as reviewed by Bright *et al.*, 2009⁵¹), as they commute between lekking locations and across nesting and foraging habitat. In this case, given the established low level of activity recorded and likely low importance of the area within and around the Wind Turbine Array, collision events with turbine bases are similarly considered unlikely.
- 7.5.27 The overall predicted impact of collisions for black grouse whilst **long-term**, is considered of **negligible** magnitude.
- 7.5.28 **Significance of Effect:** the effect on the regional NHZ 19 black grouse population as a result of potential operational collision risks is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

⁵¹ Bright, J.A., Langston, R.H.W. and Anthony, S. (2009) Mapped and written guidance in relation to birds and onshore wind energy development in England. Royal Society for the Protection of Birds (RSPB).

Cumulative Effects

- 7.5.29 Based on spatial separation from identified lek sites, the general unsuitability of habitats within the Wind Turbine Array for black grouse and implementation of industry standard mitigation measures, the Proposed Development is not likely to materially contribute to potentially significant adverse cumulative effects on black grouse at the regional NHZ 19 population level.
- 7.5.30 Potentially significant cumulative effects are therefore **scoped out** of further consideration as the Proposed Development is unlikely to contribute to such.

Golden Eagle

- 7.5.31 Given the small and re-establishing nature of the South of Scotland golden eagle population and its geographical separation from the remaining Scottish national population (Fielding et al., 2024b⁵²), effects are considered at the South of Scotland population level rather than NHZ level, with reference to predicted population sizes as set out by Fielding and Haworth (2014⁴²).

Construction Phase

- 7.5.32 **Impact:** Disturbance to breeding, roosting and/or foraging golden eagles resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.
- 7.5.33 **Sensitivity:** Medium NCI (**Table 7.8**) and unfavourable conservation status (**Table 7.9**). Overall, Medium-high sensitivity.
- 7.5.34 **Impact Magnitude:** Construction works for the Proposed Development would occur over 2 km from the known nest site of the F02/A29 range, which is beyond the currently advised disturbance avoidance buffer for the species (1 km, as per Goodship and Furness, 2022¹⁰). Disturbance to birds at and around the known nest site for the F02/A29 range would therefore not occur.
- 7.5.35 No observations of roosting golden eagles were recorded during baseline surveys. In review of satellite tag data, a large number of nighttime roosting locations⁵³ are however suggested to be used around the F02/A29 range (see **Confidential Figure 7.2.2, EIAR Volume 5**), and which is consistent with findings from studies elsewhere in Scotland (e.g., Ford et al., 2019⁵⁴). No nighttime roosting records for male A29 were however identified within the Site during analysis, or within at least 1 km of the Wind Turbine Array, with preference shown for nighttime roosting in areas closer to the range's known nest site (see **Confidential Figure 7.2.2, EIAR Volume 5**).
- 7.5.36 Through its listing on Schedule A1, 1 and 1A of the Wildlife and Countryside Act 1981, measures to avoid the potential for disturbance to breeding and roosting golden eagle (and ensure legislative compliance) would be included within the Proposed Development's BDMP (mitigation ref: OR01), as set out in **Section 7.4**. These measures would include for the undertaking of pre-construction surveys and/or consultation with third-party recording groups to inform the implementation of any required suitable working restrictions overseen by the appointed ECoW (e.g., control of timing, nature and location of works) (mitigation ref: OR02).

⁵² Fielding, A. H., Anderson, D., Barlow, C., Benn, S., Reid, R., Tingay, R., Weston, E. D., & Whitfield, D. P. (2024b). Golden Eagle Populations, Movements, and Landscape Barriers: Insights from Scotland. *Diversity*, **16** (4), pp. 195.

⁵³ Tag data filtered for roosting (night) points.

⁵⁴ Ford, A., Taylor, J. and Jardine, D.C. (2019) Observations on the roosting behaviour of adult male Golden Eagles from satellite telemetry. *Ringling & Migration*, **34** (1), pp. 38-44.

- 7.5.37 Construction works within and around the Wind Turbine Array may additionally restrict birds from foraging over areas of open moorland habitats close to human and other construction related activity. However, as golden eagles can roam widely in search of food, as illustrated by the estimated F02/A29 range boundaries (see **Confidential Figure 7.2.2 and 7.2.3, EIAR Volume 5**), and the patterns of young non-breeding (dispersing) birds in the South of Scotland, which have the potential to cover enormous distances (including into northern England) (e.g., Whitfield and Fielding, 2017⁵⁵ and Fielding et al., 2024b⁵²), the loss of potential foraging habitat loss would be relatively small.
- 7.5.38 Overall, construction disturbance to golden eagles is therefore considered to be **short-term** and no more than **negligible** magnitude.
- 7.5.39 **Significance of Effect:** the effect on the F02/A29 range and South of Scotland golden eagle population as a result of construction works is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER IMPACTS

- 7.5.40 **Impact:** Displacement and therefore indirect habitat loss for breeding and foraging golden eagle due to the presence and operation of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.
- 7.5.41 **Sensitivity:** Overall, Medium-high.
- 7.5.42 **Impact Magnitude:** As assessed for construction phase effects, the potential for operational disturbance to breeding and roosting golden eagles would be avoided. This is based on the known locations of nests being sufficiently beyond the currently advised disturbance avoidance buffer for the species (1 km, as per Goodship and Furness, 2022¹⁰), and the implementation of a finalised BDMP over the Proposed Development's operational phase (see **Section 7.4**).
- 7.5.43 Research into the movements of golden eagles in Scotland provides evidence that golden eagles display a high degree of avoidance of onshore wind farms (Haworth Conservation, 2015⁵⁶, Fielding et al., 2021⁵⁷, 2022⁵⁸, 2023⁵⁹ and 2024c⁶⁰), with early studies suggesting a decrease in use of habitats within 500 m of operational wind turbines (Haworth Conservation, 2015⁵⁶). More recent research, involving the analyses of data from GPS-tagged golden eagles, has however concluded that 500 m is likely a too conservative distance for assessing potential indirect habitat losses to golden eagles from onshore wind farms, with minimum displacement distances of only 70 to 75 m from turbines observed in such studies (Fielding et al., 2021⁵⁷, 2022⁵⁸ and 2023⁵⁹).
- 7.5.44 More recent studies also identify that mean displacement distances are not the same for all turbines, with distances seemingly dependent on the suitability of habitat (Fielding et al.,

⁵⁵ Whitfield, D.P. & Fielding, A.H. (2017). Analyses of the fates of satellite tracked golden eagles in Scotland. Scottish Natural Heritage (SNH) Commissioned Report No. 982.

⁵⁶ Haworth Conservation (2015). Edinbane Windfarm: Ornithological Monitoring 2007–2014. A review of the spatial use of the area by birds of prey. Haworth Conservation Ltd.

⁵⁷ Fielding, A.H. Anderson, D. Benn, S. Dennis, R. Geary, M., Weston, E. Whitfield, D.P. (2021). Non-territorial GPS-tagged golden eagles *Aquila chrysaetos* at two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. *PLoS ONE*, 16, e0254159

⁵⁸ Fielding, A.H. Anderson, D. Benn, S. Dennis, R. Geary, M., Weston, E., Whitfield, D.P. (2022). Responses of dispersing GPS-tagged Golden Eagles *Aquila chrysaetos* to multiple wind farms across Scotland. *Ibis*, **164**, pp. 102–117.

⁵⁹ Fielding, A.H.; Anderson, D.; Benn, S.; Taylor, J.; Tingay, R.; Weston, E.D.; Whitfield, D.P. (2023). Responses of GPS-Tagged Territorial Golden Eagles *Aquila chrysaetos* to Wind Turbines in Scotland. *Diversity*, **15**, p. 917

⁶⁰ Fielding, A.H.; Anderson, D.; Benn, S.; Taylor, J.; Tingay, R.; Weston, E.D.; Whitfield, D.P. (2024c). Approach Distances of Scottish Golden Eagles *Aquila chrysaetos* to Wind Turbines According to Blade Motion Status, Wind Speed, and Preferred Habitat. *Diversity*, **16**, p. 71.

2021⁵⁷, 2022⁵⁸, 2023⁵⁹ and 2024c⁶⁰). Turbine rotor size, blade motion status and wind speed has not been demonstrated as a clear prediction of how close golden eagles will approach operational turbines (Fielding *et al.*, 2021⁵⁷ and 2022⁵⁸), although there is some evidence of closer approach distances at higher wind speeds (Fielding *et al.*, 2024c⁶⁰). Fielding *et al.* (2023⁵⁹) also found no evidence of territorial birds' habituation in their responses to operational turbines and were generally more wary of turbines than non-territorial dispersing birds.

- 7.5.45 NatureScot (2021⁶¹) currently advises that the Golden Eagle Topographical (GET) model (Fielding *et al.*, 2019⁶²) should be used to inform the assessment of potentially significant effects of habitat displacement to golden eagles resulting from wind farm (and forestry) proposals. In review of a GET model layer for the Site and surrounding area, and adopting a precautionary 300 m potential displacement buffer from the outer turbines of the Proposed Development (as per Fielding *et al.*, 2021⁵⁷ and 2022⁵⁸), this comprises an area of approximately 40 km² of which approximately 5.34 km² is identified as being 'good' golden eagle habitat i.e., that with a GET model score of 6 or more (6+), which is not already lost to forestry or operational and consented wind turbines, and which is therefore otherwise available for foraging golden eagles (see **Confidential Figure 7.2.3, EIAR Volume 5**).
- 7.5.46 For non-breeding dispersing birds, given they can cover vast areas (e.g. Whitfield and Fielding, 2017⁵⁵ and Fielding *et al.*, 2024b⁵²), potential habitat losses at a regional South of Scotland level are unlikely to affect the survival of any individual, and can be reasonably concluded as **negligible**, without the requirement for further detailed assessment.
- 7.5.47 For the F02/A29 range, actual habitat loss would depend on the extent to which range boundaries overlap with the Proposed Developments displacement buffer, how large the range boundary is, and the importance of habitats within the displacement buffer for foraging. Generally, habitat losses are more likely to be of significance if only a single pair's core range overlaps the displacement buffer in its entirety, and it may be of less significance for individual pairs where multiple ranges overlap the displacement buffer.
- 7.5.48 In this case, the F02/A29 range represents one of up to 13 ranges conservatively predicted to be supported in the South of Scotland, and one of up to three ranges predicted to be supported within the Lowther Hills (Fielding and Haworth, 2014⁴²), within which the Proposed Development is located. The locations of two other ranges predicted for the Lowther Hills, are understood to include one to the other side of the A74/M74, and one to the north of the Clyde Wind Farm (Fielding and Haworth, 2014⁴²). The likelihood of additional range boundaries within the Lowther Hills (or wider South of Scotland) overlapping with the displacement zone for the Proposed Development, would therefore appear to be low, with potential impacts arising from the Proposed Development likely only to be relevant for the F02/A29 range.
- 7.5.49 The only modelled range boundary overlapping with the displacement buffer for the Proposed Development is that for the non-breeding season, which is estimated to encompass an area of around 150 km², and of which around 102 km² is assigned a score of 6+ by the GET Model. Accounting for habitat within the non-breeding range considered lost to forestry or operational and consented wind farms, around 85 km² remains as 'good' golden eagle habitat.

⁶¹ NatureScot (2021). NatureScot statement on modelling to support the assessment of forestry and wind farm impacts on golden eagle. Available at: <https://www.nature.scot/doc/naturescot-statement-modelling-support-assessment-forestry-and-wind-farm-impacts-golden-eagles>

⁶² Fielding, A.H., Haworth, P.F., Anderson, D., Benn, S., Dennis, R., Weston, E. and Whitfield, D.P. (2019). A simple topographical model to predict Golden Eagle *Aquila chrysaetos* space use during dispersal. *Ibis*, **162** (2), pp 400-415.

- 7.5.50 The displacement buffer for the Proposed Development, overlaps the F02/A29 non-breeding range by around 0.4 km², and which would result in a further loss of 0.4 km² of 'good' golden eagle habitat from the range i.e., a potential 0.5% loss.
- 7.5.51 To examine potential range losses for the Proposed Development more qualitatively, the overall level of golden eagle flight activity (particularly that of adult birds) within the displacement zone recorded during baseline surveys has been very low. This is supported by the low collision mortality risk estimated for the species (**Table 7.5**) and absence of any key aggregations of satellite tag points within proximity to the Wind Turbine Array. This overall, suggests that the displacement buffer for the Proposed Development is very unlikely to form an important area for the F02/A29 range, with more important shown to occur to the east and south of the Site.
- 7.5.52 In review of the surrounding landscape, the Proposed Development is also located to the periphery of a very large continuous area of land assigned a score 6+ by the GET model and which, where not lost due to forestry or wind farm developments, would otherwise be available for golden eagles in the southern Lowther Hills group. Key movement corridors for the F02/A29 range and dispersing eagles through this area, such as the connecting ridge lines of Sheil Dodd, Wedder Law, Earn Crag and Scaw'd Law to the south of the Site, would also not be interrupted or severed by the displacement buffer of the Proposed Development.
- 7.5.53 Overall, although some potential foraging habitat for the F02/A29 range may be lost as a result of the Proposed Development, it is unlikely that this would affect the viability or productivity of the range in any year.
- 7.5.54 The implementation of the BDMP (mitigation ref: OR01) would also continue as required throughout the operational period of the Proposed Development, to enable the avoidance of disturbance to breeding and roosting birds (see **Section 7.4**).
- 7.5.55 An impact of **long-term**, but no more than **negligible** magnitude on the F02/A29 range and wider Lowther Hills and wider South of Scotland golden eagle population is therefore predicted.
- 7.5.56 **Significance of Effect:** the effect on the Lowther Hills and wider South of Scotland golden eagle population as a result of operational displacement is concluded to be no more than **negligible** and **not significant** in the context of the EIA Regulations.
- 7.5.57 Habitat enhancement measures to be included as part of Proposed Development and set out further in **Section 7.7** and the Outline Biodiversity Enhancement Management Plan (OBEMP) (**Technical Appendix 6.7, EIAR Volume 4**) are also likely to provide benefits to foraging golden eagle, including within the F02/A29 range.

COLLISION MORTALITY RISK

- 7.5.58 **Impact:** Golden eagles may be subject to a collision risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.
- 7.5.59 **Sensitivity:** Medium-high.
- 7.5.60 **Impact Magnitude:** A very low mean annual collision risk of 0.007-0.011, or one collision event every 91.5-137.2 years is predicted for golden eagle (**Table 7.5**), and which corresponds with the low activity levels recorded during baseline surveys.
- 7.5.61 Evidence presented in Fielding *et al.*, (2021⁵⁷, 2022⁵⁸, 2023⁵⁹ and 2024c⁶⁰) suggests that the general risk of collision to golden eagles in Scotland is also low due to their strong avoidance

behaviour of turbines. Reported collisions are considered to be very rare (seven fatalities reported in the last 10 years⁶³).

7.5.62 With a potential collision event over the operational lifetime of the Proposed Development being considered unlikely to occur, the impact on the South of Scotland population whilst **long-term** is considered to be of **negligible** magnitude.

7.5.63 **Significance of Effect:** the effect on the South of Scotland golden eagle population as a result of potential collision risk is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

Cumulative Effects

7.5.64 The consideration of potentially significant cumulative collision mortality risks for golden eagle is not required in this case, due to negligible effects arising from the Proposed Development and, in the case of collision risk, extensive evidence for the species displacement around onshore wind turbines (Fielding *et al.*, 2021⁵⁷, 2022⁵⁸, 2023⁵⁹ and 2024⁶⁰).

7.5.65 The potential for the Proposed Development to contribute to cumulative construction phase disturbance effects would also be avoided based on the implementation of a BDMP, see **Section 7.4**.

7.5.66 Cumulative operational displacement effects to golden eagle are however considered together with other application stage wind farm developments that overlap the F02/A29 non-breeding range, and which are considered at this time to include the proposed Rivox and Daer Wind Farms. Adopting a 300 m displacement buffer around currently proposed turbine locations for those developments, this might result in the loss of a 4 km² of "good" golden eagle habitat from the F02/A29 non-breeding range. Together with the Proposed Development an overall cumulative loss of 4.4 km² of "good" golden eagle habitat from the non-breeding range might therefore be estimated i.e., a potential 5.18% loss.

7.5.67 The contribution of the Proposed Development to the cumulative effect on the non-breeding range, is however very relatively small and would not occur in core areas of the range, identified by the annual and breeding range boundaries.

7.5.68 As such, the contribution of the Proposed Development to potential significant cumulative operational disturbance/displacement effects to golden eagle, is considered to remain **negligible** and **not significant** in the context of the EIA Regulations.

Red Kite

Construction Phase

7.5.69 **Impact:** Disturbance to breeding and/or foraging red kite resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.70 **Sensitivity:** Medium NCI (**Table 7.8**) and favourable conservation status (**Table 7.9**), therefore an overall Medium sensitivity.

7.5.71 **Impact Magnitude:** Baseline studies identified two red kite breeding sites within proximity Proposed Development (see **Confidential Figure 7.2.4, EIAR Volume 5**). Both breeding sites are understood to relate to the same breeding pair, with one site (KT_2) located within

⁶³ Deaths of Birds of Prey in Scotland from wind farms [Online] Available at: <https://www.nature.scot/doc/freedom-information-request-deaths-birds-prey-scotland-windfarms>

proximity to an Access Route section, and within the upper disturbance distance buffer currently recommended for the species (300 m, as per Goodship and Furness, 2022¹⁰).

- 7.5.72 No red kite roost locations were identified during baseline studies that may be impacted by the Proposed Development.
- 7.5.73 Through its listing on Schedule 1 and 1A of the Wildlife and Countryside Act 1981, measures to avoid the disturbance to breeding (and roosting red kite), would be included within the Proposed Developments BDMP (mitigation ref: OR01), as set out in **Section 7.4**. The potential for disturbance of red kites at their nest sites (or roost sites) during construction works would therefore not occur.
- 7.5.74 Red kites usually forage within 3 km of their nest sites but can forage up to 6 km (Hardey *et al.*, 2013¹⁹). Much of the red kite activity recorded within the Site is therefore most likely related to birds that breed locally, including at those breeding sites identified during baseline studies. Some activity will however be attributable to juvenile or non-breeding adults that can range across much wider areas.
- 7.5.75 Red kites are generally accepted as being opportunistic foragers and scavengers and can often be found nesting close to human habitation and roadways (see **Confidential Figure 7.2.4, EIAR Volume 5**). Any disturbance of foraging birds within proximity to construction working areas is therefore likely to be minimal.
- 7.5.76 Overall, construction impacts to red kite is therefore predicted to be **short-term** and of **negligible** magnitude.
- 7.5.77 **Significance of effect:** the effect on the regional NHZ 19 red kite population as a result of construction works is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

Potential Operational Effects

DISPLACEMENT AND BARRIER IMPACTS

- 7.5.78 **Impact:** Displacement and therefore indirect habitat loss for breeding and/or foraging red kite due to the presence and operations of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.
- 7.5.79 **Sensitivity:** Medium.
- 7.5.80 **Impact Magnitude:** Current evidence suggests that red kites do not exhibit a strong degree of displacement from operational wind farms in Scotland (Duffy and Urquhart, 2014⁶⁴). It is also reasonable to assume that pairs recorded nesting in proximity to the Proposed Development currently have a degree of tolerance to the passing of nearby vehicles and therefore any operational vehicle access taken along Access Routes (see **Confidential Figure 7.2.4, EIAR Volume 5**).
- 7.5.81 The implementation of the BDMP (mitigation ref: OR01) would also continue as relevant throughout the operational period of the Proposed Development, to avoid disturbance to breeding (and where relevant roosting) birds (see **Section 7.4**).
- 7.5.82 Overall operational displacement and barrier impacts to red kite are concluded as being of no more than **long-term** and **negligible** magnitude, as there would continue to be sufficient

⁶⁴ Duffy, K. & Urquhart, B. (2014). Braes of Doune Windfarm Report on Red Kite Studies 2004-2012. A report prepared by Natural Research Projects on behalf of the Braes of Doune Ornithology Steering Group.

available foraging habitat and nesting opportunities for the species surrounding the Proposed Development.

- 7.5.83 **Significance of effect:** the effect on the regional NHZ 19 red kite population as a result of operational displacement is concluded to be negligible and not significant in the context of the EIA Regulations.

COLLISION MORTALITY RISK

- 7.5.84 **Impact:** Red kite may be subject to a collision risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.
- 7.5.85 **Sensitivity:** Medium.
- 7.5.86 **Impact Magnitude:** A mean annual collision mortality risk of 0.248 to 0.263 is predicted for red kite. Based on a likely minimum regional NHZ 19 population of 248 adult breeding birds (see **Table 7.9**), the additional mortality due to collisions represents an increase in baseline mortality of 0.75% (based on the precautionary assumption that all collisions are attributable to breeding adults, and using an annual adult mortality rate of 0.14, as per Sansom *et al.*, 2016⁶⁵).
- 7.5.87 To help determine the magnitude of impact on the population due to collisions, a Population Viability Analysis (PVA) has been used to investigate the impact of additional mortality associated with wind turbine collisions on the future growth rates of the NHZ 19 red kite population (see **Technical Appendix 7.4, EIAR Volume 4** for full details).
- 7.5.88 Reflecting the continued expansion of the NHZ 19 (and wider south Scotland red kite population), the predicted current annual population growth rate appears to be healthy, at 13.6%. Assuming that no density-dependence may limit this growth within the modelled 25-year period (similar assumptions were made by Samson *et al.*, (2016⁶⁵) and Hereward *et al.* (2024⁶⁶) who modelled the north Scotland and Welsh red kite populations respectively), the total population would increase from an estimated 422 individuals (as per 2022 when 124 pairs were monitored for the SRMS), to nearly 11,000 individuals.
- 7.5.89 The addition of 0.263 deaths on average per year was shown to change the predicted growth rate very little, with a reduction from 13.6% to 13.5%, thus remaining healthy (total population at year 25 would be c. 10,500 individuals).
- 7.5.90 These findings are consistent with previous population modelling for the north Scotland population (Samson *et al.*, 2016⁶⁵) which demonstrated that the growth (even where constrained by other significant anthropogenic sources e.g., persecution events) is not necessarily further constrained by additional predicted baseline mortality from onshore wind farms i.e., growth is slowed, but the population remains stable and expanding.
- 7.5.91 Given the small predicted increase in annual baseline mortality for red kite, which would make very little change to the growth rate of the regional population, an impact of **long-term** and **negligible** magnitude is predicted.
- 7.5.92 **Significance of effect:** The effect on the NHZ 19 red kite population as a result of potential collision risk is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

⁶⁵ Sansom, A., Etheridge, B., Smart, J. & Roos, S. (2016). Population modelling of North Scotland red kites in relation to the cumulative impacts of wildlife crime and wind farm mortality. Scottish Natural Heritage Commissioned Report No. 904.

⁶⁶ Hereward, H.F.R., Macgregor, C.J., Gabb, O., Connell, A., Thomas, R.J., Cross, A.V. & Taylor, R.C. (2024). Modelling population-level impacts of wind farm collision risk on Welsh Red Kites. BTO Research Report 766, BTO, Thetford, UK.

- 7.5.93 To further minimise the magnitude of potential operational collision risks upon red kite, it is proposed that an operational livestock carcass monitoring and removal strategy would be implemented for the Proposed Development (OR04). This would include for the regular searching of livestock carcasses within the turbine array, and removal of such off Site to an agreed location (see **Section 7.6**).

Cumulative Effects

- 7.5.94 Given the evidence for limited displacement of red kite around operational wind farms, only collision mortality risks are assessed within a cumulative (NHZ 19) context.
- 7.5.95 **Technical Appendix 7.3 (EIAR Volume 4)** presents a list of wind farm developments located within NHZ 19, and for which available information has been reviewed to obtain cumulative annual collision mortality risks.
- 7.5.96 Despite the numerous operational wind farms within NHZ 19, very few of these developments recorded sufficient, if any, red kite activity to require an assessment of potential collision mortality risks. This is likely to be a reflection of the much lower abundance and distribution of the species at the time of baseline surveys for these developments (e.g., undertaken prior to species-reintroduction efforts and former range establishment). In practice, it is likely that red kite activity is now higher within the area of at least some of these developments, and so collision mortality risks may occur and/or be higher than otherwise previously estimated. It should however also be noted, that many of these developments have been operational for a relatively long time, and so their potential impacts on red kite mortality may be considered as being incorporated into the population parameters included within the red kite population model (**Technical Appendix 7.4, EIAR Volume 4**), and as taken from the most recent annual SRMS monitoring reports.
- 7.5.97 Nevertheless, an NHZ 19 cumulative annual collision mortality risk of 2.243 is estimated. This is comprised of estimates for the Proposed Development (0.263), operational developments (0.014), those under construction (0.387), consented development (1.001) and other application stage developments (0.578) and should be considered as a minimum estimate, both due to possible information gaps, and the increasing red kite population.
- 7.5.98 When considering this additional mortality on the NHZ 19 population in the population model, an additional two deaths per year would reduce the annual growth rate from 13.6% to 13.0%, resulting in a predicted population of c. 9,000 individuals after 25 years (compared to nearly 11,000 under the baseline scenario). Growth in the NHZ 19 population would therefore remain relatively strong.
- 7.5.99 Accounting for the total cumulative collision mortality risk being a possible underestimation of cumulative collision risk, the population model has been run for a range of additional annual mortality of up to ten individuals per year. At five birds, the population growth rate would reduce to 12.1%, and at ten birds this would be 10.4%, resulting in 25-year populations of c. 7,500 and 4,000 individuals respectively (compared to 422 individuals presently).
- 7.5.100 Thus, even accounting for underestimations of additional cumulative mortality, other parameters in the population model such as survival rates within NHZ 19, or the potential for density dependence limiting numbers at some stage, evidence suggests that the regional NHZ 19 red kite population would continue to grow despite additional mortality that may arise from foreseeable wind farm projects.

7.5.101 Overall, therefore, the cumulative collision risk for red kite is considered to be of **low, long-term** impact magnitude, and no more than a **minor** adverse effect, which is **not significant** in the context of the EIA Regulations.

7.5.102 The contribution of the Proposed Development to cumulative collision risks upon red kite would also be minimised through the proposed operational livestock carcass monitoring and removal strategy (OR04) (see **Section 7.6**).

Curlew

Construction Phase

7.5.103 **Impact:** Disturbance to breeding and/or foraging curlew resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.104 **Sensitivity:** Medium NCI (**Table 7.8**) and likely unfavourable conservation status (**Table 7.9**). Overall, Medium-high sensitivity.

7.5.105 **Impact Magnitude:** Baseline surveys over the 2023, 2024 and 2025 breeding seasons recorded between 12 and 22 curlew territories annually within the adopted survey areas. The majority of which were recorded away from the Wind Turbine Array (the core construction area of the Proposed Development), with a maximum of eight territories recorded within 500 m of turbine locations in 2023, representing around 0.22% of possible current NHZ 19 breeding population of 3,641 breeding pairs (see **Table 7.9**).

7.5.106 A disturbance buffer of up to 300 m is currently recommended as being appropriate to avoid the potential for disturbance to breeding curlew (Goodship and Furness, 2022¹⁰). As such, it is unlikely that all breeding curlew pairs within 500 m of the core construction area of the Proposed Development would be displaced from the regional NHZ population in any year due to construction activities associated with the Proposed Development.

7.5.107 Construction activity would also not take place simultaneously across the whole Site during the breeding season and some pairs, where affected by construction disturbance, may move to adjacent suitable habitats within and surrounding the Site, unaffected by construction activities. Where active nest locations are found during pre-construction surveys, restrictions as part of the BDMP (mitigation ref: OR01) would be imposed upon construction activities as part of the BDMP (as for all wild birds), to avoid or where otherwise minimise disturbance and enable compliance with the Wildlife and Countryside Act 1981 (see **Section 7.4**).

7.5.108 As a worst-case, assuming some breeding pairs would be temporarily displaced during the construction phase, (and considered temporarily lost to the NHZ populations for the purposes of assessment) an impact of no more than **negligible** and **short-term** magnitude is predicted.

7.5.109 **Significance of effect:** the effect on the regional NHZ 19 curlew population as a result of construction disturbance is therefore considered to be no more than **negligible** and **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER IMPACTS

7.5.110 **Impact:** Displacement and therefore indirect habitat loss for breeding or foraging curlew due to the presence and operation of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.111 **Sensitivity:** Medium-high.

- 7.5.112 **Impact Magnitude:** Current evidence does not suggest the occurrence of total displacement of breeding curlew from wind farm sites.
- 7.5.113 Evidence from monitoring surveys at the operational Fallago Rig Wind Farm referred to within the Fallago Rig II EIA Report (2015⁶⁷) indicate that curlews were not wholly displaced from operational turbines, with surveys in 2012 recording seven to nine pairs within 200 m of turbines and 16 pairs within 500 m of turbines in 2013. This was stated as being comparable with the pre-construction baseline for the development, of eight pairs in 2004.
- 7.5.114 A study by Pearce-Higgins *et al.* (2009⁶⁸) across 12 wind farms also did not conclude the complete displacement of breeding curlew from turbine arrays, but estimated that curlew density within 500 m of turbines decreased by 42%. An earlier study by Whitfield *et al.* (2010⁶⁹), whilst on a smaller scale, also recorded the presence of breeding curlew territories within 500 m of operational turbines. In the Whitfield *et al.* (2010⁶⁹) study, one turbine from one wind farm had three territories located within 200 m, even though there had been no curlews reported at the particular location prior to construction.
- 7.5.115 It is therefore unlikely that all breeding curlew recorded within 500 m of the Wind Turbine Array would be lost from the regional NHZ 19 population over the Proposed Development's operational lifetime. Adopting the findings of the Pearce-Higgins *et al.* (2009⁶⁸) study and a 42% decrease in the number of breeding curlew pairs within 500 m of proposed turbine locations (up to eight pairs), this would represent a potential displacement of up to five pairs, representing 0.11% of a possible NHZ 19 breeding population estimate of 3,641 breeding pairs (see **Table 7.9**). At least some of such pairs would however most likely be displaced into suitable alternative breeding habitat within the Site or surrounding area.
- 7.5.116 The BDMP (mitigation ref: OR01) would also continue throughout the operational period of the Proposed Development and ensure the adoption of measures to enable legislative compliance with regards any recorded active nest sites.
- 7.5.117 An impact of **negligible** but **long-term** magnitude is therefore predicted.
- 7.5.118 **Significance of effect:** the effect on the regional NHZ 19 curlew population as a result of operational displacement is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.
- 7.5.119 Habitat enhancement measures to be included as part of Proposed Development and set out further in **Section 7.7** and the Outline Biodiversity Enhancement Management Plan (OBEMP) (**Technical Appendix 6.7, EIAR Volume 4**) are also likely to provide benefits to curlew, at least at a local level and offset potential displacement effects to some extent.

COLLISION MORTALITY RISK

- 7.5.120 **Impact:** Curlew may be subject to a collision risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.
- 7.5.121 **Sensitivity:** Overall, medium-high.
- 7.5.122 **Impact Magnitude:** An annual mean collision mortality risk of 0.111 to 0.119 (one collision every 8 to 9 years), is predicted for curlew (see **Table 7.5**).

⁶⁷ Amec Foster Wheeler Environment & Infrastructure UK Ltd. (2015) Fallago Rig 2 Wind Farm & Fallago Rig Wind Farm Extension of Time. Volume 2 Environmental Statement. Chapter 10: Ornithology. December 2015.

⁶⁸ James W. Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. and Bullman, R. (2009). The distribution of breeding birds around upland windfarms. *Journal of Applied Ecology*, 46, pp. 1323-1331

⁶⁹ Whitfield, D.P., Green, M. & Fielding, A.H. (2010). Are breeding Eurasian curlew *Numenius Arquata* displaced by wind energy developments? Natural Research Projects Ltd. Banchory, Scotland.

- 7.5.123 Flight activity was considered largely associated with breeding territories within proximity to the Proposed Development. Predicted collision risks for the purposes of assessment are therefore attributed to the NHZ 19 breeding population, conservatively estimated at 3,641 pairs (or 7,282 adult breeding birds).
- 7.5.124 The additional predicted annual mortality due to collision with operational turbines would result in an increase of 0.03% over the calculated annual baseline mortality rate (0.101, BTO BirdFacts⁷⁰) and which is very small in the context of the regional population level.
- 7.5.125 The increase in annual baseline mortality for curlew is therefore considered to be an effect of **negligible** but **long-term** magnitude.
- 7.5.126 **Significance of effect:** The effect on the NHZ 19 curlew population as a result of potential collision risk is concluded to be **negligible** and **not significant** in the context of the EIA Regulations.

Cumulative Effects

- 7.5.127 Given the very small collision mortality risk predicted for curlew as a result of the Proposed Development, it is highly unlikely that such an effect would contribute to a potentially significant cumulative risk at the NHZ 19 population level. As such, only potentially significant displacement effects are assessed in detail.
- 7.5.128 In review of available information for other wind farm developments located within NHZ 19 (see **Technical Appendix 7.3, EIAR Volume 4**), a minimum estimate (due to unavailable data) of around 129 pairs of curlew are estimated to be displaced from operational, under construction, consented and application stage developments, including the Proposed Development, representing up to 3.54% of the breeding population (3,641 pairs, as per **Table 7.9**).
- 7.5.129 This estimate is however considered to represent an unlikely scenario for the regional NHZ 19 curlew population. In some cases, information available for the various cumulative projects relates to the number of breeding curlew territories located within 500 m of proposed infrastructure, and therefore beyond currently recommended buffers to avoid the potential for disturbance to breeding curlew (300 m, as per Goodship and Furness, 2022¹⁰).
- 7.5.130 The estimation does also not take into account the potential for any overlap in “zones of influence” for each development, and the potential for some pairs to have been “double-counted” in the cumulative displacement figure as a result. The assessment also does not take into account that actual displacement may be variable between developments, on account of individual pair tolerance of disturbance sources.
- 7.5.131 Predicted losses presented for wind farm developments would therefore likely exceed reality, and furthermore the assessment does not consider the provision of positive enhancement measures that may be realised for curlew, such as those set out for the Proposed Development, for M74 West, Cloud Hill (and likely other projects) to further reduce potential displacement effects and deliver enhancements for curlew (and other breeding waders) in the short to long-term future.
- 7.5.132 Potential cumulative operational displacement effects upon for curlew, and arising from the Proposed Development in-combination with other relevant wind farm proposals, are therefore considered to be of **low** yet **long-term** magnitude, and which is overall **minor** and **not significant** in the context of the EIA Regulations.

⁷⁰ Available at: <https://www.bto.org/learn/about-birds/birdfacts/curlew>

Decommissioning Phase

- 7.5.133 As set out in **Section 7.2** potential impacts and likely significant effects on ornithological features associated with the decommissioning the Proposed Development can be reasonably concluded as being comparable, but of equal or lesser significance to construction disturbance effects, over a reduced timeframe.
- 7.5.134 The BDMP (mitigation ref: OR01) as finalised for the Proposed Development would remain in place over the Proposed Development's decommissioning phase, updated as necessary through pre-commencement surveys, to avoid or otherwise minimise the potential for disturbance to all bird species and enable legislative compliance (see **Section 7.4**).
- 7.5.135 Potential impacts and likely significant effects from decommissioning works are therefore concluded to be of **short-term** and **negligible** magnitude for any IOF assessed, of no more than **negligible** significance and **not significant** in the context of the EIA Regulations.

7.6 Specific Mitigation

- 7.6.1 Taking into account the implementation of embedded and standard good practice mitigation, no significant construction or operational phase effects are predicted for any IOF, and therefore no additional specific mitigation measures are required.
- 7.6.2 However, the following specific mitigation measure for red kite is set out for adoption as part of the Proposed Development's operational phase, and is considered industry good practice where collision mortality risks for the species are predicted to occur.
- 7.6.3 A summary of the specific mitigation is set out in **Table 7.11**.

Red Kite

- 7.6.4 To further minimise the risk of potential collision mortality to red kite, an operational livestock carcass recovery protocol (mitigation ref: OR04) would be prescribed and implemented for the Proposed Development. This would include for regular searching of the turbine array area for fallen livestock and removal to an agreed disposal site. This would reduce the likelihood that red kites would be attracted to carrion near to turbines and therefore be subject to collision risk.
- 7.6.5 It is proposed that the finalisation of the protocol, including the frequency of searches, monitoring and review period together would be submitted to SLC for approval in consultation with NatureScot and then implemented, all by way of a suitably worded planning condition.

Table 7.11: Summary of Specific Mitigation					
Description of Impact	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation*	Consultation or Approval Required
Collision mortality risks to red kite.	OR04	Operational carcass recovery protocol	Minimise collision mortality risks.	Operation	Approval with SLC in consultation with NatureScot.

7.7 Enhancement

- 7.7.1 The Proposed Development would include for the implementation of a Biodiversity Enhancement Management Plan (BEMP). The BEMP would be approved by SLC and in

consultation with relevant landowners and stakeholders prior to the commissioning of the Proposed Development, and would be based on the Outline BEMP (OBEMP) presented as **Technical Appendix 6.7 (EIAR Volume 4)**.

- 7.7.2 The BEMP is proposed to have four aims, which encompass moorland, peatland, woodland and grassland enhancement and long-term positive management commitments informed by an appointed Biodiversity Advisory Committee (BAC). Collectively these aims would serve to improve nesting and foraging opportunities for the breeding waders, black grouse, nightjar and foraging raptors, including in areas away from operational infrastructure (mitigation ref: OR05) (see **Figure 6.14, EIAR Volume 3a**).
- 7.7.3 The formation of the BAC and subsequent monitoring and review of management prescriptions would ensure the aims and objectives of the finalised BEMP would be delivered over the operational lifetime of the Proposed Development.
- 7.7.4 Such measures are considered to further minimise displacement effects predicted by the Proposed Development, and would ensure that habitats within the Site are restored from the effects of historical management to a better state than without intervention and in the absence of the Proposed Development.

7.8 Assessment of Residual Effects

- 7.8.1 Following the adoption of additional specific mitigation measures and enhancement measures detailed above, the residual effects upon assessed IOFs remain no more than **negligible** or **minor adverse** and **not significant** in the context of the EIA Regulations.

7.9 Monitoring

Construction (and Decommissioning) Phase Monitoring

BDMP

- 7.9.1 During the construction (and where relevant during the decommissioning phase) ornithological monitoring would be undertaken as required by the appointed ECoW (or qualified ornithologist) to ensure compliance with environmental legislation and determine the scope and effectiveness of mitigation measures as part of the BDMP.

Operational Phase Monitoring

BDMP

- 7.9.2 During the operational phase ornithological monitoring would be undertaken as required to ensure compliance with environmental legislation and determine the scope and effectiveness of mitigation measures as part of the BDMP.

BEMP

- 7.9.3 During the operational phase, ornithological monitoring would be undertaken to measure the effectiveness of habitat management measures for the Proposed Development's agreed BEMP, in relation to ornithological feature numbers and distribution.
- 7.9.4 Monitoring would be used to ensure that habitat management measures remain effective, respond to change in emerging research, stakeholder advice and available technology, and meet the aims and objectives of the BEMP over the operational lifetime of the Proposed Development.

- 7.9.5 Protocols for monitoring would be set out within the BEMP and submitted for approval by the SLC, in consultation with the appointed BAG.

Collision mortality

- 7.9.6 In accordance with considered industry good practice, a protocol for the reporting and removal of all confirmed or suspected bird collision fatalities with the Proposed Development would be submitted to and approved in writing by SLC, in consultation with NatureScot.

7.10 Summary of Assessment

- 7.10.1 **Table 7.12** provides a summary of the assessment along with mitigation and monitoring measures.

Table 7.12: Summary of Ornithology Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Black grouse, Golden Eagle, Red Kite and Curlew – disturbance	OR01 OR02 OR03	Implementation of BDMP Appointment of ECoW. Implementation of CEMP.	Planning condition.	Short-term, Negligible.	Monitoring under BDMP.
Operation					
Black grouse, Golden Eagle, Red Kite and Curlew – displacement	OR01 OR05	Implementation of BDMP and BEMP	Planning condition.	Long-term, Negligible.	Monitoring under BDMP and BEMP.
Black Grouse, Golden Eagle and Red Kite and Curlew – collision mortality risk	-	Not required	n/a	Long-term, Negligible.	Good practice collision reporting protocol.
Red kite – collision mortality risk	OR04	Livestock carcass recovery protocol	Planning condition.	Long-term, Negligible.	Good practice collision reporting protocol.
Decommissioning					
Black grouse, Golden Eagle, Red Kite and Curlew – disturbance	OR01 OR02 OR03	Implementation of BDMP Appointment of ECoW. Implementation of CEMP.	Planning condition.	Short-term, Negligible.	Monitoring under BDMP.
Cumulative Construction					
Assessment not required					
Cumulative Operation					
Golden eagle – displacement	-	Not required.	n/a	Long-term, Negligible.	Monitoring under BDMP and BEMP.
Red kite – collision mortality risk	OR04	Livestock carcass recovery protocol	Planning condition.	Long-term, Minor.	Good practice collision reporting protocol
Curlew - displacement	-	Not required.	n/a	Long-term, Minor.	Monitoring under BDMP and BEMP.

8. Hydrology, Hydrogeology, Geology and Soils

8.1. Introduction

8.1.1 The following Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects on Hydrology, Hydrogeology, Geology and Soils associated with the construction, operation and decommissioning of the Proposed Development.

8.1.2 The specific objectives of the Chapter are to:

- Describe the existing hydrological, hydrogeological and geological baseline;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

8.1.3 The hydrological and hydrogeological assessment has been carried out by Melanie Hooper and Jo Thorp of Ramboll UK Limited (Ramboll). Melanie Hooper (Consultant, MCIWEM) has four years' experience of hydrological assessment for onshore wind farms and energy infrastructure and Jo Thorp (Principal Consultant, MCIWEM) has eight years' experience of EIA in the energy sector.

8.1.4 The geological assessment has been carried out by Jeff Turner, Senior Managing Consultant and Director at Ramboll. Jeff is a Chartered Environmentalist and member of the Society for the Environment, Institute of Environmental Science (IES), and Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA) (CEnv, MEnvSc, PIEMA, BSc (Hons)). Jeff has over 25 years' experience in the co-ordination and management of EIAs, including those for renewable energy developments. As part of this experience, Jeff has been responsible for managing the potential effects of wind farm infrastructure on peat and carbon rich soils, including the identification of suitable mitigation measures to minimise the effects from development.

8.1.5 This Chapter is supported by the following Figures and Technical Appendices:

- Figures (EIAR Volume 3a):
 - **Figure 8.1a: Study Area and Surface Water Features;**
 - **Figure 8.1b: Flood Risk;**
 - **Figure 8.2: Drinking Water Protected Areas Water Resources;**
 - **Figure 8.3: Superficial Geology;**
 - **Figure 8.4: Bedrock Geology;**
 - **Figure 8.5: 625K Hydrogeology;**
 - **Figure 8.6: Surface Water Accumulation;**
 - **Figure 8.7: NVC GWDTE Classification;**
 - **Figure 8.8: NVC GWDTE High Classification;**
 - **Figure 8.9: GWDTE Assessment - GWDTE Classification;**
 - **Figure 8.10: Peat Depths;** and
 - **Figure 8.11: SNH Carbon and Peatland Map 2016 Extract.**
- Technical Appendices (EIAR Volume 4):
 - **Technical Appendix 8.1: Assessment Methodology;**

- **Technical Appendix 8.2: Watercourse Crossing Assessment;**
- **Technical Appendix 8.3: Groundwater Dependent Terrestrial Ecosystems;**
- **Technical Appendix 8.4: Peat Depth Survey Results;**
- **Technical Appendix 8.5: Outline Peat Management Plan;** and
- **Technical Appendix 8.6: Peat Landslide Hazard Risk Assessment.**

8.1.6 Figures and Technical Appendices are referenced in the text where relevant.

8.2. Assessment Methodology

Overview

- 8.2.1 The Hydrology, Hydrogeology and Geology and Soils assessment methodology is detailed in **Technical Appendix 8.1 (EIAR Volume 4)**.
- 8.2.2 Where applicable, the assessment is presented with reference to specific 'areas' of the Site within the Site Boundary. These areas comprise the wind turbine array and associated Eastern and Western Access routes, as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.
- 8.2.3 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being '**Major**' or '**Moderate**'.

Scope of Assessment

Potential Effects Scoped In

- 8.2.4 This Chapter considers the potential effects of the Proposed Development on the hydrological, hydrogeological, geological, and soil characteristics of the Proposed Development.
- 8.2.5 This Chapter considers the effects as result of the Proposed Development on:
- Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution;
 - Flood risk; both risk to the Proposed Development and the potential for direct and indirect impacts of the Proposed Development on off-site flood risk;
 - Water resources; impacts on flow regimes and the geomorphological characteristics of watercourses as a result of proposed watercourse crossings;
 - Potential for effects on hydrology or hydrogeology to lead to secondary effects on Groundwater Dependent Terrestrial Ecosystems (GWDTE). It is noted, however, that the ecology or biodiversity effects (e.g., on sensitive habitats) are captured in **Chapter 6: Ecology (EIAR Volume 2)**; and
 - Potential for effects on carbon rich soils and deep peat, including potential for peat landslide effects.
- 8.2.6 The Chapter assesses the cumulative effects as arising from the addition of the Proposed Development to other developments, which are the subject of a valid planning application (either consented or in planning). Operational and under construction are considered as part of the baseline. Developments close to the end of their operational life are included as part of the baseline to present a 'worst case scenario'.
- 8.2.7 Potential cumulative construction and operational effects with regard to geology and soils have been scoped out of assessment on the basis that no potential for significant cumulative effects have been identified, and given the current condition of the peat and soils at the Site.

It is also considered that the Site is not hydraulically connected or influenced by the cumulative projects put forward.

- 8.2.8 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and takes into account the Outline Construction Environmental Management Plan (**Technical Appendix 2.1, EIAR Volume 4**).
- 8.2.9 The scope of assessment within this Chapter is set out in **Table 8.1**. The scope of the assessment has been informed by the Scoping Report/Opinion (**Technical Appendix 1.4 and 1.5, EIAR Volume 4**) and consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)** and the following legislation, policy, guidance and advice:

LEGISLATION AND POLICIES

- Water Environment and Water Services (Scotland) Act 2003¹;
- Environmental Authorisations (Scotland) Regulations 2018 (EASR)²;
- The Scottish Government (2023) National Planning Framework 4³
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017⁴;
- Flood Risk Management (Scotland) Act 2009⁵;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017⁶;
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015⁷;
- The Public Water Supplies (Scotland) Regulations 2014⁸; and
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013⁹.

GUIDANCE AND ADVICE

- GPP¹⁰ 1: Understanding your environmental responsibilities - good environmental practices;
- GPP 2: Above ground oil storage tanks;
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer;
- GPP 5: Works and maintenance in or near water;

¹ Scottish Government (2003). Water Environment and Water Services (Scotland) Act 2003. Available at: <https://www.legislation.gov.uk/asp/2003/3/contents>

² Scottish Government (2018) Environmental Authorisations (Scotland) Regulations 2018 (EASR) Available at: <https://www.legislation.gov.uk/ssi/2018/219/contents>

³ The Scottish Government. (2023). National planning framework 4. The Scottish Government. Available online: <https://www.gov.scot/publications/national-planning-framework-4/>

⁴ Scottish Government (2017) The Water Environment (Miscellaneous) (Scotland) Regulations 2017. Available at: <http://www.legislation.gov.uk/ssi/2017/389/contents/made>

⁵ Scottish Government (2009) Flood Risk Management (Scotland) Act 2009. Available at: <http://www.legislation.gov.uk/asp/2009/6/contents>

⁶ Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 Available at: <https://www.legislation.gov.uk/ssi/2017/282/note/made>

⁷ Scottish Government (2015) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015. Available at: <https://www.legislation.gov.uk/ssi/2015/346/contents>

⁸ Scottish Government (2017) The Public Water Supplies (Scotland) Regulations 2014 (as amended). Available at: <https://www.legislation.gov.uk/sdsi/2014/9780111024782/contents>

⁹ Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at: <http://www.legislation.gov.uk/ssi/2013/29/introduction/made>

¹⁰ NetRegs. Guidance for Pollution Prevention (GPPs): full list. [online] Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/>

- GPP 6: Working at construction and demolition sites¹¹;
- GPP 13: Vehicle washing and cleaning;
- GPP 21: Pollution incident response planning;
- GPP 22: Dealing with spills;
- PAN 79: Water and Drainage (September 2006) – This PAN was withdrawn on 8 December 2025¹². It was current and considered as part of the assessment at the time of preparation and is therefore included for completeness.
- LUPS-GU31¹³: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3 (October 2014);
- Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2024), Good Practice During Wind Farm Construction¹⁴;
- SEPA (August 2024): Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems¹⁵
- SEPA (August 2024) Guidance on Assessing the Impacts of Development on Groundwater Abstractions¹⁶;
- The Scottish Government (2017), Peat Landslide Hazard and Risk Assessments - Best Practice Guide for Proposed Electricity Generation Developments¹⁷;
- Scottish Government, SNH, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland¹⁸;
- SNH (2016) Carbon and Peatland Map¹⁹;
- The Scottish Government (2009), The Scottish Soil Framework²⁰;
- The Construction Industry Research and Information Association (CIRIA) (2023), Environmental Good Practice on Site (C811)²¹;
- Scottish Renewables and SEPA (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste²²; and

¹¹ Guidance provided in recent GPPs will be followed and take precedent over information provided in PPG 6, which was withdrawn on 14 December 2015, where there is overlap in the provision of advice. For example, guidance on the storage of handling of oils/fuels in GPP 2 will take precedent over guidance provided in Section 5 (Oil use, storage and refuelling) of PPG 6.

¹² Further details available at: <https://www.gov.scot/collections/planning-advice-notes-pans/>

¹³ Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3. Available at:

https://www.sepa.org.uk/media/143868/lupsqu31_planning_guidance_on_groundwater_abstractions.pdf

¹⁴ Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency (SEPA), Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2024) Good practice during wind farm construction. 4th edn. [online] Available at: <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction>

¹⁵ SEPA (August 2024): Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems. Available online: <https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

¹⁶ SEPA (August 2024): Guidance on Assessing the Impacts of Development on Groundwater Abstractions. Available online: <https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

¹⁷ The Scottish Government (2017), Peat Landslide Hazard and Risk Assessments - Best Practice Guide for Proposed Electricity Generation Developments Available at: <https://www.gov.scot/publications/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/>

¹⁸ Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. Guidance on Developments on Peatland, online version only. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot:document/Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf>

¹⁹ Scottish Natural Heritage. (2016). Carbon and Peatland 2016 Map. Available at: http://map.environment.gov.scot/soil_maps/

²⁰ Available at: <https://www.gov.scot/publications/scottish-soil-framework/>

²¹ CIRIA (2023) Environmental Good Practice on Site Guide (C811).

²² Scottish Renewables and SEPA (2012). Development on Peatlands. Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste. Available [here](#).

- SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works²³.

- 8.2.10 The policies set out in NPF4³ particularly in relation to site specific assessment for development on carbon rich soils, the water environment and drainage, require the use of the mitigation hierarchy, with avoidance of impacts on peatland and sensitive hydrological systems prioritised in the first instance where practicable, followed by minimisation through appropriate mitigation and best practice measures. Where avoidance is not possible, restoration measures, including sustainable drainage and water management designed to maintain natural hydrological regimes and protect water quality, should also be considered.
- 8.2.11 Consideration within the assessment has also been given to the net effect of the development on climate emissions, carbon loss and the water environment. A summary of the effects scoped in is presented in **Table 8.1**.

Table 8.1: Effects Considered within the Assessment			
Effect	Phase*		
	C	O/M	D
Alteration to in-channel or overland flow regimes	Yes	Yes	No
Flood Risk at Access Points to the Site	Yes	Yes	No
Sedimentation and Increased Erosion Rates	Yes	Yes	No
Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution	Yes	Yes	No
Permanent alteration or disruption to shallow groundwater flow	Yes	Yes	No
Potential for loss/disturbance to peat and carbon rich soils	Yes	No	No
Potential for peat landslide effects	Yes	No	No

*C=construction, O=operation and maintenance and D=decommissioning.

- 8.2.12 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and takes into account measures set out within the OCEMP (refer to **Technical Appendix 2.1, EIAR Volume 4**).

Potential Effects Scoped Out

- 8.2.13 The assessment focusses on likely significant effects and as such impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the effects scoped out, together with reasoning for scoping them out is presented in **Table 8.2**.

Table 8.2: Effects Scoped Out of the Assessment	
Effect	Reasoning
Flood Risk to the wind turbine array, Battery Energy Storage System (BESS), Substation and Construction Compounds. <i>Note - Flood risk at access points to the Site is scoped into the assessment as set out above.</i>	Based on a review of SEPA Flood Maps ²⁴ , it is noted that flood risk is highly unlikely to increase as a result of the Proposed Development across the majority of the Site, either through development taking place on areas considered to be at risk of flooding or through an increase in flood risk downstream.

²³ SEPA (2011). Restoration Techniques Using Peat Spoil from Construction Works.

²⁴ Available at: <https://beta.sepa.scot/flooding/flood-maps/>

Table 8.2: Effects Scoped Out of the Assessment	
Effect	Reasoning
Private Water Supplies (PWS)	Local authority records indicate that three PWS are located either within the Site or within 250 m of the Site. Two are situated in the southeast of the Site Boundary, outwith a 250 m buffer of proposed infrastructure and construction activity and the third is located in the northeast outside and upslope of the Site Boundary. Therefore, there is no requirement for a separate detailed risk assessment for PWS abstractions (in line with SEPA Land Use Planning System (LUPS) SEPA Guidance Note 31 ¹³). Please refer to the Section 8.3 for further detail.
Groundwater Dependant Terrestrial Ecosystems (GWDTE)	Where it has been identified that potentially groundwater dependent vegetation communities (as identified by ecological surveying and classification of National Vegetation Classification (NVC) communities (refer to Technical Appendix 6.2a, EIAR Volume 4) are not supported by groundwater supplies (Technical Appendix 8.3, EIAR Volume 4) these are scoped out of assessment. The GWDTE assessment confirmed that the majority of potential GWDTE habitats within the Site have a low likelihood of groundwater dependency, with one community assessed as having a moderate likelihood. Site review and inspection by the Hydrology team confirmed this to be maintained primarily by surface water and rainfall inputs rather than groundwater. Therefore, in line with SEPA Guidance, no significant effects on GWDTE are anticipated, and no further detailed risk assessment is required.
Potential effects on geological designations and geological assets	The Proposed Development is not likely to result in likely significant impacts on designated geological resource given the distance to the nearest receptor (greater than 1 km), therefore this has been scoped out of the assessment.
Potential effects from contaminated land/soils	The potential impacts associated with historical contamination have been scoped out as no likely significant contaminative land uses were identified.
Decommissioning effects	Decommissioning activities are anticipated to be of a similar or lesser nature, scale and duration to construction activities and would be controlled through the implementation of appropriate method statements and environmental management measures. On this basis, no likely significant effects are anticipated to arise during decommissioning that would be materially different from, or exceed, those assessed for the construction phase.

Method of Baseline Characterisation

Extent of the Study Area

- 8.2.14 The Study Area, in respect of potential impacts on water resources, includes the Site extent plus a 2 km buffer (refer to **Figure 8.1a, EIAR Volume 3a**). Additionally, the assessment

considers potential hydrological downstream connectivity to areas extending beyond this buffer.

- 8.2.15 The Study Area, in respect of potential impacts on geology, peat and carbon rich soils, considers land within the Site Boundary.

Desk Study

- 8.2.16 The methodology for baseline characterisation is set out as follows:
- Describe surface water hydrology, including watercourses, springs and ponds;
 - Identify existing catchment pressures;
 - Identify private drinking water abstractions and PWS within the Study Area;
 - Identify any flood risks;
 - Describe the hydromorphological conditions of watercourses; and
 - Review desk top soil, geological and peatland information using sources including, but not limited to the National Soils Map of Scotland²⁵, British Geological Survey (BGS) information²⁶, SNH Carbon and Peatland Map¹⁹, and online aerial, Ordnance Survey and historical mapping.

Hydrology Field Survey

- 8.2.17 A survey of the Site, excluding the Western and Eastern Access routes, was conducted by the Ramboll hydrology team in October 2024. The purpose of the site walkover was to:
- Assess the general hydrological conditions;
 - Characterise watercourses such that assumed proposed watercourse crossing points could be assessed; and
 - Assess hydrological conditions at potential GWDTE locations.
- 8.2.18 The survey consisted of visual inspection and geolocated surveying of watercourses. Where potentially groundwater dependent vegetation communities were identified by prior ecological surveying a site-specific review was conducted to identify visual evidence of groundwater emergence, association of habitats to surface water features, and evidence of connection to upslope surface water runoff in association with habitats.
- 8.2.19 In addition to the Ramboll hydrology walkover, information on watercourses along the proposed Eastern and Western Access tracks was obtained from ecological surveys undertaken by MacArthur Green (now SLR) in June 2025. Ramboll requested spatial and descriptive data on all surface water features recorded along these access tracks, including the location, extent and approximate dimensions.
- 8.2.20 The information provided by the ecology team comprised of photographs together with supporting survey notes. This information was used to supplement the hydrology baseline and inform the identification and assessment of potential watercourse crossings and associated mitigation requirements.
- 8.2.21 Ecological surveying in order to identify potential groundwater dependent vegetation communities was carried out by MacArthur Green (now SLR) in June 2023, September 2024, June 2025 and July 2025. Further details of the methodology for NVC surveying of habitats and the results of these surveys are provided in **Chapter 6: Ecology (EIAR Volume 2)**.

²⁵ National Soils Map of Scotland. Available at: <https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/>

²⁶ Available at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

Peat Survey

- 8.2.22 Peat surveys were undertaken at the Site to understand the baseline peat conditions and potential constraints, and to inform the design of the Proposed Development to minimise, as far as practicable, the potential direct and indirect effects on peat and carbon rich soils.
- 8.2.23 The surveys were undertaken by Ramboll on the following dates:
- Stage 1 peat probing was completed by Ramboll in June 2024; and
 - Stage 2 peat probing and coring was completed by Ramboll in April 2025 and with an additional Stage 2 survey undertaken in August 2025 following design refinement.
- 8.2.24 Surveys followed relevant good practice guidance published at the time of the surveys with regard to surveying for developments on peatland^{17, 18}.
- 8.2.25 The Stage 1 survey is a preliminary, low-density survey and was carried out on a 100 m grid across the developable area of the Site and within areas of likely peatland. The probing was carried out using collapsible avalanche probes, allowing for probing in excess of 6 m (although such depths were not reached). This peat depth data, along with other environmental and engineering constraints, were used to inform the early layout of the Proposed Development.
- 8.2.26 The survey points and field data were collected using a handheld Trimble GPS unit. Peat depth data was modelled using Inverse Distance Weighted (IDW) interpolation in GIS software, and a depth model generated using incremented peat depth categories.
- 8.2.27 The high-density probing during the Stage 2 survey was carried out along the access tracks, and at the planned turbine, crane pad, and other infrastructure locations, known at the time of the survey. The sampling pattern comprised:
- Proposed turbine locations: peat probing was undertaken at 10 m intervals along cardinal points from the central point of the infrastructure to a distance of 50 m; and
 - Proposed new tracks: the alignment was probed at 50 m intervals along the track and at points every 10 m perpendicular to the centreline on either side of the proposed track.
- 8.2.28 Again, this was carried out using collapsible avalanche probes, and data collected using a handheld Trimble GPS unit.
- 8.2.29 As part of the Stage 2 surveys, peat cores were taken using a Russian auger, with a sample volume of 0.5 litres (l), and a number of field tests and observations were undertaken. The records taken include:
- Depth of acrotelm;
 - Degree of humification²⁷ to establish amorphous, intermediate, fibrous and content;
 - Degree of humification using the Von Post classification;
 - Fine fibre content, based on scale of F0 (none) to F3 (very high);
 - Coarse fibre content, based on scale of R0 (none) to R3 (very high);
 - Water content, based on scale of B1 (dry) to B5 (very wet); and
 - Substrate underlying the peat where this was possible.
- 8.2.30 A peat depth probe was taken adjacent to the core location, and cores were photographed.

²⁷ Hodgson, J.M. (ed.) (1974) Soil Survey Field Handbook: Describing and Sampling Soil Profiles. Technical Monograph No. 5, Soil Survey of England and Wales, Harpenden

- 8.2.31 Further information on the survey methodology is included in the Peat Depth Report (**Technical Appendix 8.4, EIAR Volume 4**).

Peat Landslide Hazard Risk Assessment

- 8.2.32 A Peat Landslide Hazard Risk Assessment (PLHRA) was undertaken by Ramboll in 2025 in accordance with the methodologies set out within Scottish Government guidance¹⁷. The results are included in **Technical Appendix 8.6 (EIAR Volume 4)**.

Borrow Pit Assessment

- 8.2.33 A borrow pit assessment was undertaken by Ramboll to provide an estimate of the suitability of the rock available for use as part of the Proposed Development, areas and volumes, and restoration requirements. It should be noted that the assessment was undertaken using desk top information supplemented by incidental information gathered in the field during the peat depth surveys. No ground investigation was undertaken to inform the assessment. Further information on the methodology and the results are included in the Borrow Pit Assessment (**Technical Appendix 2.2, EIAR Volume 4**).

Method of Assessment

Overview

- 8.2.34 Detailed information on the assessment methodology, including criteria for assessing sensitivity of receptors, magnitude of change and cumulative effects, as well as overall significance criteria, is provided in **Technical Appendix 8.1 (EIAR Volume 4)**.

Limitations and Assumptions

- 8.2.35 This assessment refers to, and uses, publicly available data sources and relies upon the accuracy of this data.
- 8.2.36 At this stage, the final quantities required to construct the Proposed Development are estimates, and the final extent and estimate of material to be won and reused, such as peat and soils at the borrow pit areas would be confirmed following completion of an intrusive ground investigation exercise which would be undertaken when the Proposed Development is consented.
- 8.2.37 The assessment also relies on an assumption that the schedule of good practice measures set out in this Chapter is implemented through the CEMP (outline CEMP provided in **Technical Appendix 2.1, EIAR Volume 4**) and Outline Peat Management Plan (OPMP) (refer to **Technical Appendix 8.5, EIAR Volume 4**). These documents would be continually reviewed and updated as required to incorporate further mitigation if required, following the implementation of these good practice measures.

8.3. Baseline Conditions

Current Baseline

Hydrology

- 8.3.1 The south of the Site (approximately 50% of the total Site area) is within the catchment of Daer Water, upstream of Daer Reservoir. The central area of the Site (approximately 30% of the total Site area) drains to Kirkhope Cleuch which in turn flows to Daer Reservoir with the west of the central catchment draining directly to Daer Reservoir. The north of the Site

(approximately 15% of the total Site area) drains via Meikle and Calf Burn to Daer Water downstream of the reservoir. A very small area (<5% of the total Site area) drains in a north westerly direction to Potrail Water.

8.3.2 Surface water features are detailed on **Figure 8.1a (EIAR Volume 3a)**.

8.3.3 Larger waterbodies to which the Site discharges have been assessed by SEPA under the Water Framework Directive (WFD) classification system²⁸ as follows:

- Daer Water (upstream of Daer Reservoir): Good Overall Condition;
- Daer Reservoir: Good Overall Condition;
- Daer Water (downstream of Daer Reservoir: Moderate Overall Condition; and
- Potrail Water: Good Overall Condition.

Flood Risk

8.3.4 SEPA Flood Risk maps²⁴ show that only lower lying land in close proximity to watercourses within the Site are at risk of flooding from rivers, including areas at a high risk of flooding (1 in 10 (10%) annual probability). The majority of the Site is assessed by SEPA to be at very low likelihood (>1 in 1,000 (0.1%)) Annual Exceedance Probability.

8.3.5 The Eastern Access route extends across Meikle Burn and Daer Water which are shown to be areas of High risk of flooding from rivers (1 in 10 (10%)). The Western Access route extends across the Potrail Water where the land is also shown to be at High risk of flooding from rivers (1 in 10 (10%)). However, the watercourse crossings would be designed to a 1 in 200 annual probability plus allowance for climate change²⁹, ensuring the Site remains accessible during a flood event.

8.3.6 Areas close to smaller watercourses on the Site are shown to be at a High (1 in 10 (10%)), Medium (1 in 200 (0.5%)) and Low (1 in 1,000 (0.1%)) annual probability of Surface Water and Small Watercourse Flooding, including the locations of proposed track crossings of Old Town Burn, Meikle Burn and the headwaters of Kirkhope Cleuch. Crossings of these linear areas of flow accumulation would also be designed to a 1 in 200 annual probability plus allowance for climate change. No track would cross the Benuff Burn and no development is proposed within the narrow flood plain adjacent to this small watercourse.

8.3.7 SEPA mapping shows that the main area of the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability), including all proposed turbine locations.

8.3.8 Flood risk in relation to the Site is shown on **Figure 8.1b (EIAR Volume 3a)**.

Water Resources

8.3.9 According to British Geological Society (BGS) hydrogeological mapping³⁰, the majority of the Proposed Development is underlain by an aquifer of the Gala Group which is classified by the BGS as a Low productivity aquifer. Refer to **Figure 8.5 (EIAR Volume 3a)**.

8.3.10 Following a request for information by Ramboll, South Lanarkshire Council (SLC) have confirmed that there are two PWS locations in the south of the Site, with the respective National Grid References (NGR) of 296270, 605866 and one PWS near, but outwith, the

²⁸ SEPA Water Environment Hub. Available at: <https://www.sepa.org.uk/data-visualisation/water-environment-hub>

²⁹ Scottish Environment Protection Agency (SEPA) (2025) Climate change allowances for flood risk assessment in land use planning [Version 6], Scottish Environment Protection Agency.

³⁰ Available at: https://www2.bgs.ac.uk/groundwater/datainfo/hydromaps/hydro_map_625.html

northern boundary of the Site (NGR: 296526, 610151). The PWS are either situated outside the required 250 m assessment buffer or positioned upslope and beyond the area proposed for infrastructure and therefore fall out with the zone within which hydrogeological impacts on water abstractions are required to be assessed by SEPA. The PWS locations are also not in potential hydrological connectivity to the Proposed Development. Further, hydrological analysis, including review of Site topography, surface water catchments and mapped watercourse networks, confirms PWS identified in the surrounding area are not in potential hydrological/hydrogeological connection to the Site.

- 8.3.11 Approximately 30% of the Site is within the Daer Water Drinking Water Protected Area (DWPA, Surface). This DWPA also includes Daer Reservoir itself, and public water supply is provided from the Daer Water Treatment Works, which are situated adjacent to and downstream from the reservoir. The southern area of the Site is within the catchment of Daer Water, upstream of Daer Reservoir, and there is therefore in hydrological connection to the Daer Water DWPA. The location of the DWPA is shown on **Figure 8.2 (EIAR Volume 3a)**.

Geological Baseline

- 8.3.12 According to BGS geological mapping²⁶, areas of the Site are underlain by superficial deposits of diamicton and alluvial deposits on areas in close connection to watercourses (approximately 5% of the total Site area). Small areas are shown to be underlain by superficial deposits of peat (>5% of the total Site area). Superficial geology is not recorded by the BGS on remaining areas of the Site indicating the absence of superficial deposits in these areas, where shallow soils may directly overlay the bedrock geology. This is shown on **Figure 8.3 (EIAR Volume 3a)**.
- 8.3.13 The majority of the Site is further underlain by bedrock geology of the Mindork Formation (Metasandstone and Metamudstone), with a small area of Ballencleuch Law Granite (Granite) in the southwest of the Site and Gala Unit 4 (Wacke) in the southeast. This is shown on **Figure 8.4 (EIAR Volume 3a)**.
- 8.3.14 According to the Scottish Government's Carbon and Peatland Map (2016)¹⁹ the majority of the Site (approximately 75% of the Site) is no priority peatland habitat (Class 3 – '*occasional peatland habitat can be found but most soils are carbon-rich soils with some areas of deep peat*'). Smaller areas of Class 1 peat, designated as being '*nationally important carbon rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value*', are recorded in the south of the Site forming approximately 10% of its total area. The remaining areas are comprised of Class 4 or Class 5 peat (described as areas unlikely to be associated with peatland habitats or wet and acidic type (Class 4) or peat soil with no peatland vegetation (Class 5)) or where no peat soils are recorded. An extract of the Carbon and Peatland Map in relation to the Site is shown on **Figure 8.11 (EIAR Volume 3a)**.
- 8.3.15 No nationally important environmental designations specifically for peat or geological conservation are located at the Site. However, the Shiel Dod Site of Special Scientific Interest (SSSI) is located immediately to the south of the Site Boundary and has been designated for its biological upland vegetation assemblages, including blanket bog species. These are described and assessed in **Chapter 6: Ecology (EIAR Volume 2)**.
- 8.3.16 There are no Local Geodiversity Sites within the Site; with the closest located approximately 4 km to the west.
- 8.3.17 A review of aerial imagery and OS mapping indicates that drainage and erosion features are present within the Site. This was confirmed during the Site surveys. No mining features or

historic contaminative land uses were identified within the Site based on BGS and Coal Authority information³¹.

GWDTE

- 8.3.18 NVC habitat surveys (**Technical Appendix 6.2a, EIAR Volume 4**) carried out by MacArthur Green (now SLR) has confirmed that areas of the Site are classified as potentially GWDTE, with some areas noted as high potential (**Figures 8.7 and 8.8, EIAR Volume 3a**). Therefore, further hydrological assessment has been carried out by Ramboll to determine the actual likelihood of groundwater dependency and the sensitivity of such habitats. A hydrological assessment of potential impacts of the Proposed Development on GWDTE is provided in **Technical Appendix 8.3 (EIAR Volume 4)**.
- 8.3.19 The GWDTE assessment confirmed that the majority of potential GWDTE habitats within the Site have a low likelihood of groundwater dependency, with one community assessed as having a moderate likelihood (refer to **Figure 8.9, EIAR Volume 3a**). Site review and inspection by the Hydrology team confirmed this to be maintained primarily by surface water and rainfall inputs rather than groundwater. As such no significant effects from the Proposed Development are likely to occur.

Peat Depth and Characteristics

- 8.3.20 Findings of the peat depth surveys are presented in **Technical Appendix 8.4 (EIAR Volume 4)**. In summary, a total of 883 peat depth probes were taken during the Stage 1 peat survey, 1,823 peat probes during Stage 2. This resulted in a combined peat depth dataset of 2,706 probes.
- 8.3.21 The findings of the Stage 1 site-wide low-density peat probing, along with Stage 2 targeted high-density probing and coring surveys found that the majority of the Site is either absent of peat or, where organic soils are present, they are relatively shallow (less than or equal to 0.5 m in depth for 85% of samples).
- 8.3.22 In accordance with the Peatland Survey Guidance¹⁸, peat soil is defined as organic soil exceeding 0.5 m in thickness and containing greater than 60% organic matter; organic layers of less than or equal to 0.5 m are therefore classified as organo-mineral soils rather than peat.
- 8.3.23 Based on this definition, 85% of samples recorded organic layers of less than or equal to 0.5 m or were absent of peat. Further, approximately 95% of the peat depth probes recorded peat depths less than or equal to 1 m depth.
- 8.3.24 The peat depth survey results for the Site are summarised as follows:
- 1,321 no. samples (48.8%) located on land with no peat/absent;
 - 965 no. samples (35.7%) located on land with less than or equal to 0.5 m depth of peat (organo-mineral soil);
 - 294 no. samples (10.9%) located on land with between 0.51 m and 1.0 m depth of peat;
 - 62 no. samples (2.3%) located on land with between 1.1 m to 1.5 m depth of peat;
 - 44 no. samples (1.6%) located on land with between 1.6 m to 2.0 m depth of peat; and
 - 20 no. samples (0.7%) located on land with greater than 2.0 m depth of peat.

³¹ Available at: <https://datamine-cauk.hub.arcgis.com/>

- 8.3.25 The mean peat depth recorded across the Site was 0.27 m. The deepest areas of peat were recorded up to 3.0 m in the southwest of the Site.
- 8.3.26 The peat depth interpolated contours are shown on **Figure 8.10 (EIAR Volume 3a)**.
- 8.3.27 Most of the infrastructure of the Proposed Development has been located in areas where the peat depth is expected to be 0.5 m or less. This includes all of the turbines and their associated hardstanding areas, with the exception of turbines 1, 10 and 12, where the peat depth is expected to be up to 1.5 m for turbine 10 and up to 1 m for turbines 1 and 12. The peat depth beneath the proposed substation and BESS compound is expected to be up to 1 m in depth. The proposed borrow pits and borrow pit search areas are located in areas with peat depths of 0.5 m or less.
- 8.3.28 There are areas of deeper peat within the Site that interface with sections of the proposed permanent access tracks. This includes the proposed access track between turbines 7 and 8, which interfaces with a large area of deep peat where peat depths can be expected to be up to 2.5 m in places. Floating track has been proposed in this area to minimise disturbance and excavation of peat in this section.
- 8.3.29 The peat across the Site is generally intermediate or fibrous in nature, with the majority of the samples assessed as having low to moderate fine fibre content (F1-F2) and low coarse fibre content (R1).
- 8.3.30 The results of the Von Post classification indicate that the majority of the samples tested scored between H4 and H6, indicating slight to moderate rates of decomposition.
- 8.3.31 The mean water content of the peat at all sample locations was variable, with the majority samples comprising dry peat, and the others being wet to very wet. This is consistent with the potential high degree of modification to the peatland through artificial drainage (and to a lesser extent the small area of overplanting with coniferous plantation forest). The drainage of the Site for the purposes of plantation forestry has caused drying, oxidation, and erosion of peat and carbon-rich soils, which has likely increased carbon release.

Peat Geomorphology

- 8.3.32 Digital and aerial photography and DTM Lidar data was used to interpret and map geomorphological features within the Site. This interpretation and the resulting geomorphological map, as shown in **Technical Appendix 8.6 (EIAR Volume 4)**, were subsequently verified during a Site walkover and survey undertaken by an experienced peatland geotechnical engineer in June 2024.
- 8.3.33 The Site predominantly comprises open moorland and semi-improved grassland, with smaller areas of forestry also present. The wind turbines are located outside of the forestry areas. The Western Access to the Site is partly via an existing forestry track, which in places coincides with the Southern Upland Way (SUW). The topography of the Site is undulating.
- 8.3.34 The desk study review found there were no published articles, evidence from historical mapping or landowner accounts of land slips within the Site. Some evidence of peat instability was identified during the surveys, with features including hags, troughs, and other areas of peat erosion noted. Several localised areas of peat flushes were recorded across the Site which displayed basal erosion of peat due to surface water run-off. It is considered that these areas are classed as modified. No major instability features, evidence of incipient instability or past landslides were noted. The lack of visible evidence of instability features during the Site walkovers is consistent with the findings of the desk study.

- 8.3.35 The Site is considered to be Low or Very Low risk with regards to peat slide risk with the exception of three track locations which are considered to be Moderate.
- 8.3.36 It is estimated that the borrow pits would generate approximately 112,000 m³ of stone for use in the construction (e.g., access tracks / hardstandings) of the Proposed Development. It is estimated that approximately 1,276 m³ of peat and peaty soils would be excavated from borrow pits, dependent on the findings of ground investigation (based on the average peat depth at those locations). Peat excavation is also required for other elements of the Proposed Development, including turbine foundations, crane hardstandings, access tracks, the substation, BESS and construction compounds, with the total estimated peat excavation volumes reported within the outline Peat Management Plan (OPMP) (**Technical Appendix 8.5, EIAR Volume 4**).

Future Baseline

- 8.3.37 There is potential for climate change to impact on future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures. This suggests that there may be greater pressures on water resources and rain-fed habitats in summer months in the future. However, summer storms are predicted to be of greater intensity. Therefore, peak fluvial flows associated with extreme storm events may also increase in volume and velocity, with the potential to accelerate and exacerbate erosion of peat and other soils. These climate change factors have been taken into account when considering the potential for significant effects.
- 8.3.38 In the absence of the Proposed Development, it is assumed that the existing peat and carbon rich soils present would be subject to existing land use factors, such as drainage, which has the potential to result in modification to peat. The Study Area is noted to have been modified by these existing factors. However, it is also assumed that in the absence of the Proposed Development there would be no requirement to excavate peat and carbon rich soils.

Summary of Sensitive Receptors

- 8.3.39 A summary of the receptors considered likely to be affected by the Proposed Development, and therefore scoped into the assessment are set out in **Table 8.3**, together with their associated sensitivity.

Table 8.3: Summary of Sensitive Receptors		
Receptor	Sensitivity	Justification
Watercourses and Surface Water Features	Medium	Watercourses crossing the Site and adjacent to the Site are considered to be of medium sensitivity based on the water quality and hydrological characteristics.
Surface Water Resources, Daer Water Surface Water DWPA	High	The majority of the Site is within the catchment of Daer Water. Catchments within the Site are within a Scottish water DWPA. As such, the receptor is of high sensitivity to potential effects from pollution, sedimentation, or changes in hydrological regime arising from construction or operation of the Proposed Development. The protection of this resource is a key consideration, and mitigation measures would be required to ensure no deterioration in water quality or supply.
Watercourse Crossings: Eastern and	High	The Eastern Access track crosses Meikle Burn and Daer Water and the Western Access track crosses Potrail Water. Crossings could potentially alter flow regimes, floodplain connectivity, or

Table 8.3: Summary of Sensitive Receptors

Receptor	Sensitivity	Justification
Western Access Tracks		sediment transport if not properly designed. These receptors are therefore considered of high sensitivity, and mitigation measures including appropriately sized crossing structures, maintenance of hydraulic connectivity, and compliance with SEPA requirements (1 in 200-year flood event plus climate change) would be required to prevent any increase in flood risk.
Soils and Peat	Low (locally medium and high)	Peatland and carbon rich soils are sensitive receptors. These habitat types are included in Annex 1 of the EC Habitats Directive³², are sensitive to environmental change, and are of regional importance. Peatlands which are classified as Class 1 and 2 on the NatureScot Carbon and Peatland Map¹⁹ are considered to be of national importance. Across the Site, ground conditions comprise a mosaic of mineral soils, organo-mineral soils with shallow organic layers (less than 0.5 m depth), areas of shallow peat (greater than and equal to 0.5 m and less than 1 m) and localised areas of deep peat (greater than or equal to 1 m), as shown in the peat depth survey results presented in Technical Appendix 8.4 (EIAR Volume 4). The definitions of shallow and deep peat used for this assessment align with those used by the Soil Survey of Scotland³³. Where carbon rich soil and deep peat with high conservation value are present (i.e. near natural condition and greater than 1.0 m in depth), these areas are considered to be high sensitivity. Areas of peat with average depths between 0.5 m and 1.0 m in mostly near natural condition, or peat between 1.0 m and 2.0 m in depth that is drained, eroded or otherwise modified, are considered to be medium sensitivity. However, the majority of the Site has no peat or peat less than 1 m in depth which is degraded by drainage, erosion or other forms of modification and is therefore considered to be of low sensitivity. Overall, on balance, the Site is considered to be of low sensitivity, with local pockets of medium and high sensitivity peat.

8.4. Mitigation

8.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

³² Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)

³³ Lilly, A. (2023). Origins of the Soil Survey of Scotland 50 cm threshold to define a Peat soil. The James Hutton Institute. Available at: <https://sefari.scot/sites/default/files/documents/Origin%20of%2050%20cm%20Threshold%20for%20Defining%20Peat%20on%20Soil%20Maps%20of%20Scotland.pdf>

- Embedded mitigation – design stage mitigation as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**;
- Standard/Best Practice mitigation – standard/best practice mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness; and
- Specific mitigation – bespoke mitigation determined as a result of the EIA (refer to **Section 8.6**).

8.4.2 As part of the design process the following design principles (i.e., embedded mitigation) were considered:

- The area for wind turbines has been set in the upland areas of the Site and away from Daer Water and its headwater watercourse which contributes towards the protection of the DWPA;
- Application of a minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where a minimum number of watercourse crossings are required;
- Alignment of the track has been designed to minimise the extent of new track and number of watercourse crossings required, where feasible, considering the topography of the Site and other environmental Site constraints;
- Elements of the Proposed Development which may be sensitive to flooding, including all turbines and electrical equipment, located outside of areas assessed by SEPA to be at potential risk of flooding;
- Design process aimed, as far as practicable, to avoid areas of deeper peatland (greater than 1.0 m), blanket bog and wet modified bog, and potential high GWDTEs for the location of turbines and other infrastructure.

8.4.3 Best practice measures for the management of construction activities are set out in the Outline CEMP (**Technical Appendix 2.1, EIAR Volume 4**), OPMP (**Technical Appendix 8.5, EIAR Volume 4**) and PHLRA (**Technical Appendix 8.6, EIAR Volume 4**). A detailed CEMP and PMP would be prepared by the appointed Principal Contractor prior to the commencement of construction.

8.4.4 A summary of the standard/best practice mitigation considered for the hydrology, hydrogeology and geology assessment is set out in **Table 8.4**.

Table 8.4: Summary of Standard/Best Practice Mitigation			
ID	Timing of Mitigation	Description	Purpose of Mitigation
HH01 GE01	Pre-Construction Construction	Preparation of a CEMP to include best working practice to be employed at the Site, particularly with respect to works on or near watercourses and measures for the control of pollution (including sediment laden water) at the Site. The CEMP would include construction methods and environmental protection measures applying best practice guidance as set out in applicable SEPA Guidance for Pollution Prevention (GPPs) ¹⁰ . Implementation of these measures during all aspects of the	Mechanism for implementation of best working practice in relation to the water environment and management of peat/carbon rich soils.

Table 8.4: Summary of Standard/Best Practice Mitigation

ID	Timing of Mitigation	Description	Purpose of Mitigation
		construction phase would ensure construction activity would not cause adverse effects to sensitive receptors. The detailed CEMP would be prepared by the Principal Contractor prior to the commencement of construction, and submitted to the local authority for approval, in consultation with SEPA. Outline CEMP is provided in Technical Appendix 2.1 (EIAR Volume 3a) .	
HH02	Pre-Construction Construction	The appointed Contractor would compile a Pollution Prevention Plan (PPP) which would include details of proposals for the storage and handling of potentially contaminative materials, construction phase Sustainable Drainage Systems (SuDS), construction site plans and proposed drainage management measures. The PPP would form part of the CEMP and be submitted to SLC for approval in consultation with SEPA.	To ensure water quality is maintained and prevent the release of pollutants to the water environment.
HH03	Pre-Construction Construction	Storage of potentially contaminative materials at least 50 m from watercourses. Fuels, oils or chemicals stored on-site would be located over an impervious base and in accordance with the EASR. Petrol interceptors and spill kits would be utilised where chemical spillage is a possibility. Measure to form part of the PPP and therefore CEMP to be submitted to SLC for approval in consultation with SEPA.	To ensure water quality is maintained and prevent the release of pollutants to the water environment.
HH04	Pre-construction Construction	Implementation of construction phase SuDS to provide a surface water management and treatment train. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. To form part of the CEMP which would be submitted to SLC for approval in consultation with SEPA.	Maintain water quality and ensure pre-development runoff rates.
HH05	Construction	The installation of SuDS measures would be supervised by the Ecological Clerk of Works (ECOW).	Management of surface water runoff rates and prevention of the release of sediment laden water.
HH06	Pre-Construction Construction	Any requirement for monitoring water quality within watercourses downstream of the Proposed Development would be approved by SLC in consultation with SEPA and procedures for this would be detailed in the CEMP.	Monitor effectiveness of mitigation with regards to water quality.

Table 8.4: Summary of Standard/Best Practice Mitigation

ID	Timing of Mitigation	Description	Purpose of Mitigation
HH07	Pre-Construction Construction	Sediment capture methods to be implemented at the Site would be detailed in a Drainage Impact Assessment (DIA) which would be prepared by the appointed Contractor. DIA to be submitted to SLC for approval.	Prevention of the release of sediment laden water.
HH08	Pre-Construction Construction	Detailed proposals for the management of surface water runoff at the Site to be prepared by appointed Contractor and submitted to SLC for approval in consultation with SEPA.	Management of surface water runoff rates and prevention of the release of sediment laden water or pollutants to controlled waters.
HH09	Pre-Construction Construction	Drainage design is to be prepared by an appointed Contractor at the detailed design stage to ensure surface water supply is maintained to downslope habitats. Measures would include: ▪ Installation of upslope cut off drains to collect surface water runoff from upslope locations and distribute runoff to downslope areas; ▪ Installation of cross drains below tracks at regular intervals to ensure the distributed conveyance of runoff across linear features (i.e., the collection and downslope release of runoff should not create new preferential surface water flow paths); ▪ Consideration to be given to the installation of granular, permeable sub-base materials on tracks to maintain flows of soil water; and ▪ Installation of SuDS measures to ensure the settlement of sediments, prior to distributed release over downslope vegetated area. Drainage design to be submitted to SLC for approval in consultation with SEPA.	Distribution of surface water to potentially sensitive habitats.
HH10	Pre-Construction Construction	Watercourse crossings to be designed, in line with SEPA requirements, to accommodate flows of a 1 in 200 (0.5%) annual probability, inclusive of an allowance for climate change. Watercourse crossing designed to minimise disruption to bed and banks and allow the continued passage of aquatic and non-aquatic species.	Flood risk management, watercourse protection.

Table 8.4: Summary of Standard/Best Practice Mitigation			
ID	Timing of Mitigation	Description	Purpose of Mitigation
		Closed culverts, where employed, would be oversized to allow naturalisation of the culvert bed substrate, ensuring they don't obstruct passage of fish or other fauna. A detailed Watercourse Crossing Plan would be prepared by appointed Contractor and submitted to SLC for approval in consultation with SEPA.	
HH11	Pre-Construction Construction	The Eastern Access track level would be raised above the 1 in 200 with climate change flood level to maintain access to the Site. Any sections of raised track would be designed to ensure no upstream increase in flood risk would occur i.e. suitable additional capacity would be provided at the crossing or flow paths provided below the track.	Flood risk management, watercourse protection.
GE02	Pre-Construction Construction Operation	An outline PMP is provided in (Technical Appendix 8.5 (EIAR Volume 4)). The appointed Contractor would prepare a detailed PMP prior to the commencement of construction. The PMP would include operational mitigation measures as appropriate. The PMP would be submitted to SLC for approval in consultation with SEPA.	Mechanism for implementation of best working practices in relation to peat and soils.
GE03	Construction Operation	Standard mitigation measures for managing peat slide risk are detailed in Technical Appendix 8.6 (EIAR Volume 4) . These measures would be included in the detailed PMP (refer to GE02).	To manage the risk of peat land slide at the Site.
GE04	Pre-Construction Construction	Micrositing tolerances to be used in the event of encountering unexpected pockets of deep peat. All micrositing to be supervised by a ECoW or suitably appropriately experienced engineer.	To reduce as far as practicable the potential for loss/disturbance to peat and carbon rich soils.
HH12	Operation	A Site maintenance programme with regard to site plant and infrastructure would be implemented by the Principal Contractor. This would include a maintenance schedule which would be developed for all SuDS and drainage assets, including watercourse crossings, installed at the construction stage to ensure that the function and benefit provided by the assets remains for the lifetime of the Proposed Development. Programme to be submitted to SLC for approval.	Ensure effective operation of SuDS and prevent as far as practicable alteration to in-channel or overland flow regimes during operation.

Table 8.4: Summary of Standard/Best Practice Mitigation

ID	Timing of Mitigation	Description	Purpose of Mitigation
HH13	Operation	All maintenance during operation to be carried out in accordance with pollution prevention guidance, setting out best practice measures for working with potentially contaminative materials (e.g., oils and fuels) and spill response procedures in case of the unlikely event of accidental release. Forms part of the CEMP which would be submitted to SLC for approval in consultation with SEPA.	Minimise contamination of soils and prevent the release of pollutants to the water environment.
HH14 GE05	Decommissioning	At the time of decommissioning, a Decommissioning Environmental Management Plan (DEMP) would be prepared and implemented by an appointed Contractor to the extent that the infrastructure is fully or partially decommissioned. It is likely that a DEMP would include mitigation measures implemented during the construction phase for the protection of the water environment and peat/carbon rich soils. DEMP to be submitted to SLC for approval in consultation with SEPA.	Ensure the protection of the water environment during the decommissioning phase.

- 8.4.5 As the design (embedded) and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented and this is discussed further below.

8.5. Assessment of Likely Effects

Potential Construction Effects

Alteration to in-channel or overland flow regimes

- 8.5.1 There is the potential to alter in-channel or overland flow regimes through excavations, disruption to artificial drains, exposure of bare earth or rock and the construction of new or upgraded watercourse crossings as well as the crossing of forestry or field drains. There is the potential for the Proposed Development to lead to a reduced response time to peak flows following heavy rainfall due to the presence of artificial land drainage.
- 8.5.2 The layout of the Proposed Development is set out specifically to minimise interaction with watercourses and to maintain a 50 m buffer of development from watercourses as far as practicable. The design of the Proposed Development has also been set out such that the number of watercourse crossings would be minimised. Design of new watercourse crossings would maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath (mitigation ref: HH10 HH11). Watercourse crossings would also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g., 1 in 200-year event plus climate change allowance) (mitigation ref

HH10/HH11). Crossing locations are identified in **Technical Appendix 8.2 (EIAR Volume 4)**, which also sets out best practice design measures and identifies likely licensing requirements under the EASR² which would be delivered for each crossing location.

- 8.5.3 Maintaining both the quality and quantity of surface water within habitats identified as potentially groundwater dependent is considered important as, although such habitats have been confirmed not to be dependent on groundwater supplies, these areas are primarily sustained by surface water inputs. Appropriate drainage and surface water management measures, including the use of Sustainable Drainage Systems (SuDS) where practicable (mitigation ref HH09), would be adopted to preserve hydrological connectivity within peatland and wetland habitats and to avoid adverse impacts on surface water distribution. These measures would be detailed within the CEMP (mitigation ref: HH01) to be prepared by the appointed Contractor for the Proposed Development.
- 8.5.4 The watercourses and surface water features are of a medium sensitivity to alterations to in-channel or overland flow regimes. Standard mitigation summarised in **Table 8.4** and **Technical Appendix 8.2 (EIAR Volume 4)** would ensure the magnitude of impact on the watercourses and surface water features would be small. Accordingly, alterations to the in-channel flow or overland flow regime would have a temporary, short-term direct, **Minor Adverse** effect and **Not Significant**. Therefore, these are not considered further within this assessment.

Flood Risk at Access Points to the Site

- 8.5.5 There is the potential for increased flood risk at access points to the Site during the construction phase where the Proposed Development access tracks cross watercourses. The Eastern Access track crosses Meikle Burn and Daer Water and the Western Access track crosses Potrail Water. Potential effects could arise from inappropriate crossing design, temporary obstruction of flows, or disturbance of channel banks and floodplains during construction activities.
- 8.5.6 To mitigate potential effects on flood risk, all permanent watercourse crossings associated with the access tracks would be designed in accordance with SEPA requirements, to safely convey the 1 in 200-year flood event plus an appropriate climate change allowance. The detailed design of each watercourse crossing shall seek to ensure hydraulic conveyance is maintained to prevent any restriction of flows, as well as allowing the free passage of mammals and aquatic ecology, including provision of suitable ledges or mammal crossings to ensure free passage to otters during periods of high water-flow (mitigation ref: HH10/HH11).
- 8.5.7 Detailed flow calculations would be undertaken by the appointed Contractor in order to inform detailed design and to inform applications for EASR authorisation. The Contractor shall submit a detailed plan of proposed watercourse crossings to SLC for approval in consultation with SEPA.
- 8.5.8 The watercourse crossings along the Eastern and Western Access tracks are of a high sensitivity to an increase in flood risk. With the implementation of the mitigation measures outlined in **Table 8.4** in relation to flood risk, the magnitude of impact on flood risk at the access points would be small, with no increase in flood risk predicted either on Site or downstream. Accordingly, the resulting effect would be a temporary, medium to long-term, direct **Minor Adverse** effect (**Not Significant**) and it not considered further within this assessment.

Sedimentation and increased erosion rates

- 8.5.9 There is the potential to increase erosion and transport of sediment to watercourses as a result of watercourse crossing construction, vegetation and soil stripping, excavations and dewatering activities. Potential effects include indirect effects on aquatic ecology, fluvial morphology and PWS downstream of the Proposed Development.
- 8.5.10 The CEMP (mitigation ref: HH01) would include measures to minimise potential adverse effects related to sedimentation and increased erosion rates including impacts associated with dewatering which may arise from the excavation of borrow pits and turbine foundations. Therefore, the appointed Contractor would be required to meet regulatory requirements and implement best practice measures as set out in SEPA planning guidance. Sediment capture methods to be implemented at the Site would be detailed in a Drainage Impact Assessment (DIA) that would be prepared by the appointed Contractor post-consent (mitigation ref: HH07).
- 8.5.11 The watercourses and surface water features are of a medium sensitivity to sedimentation and increased erosion rates. Mitigation summarised in **Table 8.4** and in the Outline CEMP (**Technical Appendix 2.1, EIAR Volume 4**) would ensure the magnitude of impact on the watercourses and surface water features from sedimentation and increased erosion would be small. Accordingly, sedimentation and increased erosion rates would have a temporary, medium to long-term, direct, **Minor Adverse** effect (**Not Significant**). Therefore, these are not considered further within this assessment.

Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution

- 8.5.12 There is the potential to impact on receiving soils, groundwater and watercourse quality through the release of contaminated water and stored chemicals used on-site during construction works. Potential effects include effects on water quality and indirect effects on aquatic ecology.
- 8.5.13 Details of construction-phase SuDS (mitigation ref: HH04/HH05) would be set out within the Pollution Prevention Plan (PPP) (mitigation ref: HH02) and incorporated into the final CEMP (mitigation ref: HH01). These measures would establish a surface water management and treatment system designed to prevent the mobilisation of sediments and contaminants, thereby protecting the quality of both surface water and groundwater during construction of the Proposed Development.
- 8.5.14 Water quality monitoring (mitigation ref: HH06) would be implemented during construction to monitor the effectiveness of mitigation measures implemented at the Site with regards to water quality (refer to **Section 8.8** for further details).
- 8.5.15 The watercourses and surface water features are of a medium sensitivity to the impacts of pollution. The standard/best practice mitigation detailed in **Table 8.4** and in the Outline CEMP (**Technical Appendix 2.1, EIAR Volume 4**) would ensure the magnitude of impact would be small. Therefore, the impacts of pollution to watercourses and surface water features would have a temporary, medium to long-term, direct, **Minor Adverse** effect (**Not Significant**). Therefore, these are not considered further within this assessment.

Potential for loss/disturbance to peat and carbon rich soils

- 8.5.16 The Proposed Development has the potential to effect peat and carbon rich soils during the construction phase through changes that could occur due to:

- Compaction of soils/peat from vehicles and infrastructure;
- Potential for increased erosion of peat soils through disturbance, either through direct disturbance or localised drying caused by infrastructure;
- Potential for peat slide caused by the construction of infrastructure which could affect human and environmental receptors (particularly those areas of access track identified as having moderate risk); and
- Loss of peatland habitats and carbon rich soils through excavations for infrastructure including turbines, BESS, substation and access tracks, particularly turbines 1, 10 and 12 (where the peat depth is expected to be up to 1.5 m in depth for turbine 10 and up to 1 m depth for turbines 1 and 12), and also the proposed substation and BESS where peat is recorded to be up to 1 m in depth.

8.5.17 The results of the peat surveys have informed the design such that much of the area where development is proposed has either no peat present or has a shallow organic layer present in the soil (less than 0.5 m depth). These areas are considered as organo-mineral soils. Some localised areas have peat up to 1 m in depth, however in general these areas are also highly modified and as such are assessed to be of low sensitivity. The impact on these areas is considered to be of small magnitude on the basis that the impact is highly localised and would not have any material effect on the integrity of peatland habitats. In the absence of further specific mitigation the effects are **Not Significant (Negligible or Minor)**.

8.5.18 While consideration has been given in the design process to avoid locating infrastructure of the Proposed Development over areas of deep peat (greater than 1 m) where practicable, it has not been possible to completely avoid impacts. This is as a result of the need to take a holistic view of a wide range of technical and environmental constraints, including technical reasons such as the need to orientate hardstandings and tracks optimally taking account of topography to minimise cut and fill requirements and avoiding features such as watercourses for example, and also the presence of other environmental constraints such as heritage, landscape and ecology/ornithology receptors.

8.5.19 Where it has not been possible to avoid these impacts, it has been assumed that industry standard construction techniques and methodologies can be used to reduce the disturbance of peat and carbon rich soils. These include micro-siting within defined tolerances, reduced excavation, and the use of floating road construction where suitable engineering criteria are met, for example shallow topography (below 5%) (mitigation ref: GE02/GE04).

8.5.20 Where impacts are identified on areas of peat considered to be of **medium** or **high** sensitivity, the impacts are considered to be of small magnitude on the basis that the impacts are highly localised and represent a very small (less than 5%) proportion of the peat resource within the Site. On this basis, the effects would be **Minor** adverse and **Not Significant**.

Peat Slide Risk

8.5.21 A PHLRA has been undertaken for the Proposed Development (refer to **Technical Appendix 8.6, EIAR Volume 4**). This concludes that the Site is considered to be low or very low risk with regards to peat slide risk with the exception of three track locations which are located in the north of the Site along the Western (section 6) and Eastern (section 2) Access routes and as part of the permanent SUW diversion (section 10).

- 8.5.22 It is considered that the standard best practice mitigation measures included within **Technical Appendix 8.6 (EIAR Volume 4)** would be sufficient to provide mitigation for very low and low risk areas of the Site (mitigation ref: GE03).
- 8.5.23 In the absence of further specific mitigation the risk level of peat land slide would remain as **Moderate** adverse (**Significant**) for the three areas of track. Further details on specific mitigation for these areas are detailed in **Section 8.6**.

Potential Operational Effects

Alteration to in-channel or overland flow regimes

- 8.5.24 There is the potential for hardstanding surfaces and compacted tracks and infrastructure to lead to increased rates of surface runoff, in turn leading to the potential for increased risk of surface erosion and downstream flood risk; however as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and **Technical Appendix 2.1 (EIAR Volume 4)**, the Proposed Development would incorporate a drainage design using SuDS principles in accordance with The SuDS Manual (C753) 2015³⁴.
- 8.5.25 A comprehensive maintenance schedule would be developed for all SuDS and drainage assets installed at the construction stage to ensure that their function and benefits are sustained for the lifetime of the Proposed Development (mitigation ref: HH12/HH13). This maintenance schedule would include regular inspections, cleaning, and repair activities to prevent blockages, sediment accumulation, and degradation of assets.
- 8.5.26 The watercourses and surface water features are of a medium sensitivity to alterations to in-channel or overland flow regimes. The SuDS maintenance schedule would ensure the magnitude of impact on the watercourses and surface water features would be small. Accordingly, alterations to the in-channel flow or overland flow regime would have a temporary, medium to long-term, direct, **Minor** adverse effect (**Not Significant**). Therefore, these are not considered further within this assessment.

Flood Risk at Access Points to the Site

- 8.5.27 During the operational phase, there is the potential for flood risk effects at the access points to the Site where the operational access tracks cross watercourses identified by SEPA Flood Maps as being at high risk of flooding. Potential effects could arise if permanent crossing structures were to restrict channel capacity, alter floodplain conveyance or lead to increased flows during high rainfall events.
- 8.5.28 All permanent watercourse crossings associated with the operational access roads would be designed and constructed in accordance with SEPA requirements to safely convey the 1 in 200-year flood event plus an appropriate climate change allowance. The detailed design of each watercourse crossing shall seek to ensure hydraulic conveyance is maintained to prevent any restriction of flows, as well as allowing the free passage of mammals and aquatic ecology, including provision of suitable ledges or mammal crossings to ensure free passage to otters during periods of high water-flow (mitigation ref: HH10/HH11).
- 8.5.29 At one crossing location (Daer Water, crossing ref.: WC8) a bridge would span a width of approximately 27 m. At this location the track would be raised as it leads into the crossing (both to the east and west of the watercourse) and raised earthworks would be installed at the confluence of the Meikle Burn and Daer Water. It is anticipated that the bridge at this

³⁴ susDrain.The SuDS Manual (C753). [online] Available at: https://www.susdrain.org/resources/SuDS_Manual.html

location would comprise a single-span structure that would not necessitate works within the watercourse. In line with other crossing locations the bridge would be designed to accommodate the 1 in 200 year + climate change flood event (mitigation ref: HH11).

- 8.5.30 Specification for this crossing at this location would be developed at detailed design stage and would include the preparation of hydraulic modelling to demonstrate that the proposed works would not lead to an increase in flood risk due to either the constriction of flows or the displacement of water on the floodplain. Any measures to mitigate construction on the floodplain, such as openings to allow flows via the proposed track raising or volumetric floodplain compensation, would also be specified in detailed design.
- 8.5.31 Detailed flow calculations would be undertaken by the Contractor in order to inform detailed design and to inform applications for EASR authorisation. The Contractor shall submit a detailed plan of proposed watercourse crossings to SEPA for acceptance (mitigation ref:HH10).
- 8.5.32 The affected watercourses are considered to be of high sensitivity to flood risk effects. With the design and operational controls in place, the magnitude of impact on flood risk at the access points to the Site during operation would be **negligible**. Accordingly, the operational effect would have a temporary, medium to long-term, direct, **Minor** adverse effect (**Not Significant**), and is not considered further within this assessment.

Sedimentation and Increased Erosion Rates

- 8.5.33 There is the potential that alteration of runoff volumes and rates could alter fluvial morphology during the operational phase or lead to increased erosion rates (increasing sediment loads) if surface water runoff from impermeable areas is not appropriately managed. The potential risk of the release of sediment from the activities relating to the operational phase of the Proposed Development is substantially lower than during construction because of the decreased levels of ground disturbance and the reinstatement of vegetation following the construction phase.
- 8.5.34 The CEMP (mitigation ref: HH01) would detail comprehensive mitigation measures to manage and reduce sedimentation and erosion risks effectively. These measures would include strategies for runoff management and regular maintenance (mitigation ref: HH12/HH13) to ensure long-term environmental sustainability and protection of fluvial morphology.
- 8.5.35 The sensitivity of watercourses and surface water features is considered to be Medium. By adhering to the CEMP, the magnitude of impact of watercourses and surface water features as a result of the Proposed Development would be small. Therefore, the impacts of sedimentation and increased erosion rates would have a temporary, medium to long-term, direct, **Minor** adverse effect (**Not Significant**). Therefore, these are not considered further within this assessment.

Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution

- 8.5.36 Occasional maintenance and repair of turbines, BESS and substation equipment would be required during the operational phase, which could involve the operation of plant at the Proposed Development. There is the potential for the release of small volumes of fuel from plant or for the accidental release of contaminative materials transported onto the Site for maintenance.
- 8.5.37 To mitigate these risks and protect both surface water and groundwater bodies from pollution, a comprehensive PPP (mitigation ref: HH13) would be detailed within the CEMP (mitigation

ref: HH01). Regular inspection and maintenance schedules for all plant equipment would be implemented to minimise the risk of leaks and ensure operational integrity (mitigation ref: HH12). Additionally, designated refuelling areas with appropriate containment systems, such as bunding, would be established to capture any accidental releases during maintenance operations (mitigation ref: HH13).

- 8.5.38 The sensitivity of the watercourses and surface water features is determined to be medium. The standard/best practice mitigation detailed in **Table 8.4** and in the Outline CEMP (**Technical Appendix 2.1, EIAR Volume 4**) would ensure the magnitude of impact would be small. Therefore, the operational impacts on water quality of the watercourses and surface water features would have a temporary, medium to long-term, direct, **Minor** adverse effect (**Not Significant**). Therefore, these are not considered further within this assessment.

Potential for Loss/Disturbance to Peat and Carbon Rich Soils

- 8.5.39 There are not anticipated to be any impacts on loss/disturbance to peat further to those identified during the construction phase; therefore, no operational effects are predicted.

Peat Slide Risk

- 8.5.40 The PHLRA (refer to **Technical Appendix 8.6, EIAR Volume 4**) concludes that the majority of the Site is considered to be low or very low risk with regards to peat slide risk, following the implementation of specific mitigation during construction (with reference to the specific mitigation requirements detailed in **Section 8.6**).
- 8.5.41 During operation monitoring of key infrastructure locations would be undertaken through periodic Site walkovers and inspections by a geotechnical specialist employed by the maintenance Contractor to look for signs of unexpected ground disturbance (mitigation ref: GE03).

Potential Decommissioning Effects

- 8.5.42 It is anticipated that at the time of decommissioning, a DEMP (mitigation ref: HH14/GE05) would be implemented by the appointed Contractor to the extent that infrastructure is fully or partially decommissioned. Should full decommissioning of the Site be carried out following the lifespan of the Proposed Development, the Site would be returned to 'the same' or 'a better' condition such that natural drainage conditions would be replicated, as far as practicably possible based on the intended land use.
- 8.5.43 While the risks to geology and soils are similar to those identified during the construction phase, decommissioning could require the breaking up and removal of concrete structures and reinforcement (e.g. turbine bases, transformers substations or buildings); the excavation and removal of crushed rock, geotextile or geogrid reinforcement materials; lifting and removal of cables and the dismantling and laying down of turbine components prior to removal.
- 8.5.44 During the decommissioning phase there is the potential for construction activity to impair the condition of geological (and hydrogeological) resources on and downstream of the Site. NatureScot commissioned research³⁵ identifies potential risks as:
- Bank instability and increased erosion leading to run off effects;
 - Sedimentation and pollution from suspended materials;

³⁵ Nature Scot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>

- Spills of fuels and oils from vehicles, turbine gearboxes and transformers leading to effects on soils; and
- Soil compaction leading to increased runoff and erosion potential.

8.5.45 These potential impacts can be managed through the implementation of management plans and processes, and it is therefore not considered that they would give rise to likely significant effects.

Potential Cumulative Construction Effects

8.5.46 The potential for cumulative effects to occur as a result of the Proposed Development are assessed based on:

- The potential hydrological connection of other developments, which are consented or the subject of a valid planning application;
- The potential for concurrent phases of construction with other developments with the potential for hydrological connection to the Site; and
- Applicable planning conditions with regards to the potential impact of other similar developments on the water environment including requirements for the implementation of drainage measures, pollution prevention and best practice working measures with regards to the water environment.

8.5.47 **Table 8.5** details the cumulative developments that have been taken into account in assessing the potential for cumulative effects as a result of hydrological interaction with the Proposed Development.

Table 8.5: Cumulative developments (Consented/In Planning)³⁶ considered to have hydrological connection to the Proposed Development		
Development	Status	Description
Cloud Hill wind farm	Consented	Situated approximately 19.2 km west within the catchment of the River Nith.
Crookedstane wind farm	Consented	Situated approximately 1.7 km north within the catchment of the River Clyde.
Glenkerie Extension	Consented	Situated approximately 18.8 km northeast within the catchment of the River Tweed.
Glenmuckloch wind farm	Consented	Situated approximately 24.5 km northwest within the catchment of the River Nith.
Kennoxhead Phase 2 wind farm	Consented	Situated approximately 22.4 km northwest within the catchment of the River Clyde
Kennoxhead Phase 2 (Pendbreck Redesign) wind farm	Consented	Situated approximately 23.9 km northwest within the catchment of the River Clyde
Lethans Extension	Consented	Situated approximately 22.4 km northwest within the catchment of the River Ayr with four turbines within the River Nith catchment.
Lethans wind farm	Consented	Situated approximately 26.6 km west within the catchment of the River Ayr.

³⁶ Status of cumulative developments as of 18 December 2025.

Table 8.5: Cumulative developments (Consented/In Planning)³⁶ considered to have hydrological connection to the Proposed Development

Development	Status	Description
Lion Hill wind farm	Consented	Situated approximately 1.3 km east within the catchment of the River Clyde.
Sandy Knowe Extension	Consented	Situated approximately 23.3 km west within the catchment of the River Nith.
Appin wind farm	In Planning	Situated approximately 20.7 km southwest within the catchment of the River Nith.
Bodinglee wind farm	In Planning	Situated approximately 18.8 km north within the catchment of the River Clyde.
Daer wind farm	In Planning	Situated approximately 1.6 km east within the catchment of the River Clyde.
Euchanhead wind farm	In Planning	Situated approximately 23.5 km southwest within the catchment of the River Nith with six turbines in the catchment of the River Dee (Solway).
Grayside wind farm	In Planning	Situated approximately 14.8 km north within the catchment of the River Clyde.
Harestanes South wind farm	In Planning	Situated approximately 13.1 km southeast within the catchment of the River Annan.
Harestanes West wind farm	In Planning	Situated approximately 11.2 km south within the catchment of the River Annan with three turbines within the River Nith catchment.
Herds Hill wind farm	In Planning	Situated approximately 20.7 km west within the catchment of the River Nith.
Lorg	In Planning	Situated approximately 27 km west within the catchment of Water of Ken
M74 West wind farm	In Planning	Situated approximately 14.65 km north within the catchment of the River Clyde.
Oliver Forest wind farm	In Planning	Situated approximately 16.4 km northeast within the catchment of the River Tweed.
Rivox wind farm	In Planning	Situated approximately 3.8 km east within the catchment of the River Annan with three turbines within the catchment of the River Clyde.
Rowancraig wind farm	In Planning	Situated approximately 19.5 km west within the catchment of the River Nith.
Scoop Hill Community	In Planning	Situated approximately 20 km east within the Wamphray Water catchment

8.5.48 Based on the distance from the Site to developments identified above and the limited productivity of the underlying aquifer in the area there is assessed to be a low risk of cumulative hydrogeological effects on the water environment.

- 8.5.49 The majority of cumulative developments within 5 km of the Site are not in hydrological connection with watercourses to which the area of the Site directly drains. The Daer Wind Farm and Rivox Wind Farm are located within the Daer Reservoir DWPA, however it is anticipated that a CEMP would be implemented at both sites as such no cumulative construction effects are expected as a result of these developments.
- 8.5.50 Several of the proposed wind farms are within the wider catchment of the River Clyde, however, the distance of these sites to the River Clyde and its headwaters is such that direct impacts are considered to be of a low probability.
- 8.5.51 All proposed cumulative developments considered above would be subject to the same planning and regulatory requirements as the Proposed Development, with regards to protection of the water environment. At each site this would include management of construction activities under an EASR² by SEPA and the implementation of construction environmental management procedures. There is therefore considered to be a very low likelihood of cumulative effects during the construction phase of the Proposed Development.
- 8.5.52 On the basis of the assessment above, the magnitude of any potential cumulative construction effects on hydrology, hydrogeology, geology and soils is considered to be negligible.

Potential Cumulative Operational Effects

- 8.5.53 The potential for impacts on the water environment is significantly lower during the operational phase of the Proposed Development and the cumulative developments assessed above. At all cumulative developments, drainage design for the implementation of SuDS measures would prevent alteration of runoff rates and hydrological conditions in the surrounding area. Additionally, pollution prevention measures would be implemented for the management of any potentially deleterious materials. Therefore, there would be no cumulative impact on the water environment as a result of the potential interaction of the Proposed Development with operational wind farms.

8.6. Specific Mitigation

- 8.6.1 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 8.6.2 The PLHRA (**Technical Appendix 8.6, EIAR Volume 4**) noted that three sections of track were at moderate risk of peat landslide. To mitigate this risk specific mitigation is proposed through the PLHRA (GE03) as follows:
- Micrositing of infrastructure following additional post-consent ground investigation and detailed design; and
 - Where micrositing is not practicable then excavation of the peat to remove the potential risk would be required.
- 8.6.3 In relation to effects on peat and carbon rich soils, in line with the principles of the mitigation hierarchy under National Planning Framework 4, Soils, Policy 5³, further specific mitigation is proposed. This specific mitigation aims to further reduce non-significant effects on peat and carbon rich soils and provide offsetting (reinstatement) of peatland that would be disturbed by the Proposed Development through implementation of a detailed PMP (mitigation ref: GE02) and enhancement of some of the currently degraded peatland habitats present on the Site as set out in the Outline Biodiversity Enhancement Management Plan (OBEMP) (**Technical Appendix 6.7, EIAR Volume 4**).

- 8.6.4 The mitigation approach for the Proposed Development uses a combination of reuse and restoration which has formed the peat management strategy (as described in the outline PMP **Technical Appendix 8.5 (EIAR Volume 4)**).
- 8.6.5 The primary reuse strategy for excavated peat at the Proposed Development is to reinstate temporary construction areas, including borrow pits, and to restore peat within permanent infrastructure locations (e.g., turbine foundations/hardstand areas), as set out in Table 8.5.2 of the outline PMP (**Technical Appendix 8.5, EIAR Volume 4**).
- 8.6.6 It is also noted that excavated peat could be reused for the restoration and enhancement of habitats at the Site as detailed in **Technical Appendix 6.7 (EIAR Volume 4)**, for example the infilling of artificial drainage channels and erosion features and gullies. This is described further in the outline PMP (**Technical Appendix 8.5, EIAR Volume 4**).
- 8.6.7 At this stage it is estimated that the Proposed Development would result in the excavation of approximately 48,480 m³ of peat including peaty/organo-mineral soils. (comprising approximately 48,334 m³ acrotelmic peat and 146 m³ of catotelmic peat).
- 8.6.8 Potential reinstatement opportunities for excavated peat, comprising temporary infrastructure reinstatement, and borrow pit restoration are estimated to be 99,707 m³, which demonstrates that all excavated peat can be reused for reinstatement opportunities.
- 8.6.9 Based on the compensation ratios and enhancement proposals included within the OBEMP (refer to **Technical Appendix 6.7, EIAR Volume 4**) there is no requirement for a large volume of peat for enhancement purposes.

8.7. Assessment of Residual Effects

Residual Construction Effects

- 8.7.1 The assessment has identified that there are no significant effects arising from the Proposed Development, taking in to account mitigation measures implemented in the construction phase. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Residual Operational Effects

- 8.7.2 The assessment has identified that there are no significant effects arising from the Proposed Development, taking in to account mitigation measures implemented in the operational phase. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Residual Decommissioning Effects

- 8.7.3 At the point of decommissioning of the Proposed Development, the CEMP, PMP and OBEMP developed during the construction phase shall provide guidance for the management of risk to the water and soils environment, and the development of the DEMP. These would be reviewed (along with any changes in legislation, climate, designations, habitats or water use) and used to plan decommissioning activity. The assessment provided above sets out that no significant effects would occur as a result of decommissioning of the Proposed Development. It is therefore considered that the residual effect would be **Negligible** and **Not Significant**.

Residual Cumulative Construction Effects

- 8.7.4 No residual cumulative construction effects in relation to Hydrology, Hydrogeology, Geology and Soils are considered likely to occur as a result of the Proposed Development and cumulative schemes identified.

Residual Cumulative Operational Effects

- 8.7.5 No residual cumulative construction effects in relation to Hydrology, Hydrogeology, Geology and Soils are considered likely to occur as a result of the Proposed Development and cumulative schemes identified.

8.8. Monitoring

Construction Phase Monitoring

- 8.8.1 Best practice monitoring measures would be set out in the CEMP and PMP (mitigation ref: HH01/GE01/GE02) to be prepared and implemented by the appointed Contractor. These Plans would be secured through a suitably worded planning condition and submitted to SLC for approval prior to the commencement of relevant works.
- 8.8.2 Given that the Site is located within a DWPA, water quality monitoring would be undertaken during the construction phase to ensure that there is no deterioration in surface water quality (mitigation ref: HH06).
- 8.8.3 At watercourse crossing points, or where other infrastructure is necessary within 50 m of a surface watercourse, either as described in this Chapter or as identified by the ECoW, the installation of SuDS measures would be supervised by the ECoW during the construction phase of works (mitigation ref: HH05).
- 8.8.4 Furthermore, as part of the management of peat slide risk ongoing monitoring of construction activities and key locations on the Site would be undertaken to ensure that mitigation measures required during construction are effective, and to identify any unexpected ground disturbance.

Operational Phase Monitoring

- 8.8.5 Water quality monitoring would also be undertaken during the operational phase. Monitoring would focus on surface water bodies and drainage pathways potentially influenced by the Proposed Development, including watercourses downstream of access track crossings and SuDS outfalls. Monitoring would be risk-based and proportionate and would be designed to confirm that operational activities do not result in deterioration of water quality or compromise the integrity of the DWPA.
- 8.8.6 During operation monitoring of key infrastructure locations would continue through Site walkovers and inspections by a geotechnical specialist provided by the maintenance Contractor to look for signs of unexpected ground disturbance in relation to peat slide risk.

Decommissioning Phase Monitoring

- 8.8.7 Monitoring at the decommissioning phase would be in line with recommendations set out for the construction phase and detailed in the DEMP, which would be prepared and implemented by the appointed Contractor at the time of decommissioning. The DEMP would be submitted to SLC for approval and secured as part of a suitably worded planning condition.

8.9. Summary of Assessment

- 8.9.1 **Table 8.7** summarises the potential significant effects considered as part of this assessment alongside the proposed mitigation measures and monitoring requirements.

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Alteration to in-channel or overland flow regimes	HH01	Preparation and implementation of CEMP.	Submitted to SLC for approval in consultation with SEPA.	Not Significant	N/A
	HH04	Implementation of construction phase SuDS to provide a surface water management and treatment train.	Detailed design and specifications for the SuDS measures included in the CEMP.		
	HH05	Installation of SuDS measures to be supervised by the ECoW.	As detailed in the CEMP.		
	HH08	Detailed proposals for the management of surface water runoff at the Site.	Surface water runoff management proposals submitted to SLC for approval in consultation with SEPA.		
	HH09	Drainage management proposals to ensure surface water supply is maintained.	Drainage management proposals submitted to SLC for approval in consultation with SEPA.		
	HH10/HH11	Watercourse crossings would be designed to accommodate the 1 in 200 with climate change. Additionally, watercourse crossing will be designed to minimise disruption to bed and banks and allow the continued passage of aquatic and non-aquatic species.	Detailed Watercourse Crossing Plan submitted to SLC for approval and consultation with SEPA.		
Flood Risk at Access Points to Site	HH10/HH11	As above	As above	Not Significant	NA
Sedimentation and increased erosion rates	HH01	Preparation and implementation of CEMP.	Submitted to SLC for approval in consultation with SEPA.	Not Significant	N/A

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
	HH04	Implementation of construction phase SuDS to provide a surface water management and treatment train.	Detailed design and specifications for the SuDS measures included in the CEMP.		
	HH05	Installation of SuDS measures to be supervised by the ECoW.	As detailed in the CEMP.		
	HH07	Sediment capture methods to be implemented at the Site would be detailed in a Drainage Impact Assessment (DIA).	DIA to be submitted to SLC for approval.		
	HH08	Detailed proposals for the management of surface water runoff at the Site.	Surface water runoff management proposals submitted to SLC for approval in consultation with SEPA.		
	HH09	Drainage management proposals to ensure surface water supply is maintained.	Drainage design to be submitted to SLC for approval in consultation with SEPA.		
Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution	HH01	Preparation and implementation of CEMP.	Submitted to SLC for approval in consultation with SEPA.	Not Significant	Water quality monitoring (HH06) - Forms part of CEMP to be submitted to SLC for approval in consultation with SEPA.
	HH02	Appointed Contractor would compile a Pollution Prevention Plan (PPP) which would include details of proposals for the storage and handling of potentially contaminative materials, construction phase Sustainable Drainage Systems (SuDS), construction site plans and proposed drainage management measures.	Forms part of CEMP which would be submitted to and approved by SLC, in consultation with SEPA.		
	HH03	Storage of potentially contaminative materials at least 50 m from watercourses.	Forms part of CEMP/PPP which would be submitted to and		

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
		Fuels, oils or chemicals stored on-site would be sited over an impervious base and according with the EASR. Petrol interceptors and spill kits will be utilised where chemical spillage is a possibility.	approved by SLC, in consultation with SEPA.		
	HH04	Implementation of construction phase SuDS to provide a surface water management and treatment train.	Detailed design and specifications for the SuDS measures included in the CEMP.		
	HH05	Installation of SuDS measures to be supervised by the ECoW.	As detailed in the CEMP.		
	HH07	Sediment capture methods to be implemented at the Site would be detailed in a Drainage Impact Assessment (DIA).	DIA to be submitted to SLC for approval.		
Permanent alteration or disruption to shallow groundwater flow	HH09	Drainage management proposals to ensure surface water supply is maintained.	Drainage design to be submitted to SLC for approval in consultation with SEPA.	Not Significant	N/A
Potential for loss/disturbance to peat and carbon rich soils including peat landslide hazards	GE01	Preparation and implementation of CEMP.	Submitted to SLC for approval in consultation with SEPA.	Not Significant	Undertake periodic monitoring during construction.
	GE02	Implementation of detailed PMP to be prepared by the appointed Contractor.	Detailed PMP, PLHRA and CEMP to be submitted to and approved by the SLC, in consultation with SEPA.		
	GE03	Implementation of good practice and specific mitigation measures as outlined by the PLHRA.	The construction Contactor should follow specific and general good practice mitigation measures as		

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
			provided in Technical Appendix 8.6 (EIAR Volume 4) .		
	GE04	Micrositing tolerances to be used in the event of encountering unexpected pockets of deep peat.	Appointment of ECoW who would review all proposed micrositing. Updated Site plan submitted to SLC showing the final position of all wind turbines and other infrastructure forming part of the Proposed Development. Submitted to and approved by SLC in consultation with SEPA.		
Operation					
Alteration to in-channel or overland flow regimes	HH12	A Site maintenance programme with regard to site plant and infrastructure would be implemented by the appointed Contractor. This would include a maintenance schedule for all SuDS and drainage assets, including watercourse crossings, installed at the construction stage to ensure that the function and benefit provided by the assets remains for the lifetime of the Proposed Development.	Maintenance Programme submitted to SLC for approval. To be implemented and monitored by the Site operator, through operational maintenance schedule.	Not Significant	N/A
Flood Risk at Access Points to Site	HH10/HH11	Watercourse crossings would be designed to accommodate the 1 in 200 with climate change. Additionally, watercourse crossing will be designed to minimise disruption to bed and banks	Detailed Watercourse Crossing Plan would be submitted to SLC for approval in consultation with SEPA.	Not Significant	N/A

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
		and allow the continued passage of aquatic and non-aquatic species. At one crossing location (Daer Water, crossing ref.: WC8) a bridge would span a width of approximately 27 m. At this location the track would be raised as it leads into the crossing (both to the east and west of the watercourse) and raised earthworks would be installed at the confluence of the Meikle Burn and Daer Water.			
	HH12	A Site maintenance programme with regard to site plant and infrastructure would be implemented by the appointed Contractor. This would include a maintenance schedule for all SuDS and drainage assets, including watercourse crossings, installed at the construction stage to ensure that the function and benefit provided by the assets remains for the lifetime of the Proposed Development.	Maintenance Programme submitted to SLC for approval. To be implemented and monitored by the Site operator, through operational maintenance schedule.		
Sedimentation and Increased Erosion Rates	HH12	As above	As above	Not Significant	
Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution	HH13	All maintenance during operation to be carried out in accordance with pollution prevention guidance, setting out best practice measures for working with potentially	Forms part of Maintenance Programme which would be submitted to SLC for approval.	Not Significant	Water quality monitoring

Table 8.7: Summary of Potential Significant Effects					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
		contaminative materials (e.g., oils and fuels) and spill response procedures in case of the unlikely event of accidental release.			
Permanent alteration or disruption to shallow groundwater flow	HH09	Drainage management proposals to ensure surface water supply is maintained.	Drainage design to be submitted to SLC for approval in consultation with SEPA.	Not Significant	N/A
Potential for loss/ disturbance to peat and carbon rich soils including peat landslide hazards	N/A	There are not anticipated to be any impacts on soils and peat during the operational phase.	N/A	N/A	Post construction the maintenance Contractor would provide a geotechnical specialist to undertake periodic Site walkovers to assess for any ground disturbance.
Decommissioning					
Impacts due to construction activity assessed above).	HH14 GE05	At the time of decommissioning, a DEMP would be prepared and implemented by the appointed Contractor. It is likely that a DEMP would include measures implemented during the construction phase.	Submitted to and approved by SLC in consultation with SEPA.	Not Significant	Water quality monitoring
Cumulative construction					
No significant cumulative construction effects are predicted	N/A	N/A	N/A	N/A	N/A
Cumulative operation					
No significant cumulative operational effects are predicted	N/A	N/A	N/A	N/A	N/A

9. Traffic and Transport

9.1. Introduction

9.1.1. This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects on traffic and transport associated with the construction, operation and decommissioning of the Proposed Development considering three categories of receptor:

- Traffic flows in the surrounding study area;
- Local road users; and
- Local residents.

9.1.2. The specific objectives of the Chapter are to:

- Describe the existing transport baseline context and cumulative context;
- Describe the assessment methodology and significance criteria used in completing the assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

9.1.3. The assessment has been carried out in accordance with the Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA)) Guidelines for the Environmental Assessment of Traffic and Movement (2023)¹. This document is referred to as the 'ISEP Guidelines' throughout the remainder of this Chapter.

9.1.4. The author of this Chapter is Elaine Moran, a Principal Transport Planner within the Traffic and Transport team at Pell Frischmann. She has over ten years' experience in the traffic and transportation industry and over four years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms and other energy generation and distribution projects in Scotland. Elaine is a Member of the Chartered Institution of Highways and Transportation (MCIHT).

9.1.5. The technical reviewer of the traffic and transport assessment is Gordon Buchan BEng (Hons), MSc, CEng, CMILT, FCIHT, Sector Director - Energy of Pell Frischmann. He has over 28 years' of undertaking the transport assessments associated with new developments and has worked on renewable energy and energy distribution projects across the UK, Ireland, and Northern Europe.

9.1.6. This Chapter is supported by the following figures and technical appendices:

- **Figures (EIAR Volume 3a):**
 - **Figure 9.1: Study Area;**
 - **Figure 9.2: Traffic Count Locations;**
 - **Figure 9.3: Personal Injury Accident Plan;** and

¹ Institute of Environmental Management and Assessment (IEMA) (2023), Environmental Assessment of Traffic and Movement.

- **Figure 9.4: Abnormal Indivisible Load Route Plan.**
- **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 9.1: Transport Assessment;** and
 - **Technical Appendix 9.2: Outline Outdoor Access Management Plan.**

9.1.7. Figures and technical appendices are referenced in the text where relevant.

9.2. Assessment Methodology

Overview

- 9.2.1. The methodology adopted in this assessment involved the following key stages:
- Determine the baseline for traffic and transport;
 - Review and identify potential impacts related to the construction of the Proposed Development;
 - Evaluate significance of effects on receptors;
 - Identify mitigation; and
 - Assess residual effects.
- 9.2.2. Where required, the assessment is presented with reference to specific 'areas' of the Site within the Site Boundary. These areas comprise the Wind Turbine Array and associated access routes (Eastern and Western), as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.
- 9.2.3. Effects considered to be significant for the purposes of the EIA Regulations are those classified as being '**Major**' or '**Moderate**'.

Scope of Assessment

Potential Effects Scoped In

- 9.2.4. The scope of this assessment has been informed by the following guidelines/policies and is set out in **Table 9.1**:
- National Planning Framework 4 (2023)²;
 - South Lanarkshire Local Development Plan 2 (2021)³;
 - South Lanarkshire Local Development Plan 2 – Supporting Planning Guidance: Renewable Energy (2021)⁴;
 - Institute of Environmental Management and Assessment (IEMA) (now ISEP), Environmental Assessment of Traffic and Movement (2023)⁵;
 - IEMA (now ISEP), Guidelines for the Environmental Assessment of Road Traffic (1993)⁶;
 - IEMA (now ISEP) 'Guidelines for Environmental Impact Assessment' (2005)⁷;

² Scottish Government (2023), National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

³ South Lanarkshire Council (2021), Local Development Plan 2. Available at: https://www.southlanarkshire.gov.uk/downloads/file/14534/ldp2_volume_1_document

⁴ South Lanarkshire Council (2021), Local Development Plan 2 – Supporting Planning Guidance: Renewable Energy.

⁵ Institute of Environmental Management and Assessment (IEMA) (2023), Environmental Assessment of Traffic and Movement.

⁶ IEMA (1993), Guidelines for Environmental Impact Assessment of Road Traffic.

⁷ IEMA (2005), Guidelines for the Environmental Assessment.

- LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB) (2020)⁸;
- Table 3.8.1 of LA 104 Environmental assessment and monitoring Design Manual for Roads and Bridges (DMRB) (2020)⁸;
- Design Manual for Roads and Bridges, Volume 15, Part 5 "The NESA Manual" (2013)⁹;
- Transport Scotland, Transport Assessment Guidance (2012)¹⁰; and
- Scottish Government, Planning Advice Note (PAN) 75 – Planning for Transport (2005)¹¹.

9.2.5. It is noted that on 8 December 2025 a number of Planning Advice Notes (PAN) were withdrawn by the Scottish Government¹². This included PAN75. However, this is still noted as relevant guidance for this assessment as it was a published guidance notes at the time of the assessment.

Table 9.1: Effects Considered within the Assessment			
Effect	Phase*		
	C	O/M	D
Increase of Traffic on Users of Roads	Yes	No	No
Increase of Traffic on Users/Residents of Locations	Yes	No	No

*C=construction, O=operation and maintenance and D=decommissioning.

9.2.6. The Chapter also assesses cumulative effects arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a consented planning application.

9.2.7. The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.

Consultation

9.2.8. In undertaking the assessment, a request for a Scoping Opinion was issued to transport agencies that have an interest in the surrounding road network, which includes South Lanarkshire Council (SLC) as local roads agency and Transport Scotland (TS) as the trunk road agency.

9.2.9. **Table 9.2** summarises the consultation responses received regarding Transport and provides information on where and/or how they have been addressed in this assessment.

9.2.10. Full details on the consultation responses can be reviewed in **Technical Appendix 1.2 (EIAR Volume 4)**.

⁸ Highways England, Transport Scotland, Welsh Government & Department for Infrastructure (2020), LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB).

⁹ Department for Transport (2013), Design Manual for Roads and Bridges, Volume 15, Part 5 "The NESA Manual".

¹⁰ Transport Scotland (2012), Transport Assessment Guidance. Available at: https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management_dpmtag_ref_17_-_transport_assessment_guidance_final_-_june_2012.pdf

¹¹ Scottish Government (2005) Planning Advice Note (PAN) 75. Available at: <https://www.gov.scot/publications/planning-advice-note-pan-75-planning-transport/>

¹² Refer to: <https://blogs.gov.scot/planning-architecture/2025/12/08/publications-declutter/>

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
South Lanarkshire Council 23/01/2025	TT1: SLC agree with the extent of the proposed Study Area.	Noted.
	TT2: SLC agree that impacts arising during the operational and decommissioning phases of the proposed development can be scoped out of the EIA.	Noted. The operational and decommissioning phase have been scoped out of the assessment.
	Site Entrance The EIA Scoping Report does not specify a proposed point of access off the public road for HGV and specialist component delivery vehicles with general reference to using either the A702 or B7076 from the M74 and that further details will be developed.	The final access strategy for both AIL and general construction traffic is yet to be confirmed, however, for the purposes of the Traffic and Transport assessment it has been assumed that Abnormal Indivisible Loads (AILs) would be delivered to the Site through the Western Access via the A702 and construction vehicles would access the Site through the Eastern Access via Daer Water road, the road to Daer Reservoir. Details of the AIL delivery route through the Western Access are provided in the Route Survey Report (RSR) provided in Technical Appendix 9.1 Annex B (EIAR Volume 4). It is proposed that the detailed design of the access junctions would be secured through a suitably worded planning condition. Should the Eastern Access be chosen as the access for AILs, an updated AIL RSR would be prepared which will provide swept path assessments of the components and delivery vehicles manoeuvring along the route via Daer Water road, as well as any necessary mitigation measures to enable the delivery of AIL components. The proposed access strategy would be confirmed post consent and would be secured through an appropriately worded planning condition.
	Transport Statement Notwithstanding the above, as part of a formal planning application we would expect the applicant to submit a transport statement assessing development impacts. The assessment should include the following: 1. Delivery route plans for HGV and abnormal loads from the M74 to the proposed site entrance(s); this should include battery loads and substation/transformers. Routes and distribution for HGV movements should be detailed. This will be used to develop an 'Agreed Route' plan for inclusion within planning agreements.	Details of the worst case AIL components are provided in the RSR provided in Technical Appendix 9.1 Annex B (EIAR Volume 4).

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	2. An anticipated development programme to be included in the EIA broken down to show monthly movements for HGV and abnormal loads and in case of HGV movements this should be subdivided by construction activity e.g., timber extraction, stone delivery, concrete delivery, steel delivery, compound, battery, solar, transformers, substation, cabling etc. This will inform the profile of trips and peak movements.	The anticipated construction traffic profile is shown in Technical Appendix 9.1 (EIAR Volume 4) .
	3. Scenario to be included for 100% importation of aggregates in event that suitable borrow pits cannot be identified. Borrow pits and their estimated volumes should be clarified where such pits are expected to be used. We also require volumes/vehicle movements associated with any expected removal of surplus material.	Suitable borrow pit locations have been identified within the Site and in combination with site won material from the construction of the BESS and substation compounds, these are expected to provide 100% of aggregate materials for tracks, hardstanding and compounds (refer to Chapter 2: Description of Proposed Development (EIAR Volume 2) and Technical Appendix 2.2 (EIAR Volume 4)) for further details. However, as a worst-case assessment, it has been assumed that 100% of these materials, along with any materials for concrete batching, would be imported to Site. Prior to construction ground investigation surveys would be undertaken to determine the specific quality of rock and the rock head depth underlying the locations for Site infrastructure, including the borrow pit locations. This would provide greater certainty on the suitability and quantity of on-site material available for use in construction.
	4. Assessment of baseline traffic against anticipated trips for all construction vehicle movements at key locations along the route within South Lanarkshire.	This is provided in Technical Appendix 9.1 (EIAR Volume 4) , as well as in the Baseline Conditions section of this Chapter.
	5. Impact on existing walking and cycling routes to be assessed. The applicant should seek advice from the Council's Access Development Officer (CAG@southlanarkshire.gov.uk).	This is provided in Technical Appendix 9.1 (EIAR Volume 4) , as well as in the Baseline Conditions section of this Chapter.
	6. Swept path analysis to identify pinch points requiring road widening, overrun areas and/or alterations to street furniture as part of an Abnormal Load Route Assessment (ALRA). The applicant should also consider whether these works will have an impact on existing trees/vegetation in accordance with BS5837: Trees in Relation to Design, Demolition and Construction to Construction – Recommendations.	Swept path assessments of the worst case AIL components along the proposed delivery route are provided in the RSR in Technical Appendix 9.1 Annex B (EIAR Volume 4) .

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	7. Bridge assessments and principal inspections will be required for all abnormal loads transported along on the A702 and B7076 to the site entrances. Further advice can be sought on those structures affected by the route and Bridge Bond requirements by contacting the Council's Bridges and Structures Team Leader (james.gray@southlanarkshire.gov.uk). A minimum four-month period is recommended for submission of abnormal load route/bridge assessments in advance of any movements for approval.	A weight review was undertaken via an Electronic Service Delivery for Abnormal Loads (ESDAL) search has been undertaken as part of the RSR in Technical Appendix 9.1 Annex B (EIAR Volume 4) .
	Grid Connection There are no proposals at this stage which we expect will be addressed under a separate application.	The grid connection would be subject to a separate application.
	Visibility No definitive point(s) of access are not provided therefore we are unable to comment at this stage however we would provide the following guidance. Visibility splays shall be appropriate to the speed limit in force at the point of access with 2.4 m x 215 m splays being required at locations subject to the national speed limit. We acknowledge however that vehicle speeds may be lower than the signed speed limit given the local characteristics on a stretch of road which may allow a reduction in the visibility splay requirements. Therefore, we are willing to consider visibility splay reductions where the applicant can demonstrate, by means of a continuous 7-day vehicle speed survey, that the 85th percentile speed is lower than the signed speed limit in force on this section of road. Separate vehicle speed survey points should be established on each approach at the limit of the anticipated visibility splay and not at the access itself. The two survey points may yield different results therefore visibility splays may be different in each direction. The resultant 85th percentile speed (wet weather) for each direction can be compared to the provisions in Table 8 of the SCOTS National Roads Development Guide to determine an appropriate junction visibility splay for each direction.	Visibility splays of the Western and Eastern site accesses are provided in Technical Appendix 9.1 Annex A (EIAR Volume 4) .

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	Furthermore, the applicant must demonstrate that they have legal rights to remove everything within the visibility envelope that exceeds 1.05 m in height above the adjacent road channel level and to maintain the visibility splay free of obstructions for the life of the project. Depending on the length of the visibility splay the applicant may also need to demonstrate how the splays can be achieved in the vertical plane considering physical characteristics such as neighbouring boundary features (walls/hedges/ fences/steep verges). The applicant may need to undertake a topographical survey of the verge features and levels in both directions to help demonstrate what can be achieved.	
	The applicant shall provide plans showing required visibility splays and where necessary results of vehicle speed surveys to support a reduction in the Y-distance where sought. The splays shall be assessed in the horizontal and, where necessary, the vertical plane. The applicant shall also demonstrate that they have all necessary agreements to implement and maintain the visibility splays for land out with their ownership/control.	Visibility splays of the Western and Eastern Accesses are provided in Technical Appendix 9.1 Annex A (EIAR Volume 4).
	Drainage The Council's Developer Design Guidance: Flood Risk Assessments and Sustainable Drainage Systems (May 2020) highlights requirements in respect of Flood Risk Assessment and Drainage Strategy. We note that you have consulted our Flood Risk Management colleagues who will be able to provide advice on their requirements for information in support of the current application including proposals for future maintenance access and responsibilities.	Noted.
	Notwithstanding the above comments, any works associated with formation of the site access off the public road shall be designed to prevent surface water discharging onto the public road. The applicant will be expected to provide proposals for this.	Noted. Site entrance roads would be well maintained and monitored during the operational life of the Proposed Development. Regular maintenance would be undertaken to keep the Site access track drainage systems fully operation and to ensure there are no runoff issues onto the public road network.

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	Road Safety Audit The detailed planning application shall include a Stage 1 Road Safety Audit and Designers response covering any proposed site access(es)/alteration to existing access(es) and for any works to amend the existing public road. It should be noted that a Stage 2 Road Safety Audit along with the Designer's Response will be required to accompany the detailed drawing submission as part of the future Section 56 applications or road construction consent applications.	Noted. A Stage 1 and Stage 2 RSA would be provided post consent and can be secured via an appropriately worded planning condition.
	Other The developer will need to provide turning areas on site to enable all vehicles to enter and exit site in a forward gear. Proposals shall include arrangements for wheel wash facilities to prevent mud and debris being deposited onto the public road during the construction phase. Staff and contractor car parking will be required based on estimated peak staffing levels. No construction vehicles will be permitted to park on any part of the public road. A roads dilapidation survey will be required for the site access which shall be undertaken in conjunction with the Roads Department, during and on completion of all site work with the frequency of interim inspections as directed by the Roads Department. Written reports shall include photographs; records plans and defect descriptions for each inspection and be submitted for record purposes within timescales set by the Council. The applicant will be responsible for repairing any damage to the road deemed by the Council to be a consequence of their activities within timescales and specification acceptable to the Council.	Noted. Car parking would be provided within the Site and would be controlled via a staff travel plan. A road condition survey would be undertaken, prior to construction commencing, on the A702 and Daer Water road within the vicinity of the Site, which can be secured via a suitably worded planning condition.
	The requirement for road cleaning, road dilapidation surveys and a traffic management plan can all be addressed by suitably worded pre-commencement planning conditions and shall include, where appropriate, any timber felling activities.	Agreed.
	The developer will be expected to enter into a Section 96 Agreement with the Council as Roads Authority covering extraordinary wear and tear to the public road (B7076)	Noted. The Applicant would be willing in principle to enter into a Section 96 Agreement in the event that consent is granted.

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	although consideration will be given to an upfront payment in lieu of a Section 96.	
	The windfarm developer will be expected to enter into a Section 96 Agreement covering structures and will need to lodge a Bridge Bond before works commence on site.	The Applicant is willing to enter into discussions regarding a Section 96 agreement.
The British Horse Society Scotland 13/12/2024	The applicant does note that the Southern Upland Way, a designated core path and one of Scotland's Great Trails (http://www.scotlandsgreattrails.com) passes through the site. In addition, South Lanarkshire's Core Path Plan shows other routes passing through the site which, whilst not designated as core paths, are likely to be rights of way and are important parts of the wider path network. Forestry tracks and hills tracks, like those found within and close to the site are often ideal routes for equestrians, as well as other non-motorised access users. Consideration should therefore be given to how access will be managed both during the construction phase and when the wind farm is operational. The creation of new tracks and upgrading of existing ones within wind farms can be an opportunity to improve outdoor access and provide the local community with additional amenity, especially if tracks can offer circular routes for walkers, cyclists, horse riders and others. Obstructions to access like cattle or deer grids and locked gates with no side gate should be avoided. The BHS is here to help and can provide guidance on suitable surfaces and infrastructure to accommodate equestrians and other access takers. We would be very willing to work with the applicant on these aspects. I strongly advise the applicant to properly consider outdoor access and to produce an Access Management Plan to accompany their application.	The on-site paths including the Southern Upland Way (SUW) would be managed through an Outdoor Access Management Plan (OAMP) which can be secured via a suitably worded planning condition. An Outline OAMP is provided as Technical Appendix 9.2 (EIAR Volume 4) .
	Traffic and transport Access to safe off-roading routes is vital to the health and wellbeing of horses and riders seeking to access the countryside, adequate access to off-road riding should be a priority, especially in rural and semi-rural areas and areas of high horse ownership, like South Lanarkshire and the adjoining Dumfries and Galloway and Scottish Borders. Few riders access	As noted above.

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	busy roads by choice (although the horse has as much right to be on public roads as car, bikes and pedestrians) – but often they have few other places to ride or no other way to access their safe off-road riding. Vehicles travelling to and from the site are likely to meet equestrians on the road and drivers should be advised of this risk. I have enclosed a copy of our “Guidance to drivers of large vehicles” document.	
	I strongly advise the applicant to produce a Construction Traffic Management Plan. This should include a clear plan of how vulnerable road users, including equestrians, will be accommodated and their safety prioritised alongside wind farm traffic during both the construction and operational phases.	A Construction Traffic Management Plan (CTMP) would be provided as well as an OAMP. Details of an outline CTMP is provided in this Chapter and an outline OAMP is provided in Technical Appendix 9.2 (EIAR Volume 4).
ScotWays 18/12/2024	The enclosed map shows that rights of way SL170 and SL171 as recorded in the National Catalogue of Rights of Way (CROW) cross or are close to the application site as shown on Figure 1.1 Site Location. The enclosed map shows other path SL180 as recorded in the National Catalogue of Rights of Way (CROW) crosses or is close to the application site as shown on Figure 1.1 Site Location. The enclosed map shows the Heritage Paths project promotes routes, Daer Water to Thornhill and Daer Water to Kirkpatrick for their historic interest. These old routes cross or are close to the application site as shown on Figure 1.1 Site Location. The enclosed map shows that our book Scottish Hill Tracks describes routes SHT(6)063 and SHT(6)064 which cross or are close to the application site as shown on Figure 1.1 Site Location.	Details of the information provided by ScotWays has been used to inform this assessment.
	Other Access to Land You should be aware that other forms of public access to land may affect the proposed application site. More detail about these other types of access is set out in the enclosed Catalogue of Rights of Way Guidance Notes. The applicant may already be aware that SL180 forms part of the Southern Upland Way, a long distance route which is used by walkers, runners and cyclists. This route is promoted by NatureScot (formerly Scottish Natural Heritage) as one of Scotland’s Great Trails.	As above.

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	Wind Farm and public access It is our understanding that there is very little guidance regarding the siting of turbines in relation to established paths and rights of way, so we use the following starting principle in considering what could be reasonable: "a minimum distance, equivalent to the height of the blade tip, from the edge of any public highway (road or other public right of way) or railway line." ScotWays considers the above sets out a reasonable principle for a recommended minimum separation distance. There could also be site specific factors which would lead us to prefer a larger minimum separation distance; these could include the affected route being one of Scotland's Great Trails or it being known for equestrian use, for example. Whilst it appears that turbines are not proposed in close proximity to the Southern Upland Way (where we would prefer a larger separation distance) we request that the applicant provides information with regard to turbine distances in relation to the rights of way noted above as it appears some may be proposed closer than the principle noted above. ScotWays is likely to object to any proposal where the above principle is not followed, including where a micro-siting allowance could lead to turbine encroachment upon a route because it has been insufficiently buffered.	The turbines are located in excess of the blade tip height from existing paths within the Site. It should be noted that a permanent diversion would be provided so that users of the Core Path network can avoid infrastructure associated with the Proposed Development. During the construction phase, the permanent diversion would not be used by construction traffic associated with the Proposed Development, instead it would provide continuing access for existing users away from the Proposed Development. A temporary diversion during construction would be put in place for the part of the SUW which is impacted by construction traffic. Further details are provided in the Technical Appendix 9.2 (EIAR Volume 4).
Transport Scotland 19/12/2024	Proposed Development The proposed Watchman Energy Park comprises a wind farm of approximately 16 turbines with a maximum tip height of 240 m and associated infrastructure including a BESS with approximately 50MW capacity, located approximately 9 km west of the M74 and 10 km south of Crawford in South Lanarkshire. The SR states that the final choice of access route to site has yet to be finalised but will either be from the A702 or B7076.	Number of wind turbines reduced following design development. Refer to Chapter 3: Design Evolution and Alternatives (EIAR Volume 2). Refer to response for SLC 'Site Entrance' above re access route into the Site.
	Assessment of Environmental Impacts Section 3.8 of the SR presents the proposed methodology for the assessment of Traffic and Transport. This states that the assessment will be carried out in accordance with the Institute	

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	of Environmental Management and Assessment (IEMA) Guidelines, entitled Environmental Assessment of Traffic and Movement (July 2023). These specify that road links should be taken forward for further assessment where the following two rules are breached: ▪ Rule 1: Include road links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%) ▪ Rule 2: Include road links of high sensitivity where traffic flows have increased by 10% or more. We note that the proposed study area encompasses both access options, and includes the M74 between Junctions 13 and 15, the A702 between Junction 13 of the M74 through to Carronbridge, the B7076 from Junction 12 of the M74 through to Junction 15 and the Daer Water Road. We also note that base traffic data will be obtained from the Department of Transport (DfT) traffic survey database, Traffic Scotland database and other public datasets that are available for the M74. In addition, future traffic flows will be factored using Low Growth factors estimated from National Road Traffic Forecasts (NRTF). Transport Scotland is satisfied with this approach. It is noted that any impacts associated with the operational and decommissioning phases of the development are to be scoped out of the EIA. We would consider this to be acceptable in this instance.	
	Abnormal Loads Assessment The SR states that detailed swept path analysis will be undertaken for the main constraint points on the route from the port of entry (likely to be KGV Docks in Glasgow) through to the site access junction to demonstrate that the turbine components can be delivered to site and to identify any temporary road works which may be necessary. We would add that Transport Scotland will require to be satisfied that the size of turbines proposed can negotiate the selected route and that their transportation will not have any detrimental effect on structures within the trunk road route path.	Swept path assessments of the worst case AIL components along the proposed delivery route are provided in the RSR in Technical Appendix 9.1 Annex B (EIAR Volume 4).

Table 9.2: Consultation Summary		
Consultee and Date	Consultation Response	Applicant Response
	For your awareness, Transport Scotland is currently undertaking essential works on the Woodside Viaduct on the M8 northern flank. Temporary traffic management measures and weight restrictions are in force. The route is therefore not appropriate for abnormal loads, with all HGV traffic encouraged to use the M74 and M73 as an alternative. At this time, there is no timeframe for completion of the works.	It is expected that construction would commence in 2035, and as such should not be affected by the essential works noted. Prior to the delivery of the AILs, appropriate consents and agreements would be sought with the appropriate Road Authority.

Potential Effects Scoped Out

9.2.11. On the basis of the desk and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects, policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment, as proposed in the Scoping Report:

- Operational Phase: Once operational, it is envisaged that the level of traffic associated with the Proposed Development would be minimal. Regular monthly or weekly visits would be made to the wind farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for a Heavy Goods Vehicle (HGV) to access the wind farm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed. As such, the effects during the operational phase are scoped out of the assessment.
- Decommissioning Phase: The traffic effects during the decommissioning phase can only be fully assessed closer to that period, following 40 years of operation. As some elements of the Proposed Development may remain in situ (such as cable trenches, access tracks, etc.), the traffic flows associated with the decommissioning works would be lower than those associated with the construction phase. The construction phase therefore represents a worst-case assessment and as such, no further assessment of the decommissioning phase has been considered and has been scoped out of the assessment.

Method of Baseline Characterisation

Extent of the Study Area

9.2.12. The Study Area for the assessment has been based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope was determined through a review of the other developments in the area, Ordnance Survey (OS) plans, and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

9.2.13. Locally sourced material would be used where feasible, and traffic would avoid impacting on local communities as far as is possible.

9.2.14. There are two proposed accesses into the Site:

- Western Access – from the A702 through Watermeetings Forest; and
- Eastern Access – off the Daer Water road to enter the site at Wintercleugh.

9.2.15. The likely Port of Entry (POE) used for the discharging of wind turbine components would be Glasgow King George V (KGV) Docks. AILs would likely travel to the Site via the following route (**Figure 9.4, EIAR Volume 3a**):

- Loads would exit KGV Dock and travel straight on at three roundabouts continuing on Kings Inch Drive westbound;
- Loads would turn left and join M8 eastbound at Junction 25A;
- Loads would exit M8 at Junction 22 and merge onto M74 eastbound;
- Loads would merge from M74 onto A74(M) southbound at Junction 13;
- Loads would merge from A74(M) onto M6 southbound at Junction 45;

- Loads would exit M6 southbound at Junction 42 Golden Fleece Interchange and use the roundabout to re-join the M6 northbound;
 - Loads would merge from M6 onto A74(M) northbound at Junction 45; and
 - Loads would exit A74(M) at Junction 14 and join A702 southbound at Elvanfoot Interchange and continue to the proposed Site access junction.
- 9.2.16. This assessment assumes that the construction related traffic would enter and exit the Site through the Eastern Access via Daer Water road at Wintercleugh and AIL deliveries would enter and exit the Site through the Western Access from the A702.
- 9.2.17. However, it should be noted that the final access strategy for both AIL and general construction traffic would be confirmed post consent and would be secured through an appropriately worded planning condition.
- 9.2.18. Note that the Study Area chosen relates to those roads likely to be subject to the biggest increase in construction traffic i.e., those closest to the Site for which their users could experience significant effects and does not include all roads used in the movement of construction materials and AIL traffic.
- 9.2.19. Effects associated with construction traffic generated by the Proposed Development would be most pronounced in close proximity to the Site and on the final approaches to the Site. As vehicles travel away from the Proposed Development, they would disperse across the wider road network, thus diluting any potential effects. It is therefore expected that the effects relating to construction traffic are unlikely to be significant beyond the Study Area.
- 9.2.20. Based on the above and taking cognisance of the scale of the Proposed Development and types of roads used to access the Site, the Study Area for the assessment has therefore been assumed to be as follows:
- Daer Water road, between the A702 and Daer Water Treatment Works;
 - The A702, between Junction 14 of the M74 and Carronbridge;
 - The B7040, between the A702 and west of Elvanfoot Substation;
 - The B7076; between the A702 and Junction 15 of the A74(M); and
 - The A74(M) between Junctions 13 and 15.
- 9.2.21. The Study Area is presented in **Figure 9.1 (EIAR Volume 3a)**.

Desk Study

- 9.2.22. To inform the baseline assessment and to establish the nature of the surrounding road and footway infrastructure, the following desktop reviews have been undertaken:
- Review of relevant transport planning policy;
 - Consideration of potential origin locations of construction staff and potential supply locations for construction materials to inform extent of local area roads network to be considered in the assessment;
 - Collection of existing traffic flow information;
 - Review of the relevant roads hierarchy;
 - Review of personal injury accident (PIA) data;

- Identification of sensitive locations within Study Area (as defined by ISEP such as settlements, schools, tourist attractions etc.) using freely available online mapping;
- Identification of any other traffic sensitive receptors in the area (Core Paths, routes, communities, etc.) using freely available online mapping and relevant agency websites;
- Review of OS plans;
- Review of cumulative development information – South Lanarkshire Council’s (SLC) planning portal and the Scottish Government’s Energy Consents Unit (ECU) portal; and
- Identification of constraints to the movement of AILs through a Route Survey including swept path assessments – OS plans, video footage and Google Streetview.

Field Survey

9.2.23. The following field surveys were carried out to inform the assessment:

- Detailed Site visits were undertaken to review the proposed access route and potential constraints; and
- The collection of traffic flows and speed data was undertaken in June and September 2025 to establish a baseline on the local road network.

Method of Assessment

Assessment of Potential Effect Significance

9.2.24. The ISEP Guidelines^{6,7} have been used in the assessment, with the guidelines intended to complement professional judgement and the experience of trained assessors.

CRITERIA FOR ASSESSING SENSITIVITY OF RECEPTORS

9.2.25. The receptors are the users of the roads within the Study Area and the locations through which those roads pass.

9.2.26. The ISEP Guidelines include guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in **Table 9.3**.

Table 9.3: Classification of Receptor Sensitivity				
Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, and traffic calming measures.	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for AILs and new strategic trunk road junctions capable of accommodating AILs.

Table 9.3: Classification of Receptor Sensitivity

Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users/ Residents of Locations	Where a location is a large rural settlement containing a high number of community and public services and facilities.	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.	Where a location is a small rural settlement, containing a few community or public facilities or services.	Where a location includes individual dwellings or scattered settlements with no facilities.

9.2.27. It is acknowledged that there may be locations both in terms of users of roads or users/residents of locations that may not fit within one of the sensitivity classifications highlighted in **Table 9.3**. In these situations, professional judgement has been applied and justification for any changes provided.

9.2.28. Where a road passes through a location, users are considered subject to the highest level of sensitivity defined by either the road or the location characteristics.

CRITERIA FOR ASSESSING MAGNITUDE OF CHANGE

9.2.29. Magnitude of change has been assessed in accordance with the following rules which are outlined in the ISEP Guidelines, and are used to inform a screening exercise to determine which links within the Study Area are to be considered for detailed analysis in the assessment:

- Rule 1 – Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2 – Include any other specifically sensitive areas where total traffic flows are predicted to increase by 10% or more.

9.2.30. Examples of sensitive areas are presented in the ISEP Guidelines as hospitals, churches, schools, historical buildings, and tourist attractions etc. These locations are to be assessed in relation to "Rule 2".

9.2.31. The ISEP Guidelines identify the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development; the impacts and levels of magnitude are discussed below:

- Severance – the ISEP Guidance advises that, *"The Department for Transport has historically set out a range of indicators for determining the significance of severance. Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law. However, caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic."* (Para 3.16). The ISEP Guidelines acknowledge that changes in traffic flows should be used cautiously, stating that *"the assessment of severance should pay full regard to specific local conditions, e.g. sensitivity of adjacent land uses, prevalence of vulnerable people, whether or not crossing facilities are provided, traffic signal settings, etc."* (Para 3.17).

- Driver delay – the ISEP Guidelines note that these delays are only likely to be *"significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system"* (Para 3.20).
- Pedestrian delay (incorporating delay to all non-motorised users) – the ISEP Guidance advises that *"pedestrian delay and severance are closely related effects and can be grouped together. Changes in the volume, composition or speed of traffic may affect the ability of people to crossroads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility and general physical conditions of the development site."* (Para 3.24). Furthermore, the guidance advises that *"...it is not considered wise to set down definitive thresholds. Instead it is recommended that the competent traffic and movement expert use their judgement to determine whether pedestrian delay constitutes a significant effect."* (Para 3.26).
- Non-motorised user amenity - the ISEP Guidance advises that, *"The 1993 Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law."* (Para 3.30).
- Fear and intimidation – *"there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30%, 60% and 90% are regarded as producing minor, moderate, and substantial changes respectively in the guidelines."* (Para 2.19). As such, this has been used to assess the potential impacts associated with construction activities around fear and intimidation on people in close proximity to the Proposed Development.
- Road safety – professional judgement would be used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents. In line with the ISEP Guidance, those areas of collision clusters would be subject to detailed review.
- Road safety audits – It would be proposed to undertake any necessary Road Safety Audits (RSA) post consent, and it is considered that this can be secured via a planning condition.
- Large loads – The movement of the AILs associated with the construction of the Proposed Development have been considered in full, within a separate route survey assessment (see **Annex B of Technical Appendix 9.1, EIAR Volume 4**), which identifies physical mitigation measures required to accommodate the predicted loads. Additional mitigation in terms of addressing potential impacts on sensitive receptors are included as standard within the Mitigation During Construction sub-section of **Technical Appendix 9.1 (EIAR Volume 4)**.

9.2.32. While not specifically identified, as more vulnerable road user, cyclists are considered in similar terms to pedestrians.

CRITERIA FOR ASSESSING SIGNIFICANCE

9.2.33. Table 3.7 of LA104 Environmental Assessment Methodology of the Design Manual for Roads and Bridges (DMRB)⁸ sets out four levels against which the magnitude of these impacts should be assessed – major, moderate, minor, and negligible (refer to **Table 9.4**).

Table 9.4: Magnitude of Effects

Magnitude	Description
Major	These effects are considered to be material in the decision-making process.
Moderate	These effects may be important but are not likely to be material factors in decision making. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a receptor.
Minor	These effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in improving the subsequent design of the project.
Negligible	No effects or those that are imperceptible.

9.2.34. The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of change as detailed in **Table 9.5**.

Table 9.5: Significance Criteria

Receptor Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
High	Major	Major/Moderate	Moderate/Minor	Minor
Medium	Major/Moderate	Moderate	Minor	Minor/Negligible
Low	Moderate/Major	Minor	Minor	Minor/Negligible
Negligible	Minor	Minor	Minor/Negligible	Negligible

9.2.35. Effect significance is categorised as major, moderate, minor or negligible. Effects judged to be of **Major** or **Moderate** significance are considered to be significant in the context of the EIA Regulations and require mitigation.

9.2.36. Where an effect could be one of major/moderate or moderate/minor significance, professional judgement is used to determine which option should be applicable. Effects judged to be of minor or negligible significance are considered not significant in the context of EIA Regulations.

Limitations and Assumptions

LIMITATIONS

9.2.37. Limitations to the assessment are as follows:

- The assessment is based upon average traffic flows in one-month periods. During the month, activities at the Site may fluctuate between one day and another. It is not possible to fully develop a day-by-day traffic flow estimate as no Balance of Plant (BoP) contractor has been appointed and external factors can impact upon activities on a day-by-day basis (weather conditions, availability of materials, time of year, etc).
- Assumptions on the original points for materials have been made to provide a worst-case assessment scenario. Should these origin points change, the effects on the Study Area may alter to those presented in the assessment.
- Construction material estimates set out in **Technical Appendix 9.1 (EIAR Volume 4)** are based on what is likely to be required for a project of this size and are considered to be appropriate for enabling a robust assessment of effects to be made.

ASSUMPTIONS

9.2.38. The following main assumptions have informed the assessment of effects in this Chapter:

- A construction programme of 18 months has been assumed.
- Based on grid connection date of 2036, the year of construction is assumed to be 2035 and has been used for the basis of the assessment.
- It is anticipated that 100% of the aggregate requirements would be sourced from on-site excavations including the on-site borrow pits. However, to represent a worst-case assessment, it has been assumed that 100% of the aggregate material requirements would be imported to the Site.
- Concrete would be batched on-site meaning only raw materials to prepare the concrete i.e., cement powder, water and sand/aggregates would be imported.

9.2.39. It is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental effects on traffic and transport.

9.3. Baseline Conditions

Current Baseline

Active Travel Network

- 9.3.1. There are no dedicated pedestrian facilities such as footways in the immediate vicinity of the Site, reflecting its rural setting.
- 9.3.2. A review of SLC's Core Path network¹³ indicates that there are a number of Core Paths, Aspirational Core Path and Wider Network Paths within the Site Boundary, which are shown in **Figure 6 of Technical Appendix 9.1 (EIAR Volume 4)**.
- 9.3.3. The Southern Upland Way (SUW) is a coast-to-coast long-distance route which runs from Portpatrick on the west coast to Cove on the east coast and is approximately 340 kilometres (km) in length. Sections of the route form part of the Core Path network within the Site Boundary. Details of the paths are outlined in **Table 9.6**.

Table 9.6: Paths within the Site Boundary			
Reference	Path Name	Path Type	Total Length (m)¹⁴
CL/5692/1	Watermeetings - Coom Rig	Aspirational Core Path	2,550*
CL/5710/1	Woodland walk Watermeetings Forest	Aspirational Core Path	400*
CL/5087/1	SL180 Watermeetings forest	Wider Network Path	1,080*
CL/3559/1	Southern Upland Way, Potrail Water-Coom Rig	Core Path	905
CL/3560/1	Southern Upland Way, Hitteril Hill	Core Path	3,523
CL/5096/1	SL171Potrail Water - Kirkhope Cleuch	Wider Network Path	3,300*

¹³ South Lanarkshire Council (2025) Outdoor Access – Core Paths. Available at: https://www.southlanarkshire.gov.uk/info/200166/getting_outdoors/1002/outdoor_access/3/

¹⁴ Where * noted this is the approximate measurement – measured from OS mapping

Table 9.6: Paths within the Site Boundary

Reference	Path Name	Path Type	Total Length (m) ¹⁴
CL/5894/2	Daer Water public road	Wider Network On Road	4,481

- 9.3.4. As noted earlier in their Scoping Opinion response (see **Table 9.2**), ScotWays provided information on Heritage Paths, Other Routes, Recorded Public Rights of Way (PRoW) and Scottish Hill Tracks. Upon review, Heritage Paths, Other Routes, PRoWs and Scottish Hill Tracks are located along path routes as described in **Table 9.6**.
- 9.3.5. The Heritage Path (Daer Water to Thornhill) runs along the Daer Water public road, while Other Routes path SL/SL180/1 follows the path of the SUW Core Path within the Site Boundary. The PRoW SL/SL171/1 follows the route of Wider Network Path CL/5096/1. From the information provided by ScotWays, Scottish Hill Track SHT (6) 063a appears to mainly follow the path of Wider Network Path CL/5096/1 on the western side of the Site, while on the eastern side of the Site it appears to follow Kirkhope Cleuch stream.
- 9.3.6. Under the Land Reform (Scotland) Act 2003, walking and dog walking is permitted within the Site. The Scottish Outdoor Access Code provides responsible practices for users.
- 9.3.7. With regards to cycling, a review of Walk Wheel Cycle Trust's (previously Sustrans) National Cycle Network (NCN) map¹⁵ indicates that the nearest route is NCN Route 74, which connects Strathclyde Country Park and NCN Route 75 north of Hamilton and the village of Crawford to the south, which is approximately 9 km to the north. NCN Route 74 comprises a combination of on-road sections and traffic-free paths. The route continues as a combination of traffic-free routes and on-road routes which are not on the traffic network along and in the vicinity of the A702 and B7076 within the Study Area.

Road Access

DAER WATER

- 9.3.8. Daer Water, which is the road linking the A702 to Daer Reservoir, is a two-way single track road with passing places. There is a cattle grid located approximately 1,550 m along the road, to the south of its junction with the A702. Daer Water is generally in reasonable condition, however, there are sections of deterioration on the road, which is visible from available online imagery. Daer Water is maintained by SLC.

A702

- 9.3.9. The A702 is a two-way single carriageway road which is generally subject to the national speed limit (60 miles per hour (mph)), however this reduces to 40 mph through Elvanfoot. The A702 is generally in reasonable condition, however, there are sections of deterioration on the road, which is visible from available online imagery. The A702 is maintained by SLC and Dumfries and Galloway Council (DGC).

B7040

- 9.3.10. The B7040 is a two-way single carriageway road which is subject to the national speed limit, however this reduces to 40 mph in the vicinity of the B7040 / A702 priority junction. A cattle grid is located approximately 85 m along the B7040 to the west of the B7040/A702 priority junction and another located to the west of Elvanfoot substation. The B7040 is generally in

¹⁵ Walk Wheel Cycle Trust (2025). The National Cycle Network. Available at: <https://www.walkwheelcycletrust.org.uk/national-cycle-network/>

reasonable condition, however, there are sections of deterioration on the road, which is visible from available online imagery. The B7040 is maintained by SLC.

B7076

- 9.3.11. The B7076 is a two-way single carriageway road with cycle lanes and is subject to the national speed limit. There are parking areas located along the road. The B7076 is generally in reasonable condition, however, there are sections of deterioration on the road, which is visible from available online imagery. The B7076 is maintained by SLC

THE A74(M)

- 9.3.12. The A74(M) is a major motorway in Scotland which provides a connection to England. Within the Study Area, the motorway operates with three-lanes in each direction and forms part of the Trunk Network. The A74(M) is maintained by Autolink on behalf of Transport Scotland. The A74(M) is subject to a speed limit of 70 mph.

ROAD SUITABILITY

- 9.3.13. The Agreed Timber Route Map¹⁶ has been developed by The Timber Transport Forum who are a partnership of the forestry and timber industries, local government, national government agencies, timber hauliers and road and freight associations. One of the key aims of the forum is to minimise the impact of timber transport on the public road network, on local communities and the environment and a way of achieving this is to categorise the roads leading to forest areas in terms of their capacity to sustain the likely level of timber haulage vehicles i.e., HGVs. The routes are categorised into four groups, namely; 'Agreed Routes', 'Consultation Routes', 'Severely Restricted Routes' and 'Excluded Routes'.
- 9.3.14. 'Agreed Routes' are categorised as routes used for timber haulage without restriction as regulated by the Road Traffic Act 1988. A-roads are classified as 'Agreed Routes' by default unless covered by one of the other road classifications. Those links classed as 'Consultation Routes' are categorised as a route which is key to timber extraction, but which are not up to 'Agreed Route' standard. Consultation with the local authority is required, and it may be necessary to agree limits of timing, allowable tonnage etc. before the route can be used. B-roads are classified as 'Consultation Routes' by default unless covered by one of the other classifications. 'Severely Restricted Routes' are not normally to be used for timber transport in their present condition. These routes are close to being Excluded Routes. Consultation with the local authority is required prior to use. Finally, 'Excluded Routes' should not be used for timber transport in their present condition. These routes are either formally restricted, or are close to being formally restricted, to protect the network from damaging loads.
- 9.3.15. A number of the roads within the Study Area form part of the agreed route network used for the extraction of timber and are therefore regularly used by HGV traffic. This includes sections of the A702 (within the SLC administrative area), B7040 and B7076. Daer Water public road is considered a consultation route.

Existing Traffic Conditions

- 9.3.16. In order to assess the effect of the Proposed Development construction traffic on the Study Area, Automatic Traffic Counts (ATC) were undertaken over a seven-day period in June and September 2025. To complement the ATC surveys, existing traffic count data was obtained

¹⁶ Timber Transport Forum (2025). Available at: <https://timbertransportforum.org.uk/>

from the Department for Transport (DfT) database¹⁷ and the TS¹⁸ database, with 2024 data utilised, where available.

9.3.17. The traffic count sites used were as follows:

1. Daer Water, Eastern Access (ATC);
2. A702, Western Access (ATC);
3. A702, north of A702 / B7040 junction (ATC);
4. A702, south of A702 / B7040 junction (ATC);
5. B7040, west of Elvanfoot substation (ATC);
6. A702, Durisdeer Mill (DfT Count Point 30878);
7. A74(M), south of Leadmills Road Overpass (TS Count Points ATC6_21N & ATC6_21S);
8. A74(M), south of Junction 14 (TS Count Point ATC6_22N & ATC6_22S); and
9. B7076, north of Auchen Castle (DfT Count Point 811264).

9.3.18. DfT and TS traffic data allow the traffic flows to be split into vehicle classes. The data was summarised into Cars/Light Goods Vehicles (LGVs) and HGVs (all goods vehicles >3.5 tonnes gross maximum weight, as well as buses).

9.3.19. A Temprow low growth factor based on the Scottish region was applied to the count sites, to bring the traffic data up to the base year of 2025. The Temprow low growth factor for 2024 to 2025 is 1.012¹⁹.

9.3.20. These sites were identified as being areas where sensitive receptors on the access route would be located. The locations of the traffic sites are illustrated in **Figure 9.2 (EIAR Volume 3a)**, while **Table 9.7** summarises the Average Daily Traffic (ADT) traffic data collected and used in the assessment.

No.	Survey Location	Cars & Lights	HGV	Total
1	Daer Water, Eastern Access	39	20	59
2	A702, Western Access	522	168	690
3	A702, north of A702 / B7040 junction	885	269	1,153
4	A702, south of A702 / B7040 junction	693	186	879
5	B7040, west of Elvanfoot substation	150	45	195
6	A702, Durisdeer Mill	693	61	754
7	A74(M), south of Leadmills Road Overpass	25,228	12,793	38,021
8	A74(M), south of Junction 14	23,091	11,633	34,724
9	B7076, north of Auchen Castle	375	91	467

Please note minor variances may occur due to rounding may occur.

9.3.21. The ATC and TS survey locations which provided traffic volume data were also used to obtain speed statistics. The two-way seven-day average and 85th percentile speeds observed at the count sites are summarised in **Table 9.8**.

¹⁷ Department for Transport (2025). Road Statistics. Available at: [Road Traffic website - Home](#)

¹⁸ Access to Traffic Scotland database requires registration/unique login credentials, contact traffic.data@mobiiie.co.uk for further details.

¹⁹ For count location 9 (B7076) – there was no available 2024 traffic count data, as such 2019 available data was factored using Temprow growth factors. The Temprow low growth factor for 2019 to 2025 is 1.051

Table 9.8: Speed Summary				
No.	Survey Location	Mean Speed (mph)	85thile Speed (mph)	Speed Limit (mph)
1	Daer Water, Eastern Access	30.1	39.7	60
2	A702, Western Access	47.5	54.9	60
3	A702, north of A702 / B7040 junction	46.5	54.1	60
4	A702, south of A702 / B7040 junction	37.8	42.8	40
5	B7040, west of Elvanfoot substation	39.8	48.4	60
6	A702, Durisdeer Mill	-	-	60
7	A74(M), south of Leadmills Road Overpass	67.5	76.5	70
8	A74(M), south of Junction 14	67.8	76.8	70
9	B7076, north of Auchen Castle	-	-	60

No speed data available from DfT database

Speed data from 2024 TS database to align with traffic flow data

- 9.3.22. Speed information from **Table 9.8**, suggests that the recorded speeds are adhering to the speed limits along Daer Water road and the A702 in the vicinity of the proposed Site accesses. The 85th percentile speeds recorded marginally above the speed limits at three of the seven locations surveyed which include the A702, south of A702/B7040 junction in Elvanfoot, A74(M), south of Leadmills Road Overpass and A74(M), south of Junction 14. Police Scotland may wish to consider enforcement spot checks in these areas, if deemed necessary.

Accident Review

- 9.3.23. Personal Injury Accident (PIA) data for the five-year period covering 01 January 2020 to 31 December 2024 was obtained from the online resource CrashMap²⁰ which uses data collected by the police about road traffic crashes occurring on British roads, where someone is injured.
- 9.3.24. Transport Assessment Guidance requires an analysis of the PIA on the road network in the vicinity of any development to be undertaken for at least the most recent three-year period, or preferably a five-year period, particularly if the Site has been identified as being within a high accident area. Whilst the Study Area has not been identified as having a high accident rate, a five-year review has been undertaken to ensure a comprehensive assessment has been undertaken.
- 9.3.25. The PIA statistics are categorised into three categories, namely:
- A "Slight" PIA, examples include a sprain, bruise or cut which is not considered to be severe, or slight shock requiring roadside attention;
 - A "Serious" PIA, examples include fractures, concussion, internal injuries, crushings, severe cuts and lacerations, severe general shock requiring treatment; and
 - A "Fatal" PIA, for those accidents that result in a death.

²⁰ CrashMap (2025). Available at: <https://www.crashmap.co.uk/Search>

9.3.26. A summary of the PIAs recorded within the Study Area are shown in **Table 9.9** and their locations are shown in **Figure 9.3 (EIAR Volume 3a)**.

Table 9.9: Personal Injury Accident Summary (within the Study Area)					
Location	Slight	Serious	Fatal	TOTAL	HGV Incidents
Daer Water	0	0	0	0	0
A702	5	3	2	10	3
B7040	0	0	0	0	0
B7076	0	0	0	0	0
A74(M)	19	15	2	36	12
Total	24	18	4	46	15
% of Total	52%	39%	9%	100%	33%

9.3.27. A summary analysis of the incidents indicates that:

- A total of 46 accidents were recorded within the Study Area roads within the five-year period;
- Of those 46 accidents, 24 were classed as "slight", 18 as "serious" and four resulted in fatalities;
- Two fatalities were recorded to the south of the proposed Western Access along the A702, and both involved single motorcycle accidents which occurred on bends;
- Two fatalities were recorded on the A74(M), one of which occurred to the north of Beattock Summit and involved three cars, and one was a single HGV accident which occurred to the northwest of Moffat;
- No accidents were recorded along Daer Water, the B7040 or B7076 within the Study Area;
- A total of six accidents involved motorcycles, of which five were recorded along the A702. Three resulted in "serious" accidents and two resulted in the fatalities, as previously described. One "serious" accident involving a motorcycle was recorded along the A74(M);
- Of the total number of accidents, 15 were recorded to involve HGVs, of which three occurred on the A702. Two of these were recorded a "slight" and one was recorded as "serious"; and
- None of the recorded accidents involved cyclists or pedestrians.

9.3.28. In general, there are no clusters of PIA at any location in Study Area or high numbers of accidents involving HGVs.

9.3.29. Based on the information available, it has been established that there are no specific road safety issues within the immediate vicinity of the Proposed Development or within the Study Area that currently require to be addressed or would be exacerbated by the construction of the Proposed Development.

Future Baseline

2035 Traffic Flows

- 9.3.30. Construction of the Proposed Development is estimated to commence during 2035 if consent and deemed planning permission is granted and is anticipated to last approximately 18 months depending on weather conditions and ecological considerations.
- 9.3.31. To assess the likely effects during construction, base year traffic flows were determined by applying a Temprow low growth factor to the surveyed traffic flows. The Temprow low growth factor for 2025 to 2035 is 1.028. These factors were applied to the survey data to estimate the 2035 base traffic flows, as shown in **Table 9.10**.

Table 9.10: Two-Way Average Daily Traffic Data (2035)				
No.	Survey Location	Cars & Lights	HGV	Total
1	Daer Water, Eastern Access	40	20	60
2	A702, Western Access	537	173	709
3	A702, north of A702 / B7040 junction	910	276	1,186
4	A702, south of A702 / B7040 junction	713	192	904
5	B7040, west of Elvanfoot substation	154	47	201
6	A702, Durisdeer Mill	712	62	775
7	A74(M), south of Leadmills Road Overpass	25,937	13,152	39,089
8	A74(M), south of Junction 14	23,740	11,960	35,700
9	B7076, north of Auchen Castle	386	94	480

Please note minor variances may occur due to rounding.

FUTURE BASELINE IN THE ABSENCE OF THE PROPOSED DEVELOPMENT

- 9.3.32. As noted above, the assessment has been undertaken on the basis of a future baseline of conditions in 2035, with growth factors applied. In the absence of the Proposed Development, it is anticipated that traffic growth would occur throughout the Study Area as a result of other development pressures, tourism and population flows.

Summary of Sensitive Receptors

- 9.3.33. A summary of the receptors considered likely to be affected by the Proposed Development and therefore scoped into the EIAR are set out in **Table 9.11**, together with their associated sensitivity.

Table 9.11: Summary of Sensitive Receptors		
Receptor	Sensitivity	Justification
Daer Water (road) Users	High	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs.
Residents along Daer Water (road)	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
A702 Users	Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic.
Residents along A702	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.

Table 9.11: Summary of Sensitive Receptors		
B7040 Users	Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic.
Residents along B7040	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
A74(M) Users	Negligible	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for AILs and new strategic trunk road junctions capable of accommodating AILs.
B7076 Users	Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic.
Residents along B7076	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
Elvanfoot Residents	Low	Where a location is a small rural settlement, containing a few community or public facilities or services.
Crawford Residents	Low	Where a location is a small rural settlement, containing a few community or public facilities or services.
Abington Residents	Low	Where a location is a small rural settlement, containing a few community or public facilities or services.
Carronbridge Residents	Low	Where a location is a small rural settlement, containing a few community or public facilities or services.
Core Path/Path Network	High	Minor paths used by walkers and cyclists, not constructed to accommodate HGV traffic flows.

9.4. Mitigation

9.4.1. Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

- Embedded mitigation - design stage mitigation as outlined in **Chapter 2 (Description of Proposed Development) (EIAR Volume 2)** and **Chapter 3 (Design Evolution and Alternatives) (EIAR Volume 2)**.
- Standard/Best Practice mitigation – standard/best practice mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness.
- Specific mitigation - bespoke mitigation determined as a result of the EIA (refer to **Section 9.6**).

9.4.2. The design of the Proposed Development allows for the following measures to reduce the effects of the Proposed Development from traffic and transport:

- On-site concrete batching located within the Temporary Construction Compound. This would reduce the number of concrete delivery vehicles on the road network as a greater number of HGVs would be required to deliver ready mixed concrete.
- Use of materials extracted on-site in construction, including those materials sourced from the on-site borrow pits. This would reduce the number of aggregate deliveries on

the road network with materials being sourced on-site. However, it should be noted that to allow a worst case to be presented in this assessment and to take account of uncertainty in the quality and suitability of the materials available to be extracted on-site, it has been assumed that all materials would be imported to Site. Prior to construction ground investigation surveys would be undertaken to determine the specific quality of rock and the rock head depth underlying the locations for Site infrastructure, including the borrow pit locations. This would provide greater certainty regarding the suitability and quantity of material available to be sourced on-site and to be used in construction.

- Access junctions would be designed to accommodate all predicted loads and traffic for all phases of the Proposed Development to allow for safe operation of the junctions.

9.4.3. A summary of the standard/best practice mitigation considered for the Traffic and Transport assessment is set out in **Table 9.12**.

Table 9.12: Summary of Standard/Best Practice Mitigation			
ID	Phase	Description	Purpose of Mitigation
TT01	Construction	Construction Traffic Management Plan (CTMP)	Plan to manage effects of construction traffic on local receptors and communities, including abnormal load deliveries (e.g. wind turbines). Further details of specific measures to be included in the CTMP are discussed in Section 9.6 .

9.4.4. As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented. Specific details of the measures to be included in the CTMP are detailed in **Section 9.6**.

9.5. Assessment of Likely Effects

Potential Construction Effects

9.5.1. The assessment is based upon the construction effects that may occur within the Study Area during the 18-month construction phase. To assess the effects, it is necessary to determine the likely traffic generation associated with the Proposed Development during the peak construction month.

9.5.2. During the 18-month construction phase, the following traffic would require access to the Site:

- Staff transport, in either cars or staff minibuses;
- Construction equipment and materials, deliveries of machinery and supplies such as concrete materials and crushed rock;
- Components relating to the substation and associated infrastructure;
- AILs consisting of the turbine sections and heavy lift cranes; and
- Escort vehicles for AIL deliveries.

9.5.3. Average monthly traffic flow data was used to establish the construction trips associated with the Proposed Development, and these are detailed in **Technical Appendix 9.1 (EIAR**

Volume 4). The trip estimates have been based upon first principle estimates of traffic movements to and from the Site, having established the likely volumes of construction materials, resources and components.

- 9.5.4. There are two proposed accesses into the Site:
- Western Access – from the A702 through Watermeetings Forest; and
 - Eastern Access – off Daer Water road to enter the site at Wintercleugh.
- 9.5.5. This assessment assumes that the construction related traffic would enter and exit the Site through the Eastern Access via Daer Water and AIL deliveries would enter and exit the Site through the Western Access from the A702.
- 9.5.6. However, it should be noted that the final access strategy for both AIL and general construction traffic would be confirmed post consent and would be secured through an appropriately worded planning condition.
- 9.5.7. The likely POE used for the discharging of wind turbine components would be Glasgow King George V (KGV) Docks. AILs would likely route to the Site via the M8, M74 and A702 through to the Site access junction.
- 9.5.8. Except for the turbine components, most traffic would be HGVs and normal construction plant, including grading tractors, excavators, high-capacity cranes, forklifts, and dumper trucks. Most would arrive at the Site access on low loaders.
- 9.5.9. The turbines are delivered in component sections for transport and would be assembled within the area of each turbine location. The nacelle, hub, drive train, blade, tower sections are classified as AILs due to their weight and/or length, width, and height when loaded. The components can be delivered on a variety of transport platforms with typical examples illustrated in **Technical Appendix 9.1 (EIAR Volume 4)**.
- 9.5.10. In addition to the turbine deliveries, up to two high-capacity erection cranes would be needed to offload components and erect the turbines. The cranes are likely to be mobile cranes with a capacity up to 1,000 tonnes that would be escorted by boom and ballast trucks to allow full mobilisation on-site. A smaller erector/assist crane would also be present to allow the assembly of the main cranes and to ease overall erection of the turbines.
- 9.5.11. The resulting traffic generation profile is presented in **Technical Appendix 9.1 (EIAR Volume 4)**.
- 9.5.12. The peak of construction activity is expected to occur in month 11 for the Proposed Development, where it is estimated that there would be a total of 4,491 vehicle movements per month, which equates to 204 vehicle movements per day, comprising 152 two-way HGV movements and 52 two-way car/LGV movements.
- 9.5.13. This would equate to approximately 17 two-way total vehicles movements or 13 two-way HGV movements per hour, across a typical 12-hour day, assuming a flat traffic profile, where traffic arrived and departed the Site equally throughout the working day.
- 9.5.14. The distribution of development traffic on the network would vary depending on the types of loads being transported. Strategic access to the Site would be taken from the A74(M), which forms part of the trunk road network, accessed via the A702 and Daer Water road. Construction vehicles delivering loads to and from the Site are likely to be delivered via the A74(M). The assumptions for the distribution of construction traffic during the peak month are presented in **Technical Appendix 9.1 (EIAR Volume 4)**.

9.5.15. Following the distribution and assignment of traffic flows to the Study Area network, the resultant daily traffic during the peak of construction in month 11, is summarised in **Table 9.13**.

Table 9.13: Peak Construction Traffic (Month 11)				
No.	Survey Location	Cars & Lights	HGV	Total
1	Daer Water, Eastern Access	52	152	204
2	A702, Western Access	8	-	8
3	A702, north of A702 / B7040 junction	36	152	188
4	A702, south of A702 / B7040 junction	44	152	196
5	B7040, west of Elvanfoot substation	8	-	8
6	A702, Durisdeer Mill	8	-	8
7	A74(M), south of Leadmills Road Overpass	18	152	170
8	A74(M), south of Junction 14	18	152	170
9	B7076, north of Auchen Castle	-	-	-

Please note minor variances due to rounding may occur.

9.5.16. Note, where road links show no construction traffic, this is due to those road links not being used during the peak month of construction activity.

9.5.17. The peak month (Month 11) traffic data was combined with the future year (2035) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in **Table 9.14**.

Table 9.14: 2035 Baseline + Construction Development – Flows and Impact							
No.	Survey Location	Cars & Lights	HGV	Total	% Increase Cars & Lights	% Increase HGV	% Increase Total
1	Daer Water, Eastern Access	92	172	264	130.65%	743.70%	338.49%
2	A702, Western Access	545	173	717	1.45%	0.00%	1.10%
3	A702, north of A702 / B7040 junction	946	428	1,374	4.00%	54.96%	15.87%
4	A702, south of A702 / B7040 junction	757	343	1,100	6.20%	79.27%	21.68%
5	B7040, west of Elvanfoot substation	162	47	208	5.06%	0.00%	3.89%
6	A702, Durisdeer Mill	720	62	783	1.09%	0.00%	1.01%
7	A74(M), south of Leadmills Road Overpass	25,955	13,304	39,259	0.07%	1.15%	0.43%
8	A74(M), south of Junction 14	23,758	12,112	35,870	0.08%	1.27%	0.48%
9	B7076, north of Auchen Castle	386	94	480	0.00%	0.00%	0.00%

Please note minor variances may occur due to rounding.

9.5.18. The total traffic movements are predicted to increase by a maximum of 338.49% on the Daer Water road, where the proposed Eastern Access junction is located, and where it has

been assumed that this would be used by all non-AIL construction traffic. Along the A702, near where the proposed Western Access junction is located, the total increase in traffic will be 1.10% during the peak month.

- 9.5.19. **Table 9.14** shows that highest HGV traffic movements increase would occur on the Daer Water road, where it is estimated to increase by 743.70%, and whilst this increase could be considered statistically high, it is generally caused by the baseline low HGV flows on the road at this location. To put the increase into perspective, the Daer Water road would see an additional 152 HGV movements per day or 13 HGV movements per hour over the course of a typical 12-hour shift. This is not considered significant in terms of overall traffic flows.
- 9.5.20. The next highest HGV traffic movement increase would occur on the A702, south of A702/B7040 junction, with a 79.27% increase. To put the increase in to perspective, the A702 would see an additional 152 HGV movements per day or 13 HGV movements per hour over the course of a typical 12-hour shift. This is not considered significant in terms of overall traffic flows.
- 9.5.21. A review of existing theoretical road capacity has been undertaken using The NESA Manual⁹, formerly part of the Design Manual for Roads and Bridges, Volume 15, Part 5. The theoretical road capacity has been estimated for each of the road links for a 12-hour period that makes up the Study Area. The results are summarised in **Table 9.15**.

Table 9.15: Theoretical Road Capacity					
No.	Survey Location	2035 Baseline Flow	2035 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road
1	Daer Water, Eastern Access	60	264	3,360	92%
2	A702, Western Access	709	717	21,600	97%
3	A702, north of A702 / B7040 junction	1,186	1,374	21,600	94%
4	A702, south of A702 / B7040 junction	904	1,100	21,600	95%
5	B7040, west of Elvanfoot substation	201	208	21,600	99%
6	A702, Durisdeer Mill	775	783	21,600	96%
7	A74(M), south of Leadmills Road Overpass	39,089	39,259	136,800	71%
8	A74(M), south of Junction 14	35,700	35,870	136,800	74%
9	B7076, north of Auchen Castle	480	480	21,600	98%

Please note minor variances may occur due to rounding.

- 9.5.22. The results indicate there are no road capacity issues with the addition of construction traffic associated with the Proposed Development and significant spare capacity exists within the trunk and local road network to accommodate all construction phase traffic.
- 9.5.23. Based on the information provided in **Table 9.14** and in accordance with the ISEP Guidelines Rules 1 and 2, the following receptors have been taken forward for detailed assessment:
- Daer Water road Users;
 - Daer Water road Residents;
 - A702 Users;

- A702 Residents;
- Elvanfoot Residents; and
- Core Path/Path Users.

9.5.24. The significance of the potential effects on the above receptors has been determined using the rules and thresholds previously outlined above. **Table 9.16** summarises the significance of the effect on the receptors for the construction phase.

9.5.25. Note, for the purposes of undertaking the assessment, where both the users of a road and residents in the vicinity of the road require to be assessed, these have been done together to avoid repetition. In this scenario, the higher of the two sensitivities has been used for the assessment. Professional judgement is also applied to take account of all factors at each location, which can move the classification both up and down.

Table 9.16: Construction Phase Traffic Effects Summary							
Receptor	Severance	Driver Delay	Pedestrian Delay	Non-motorised user Amenity	Fear & Intimidation	Road Safety	Large Loads
Daer Water Users/ Residents	Major	Moderate/ Minor	Moderate/ Minor	Major	Major	Moderate/ Minor	Major
A702 Users/ Residents	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Elvanfoot Residents	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Core Path/ Path Users	Major	N/A	Major/ moderate	Major	Major	Major/ moderate	Major

9.5.26. The assessment of significance suggests that the following receptors are considered likely to experience significant effects in accordance with the EIA Regulations, prior to the application of mitigation measures:

- Daer Water Users/Residents; and
- Core Path/Path Users.

9.5.27. It should be noted that the effects relate solely to the peak of construction activities (and the delivery of AILs). The construction phase is short lived (18 months) and the effects are temporary in nature. Whilst it is acknowledged that other months within the construction programme may cause significant effects, these would be less than those assessed and for which mitigation measures have been proposed.

Potential Cumulative Construction Effects

9.5.28. The review of committed development schemes (developments with extant planning permission) undertaken in **Technical Appendix 9.1 (EIAR Volume 4)** did not identify any other significant traffic generating developments in the Study Area that may occur during the construction period associated with the Proposed Development. It is therefore considered that no cumulative assessment is required.

9.5.29. Projects in scoping or not yet determined cannot be included in cumulative assessments as they have yet to be determined. As traffic impacts are short lived for construction projects,

the potential traffic impact is highly speculative and as such, cannot be included in the assessment.

- 9.5.30. It should be noted that the use of low Temprow growth assumptions has provided a basis for general local development growth within the Study Area.
- 9.5.31. Should the existing situation change, any effects of the multiple sites being constructed at the same time would be mitigated through the use of an overarching Traffic Management and Monitoring Plan and by introducing a phased delivery plan which would be agreed with SLC, TS and the Police.

9.6. Specific Mitigation

- 9.6.1. Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 9.6.2. Preparation of a CTMP (TT01) is standard practice for this type of development and further details of the specific measures to be included in this CTMP are detailed below. The CTMP would be provided post consent and secured by a suitably worded planning condition.

Construction Traffic Management Plan (CTMP) (TT01)

- 9.6.3. The following measures would be implemented during the construction phase through the CTMP, secured via a deemed planning condition:
- Agree AIL route modifications and improvements with SLC, TS and other relevant stakeholders. Works which would be required to facilitate turbine deliveries are outlined in the Route Survey Report (RSR), which is presented in **Annex B of Technical Appendix 9.1 (EIA Volume 4)**;
 - Where possible, the detailed design process would minimise the volume of material to be imported to Site to help reduce HGV numbers;
 - A Staff Travel Plan, including transport modes to and from the worksite (including pick up and drop off times);
 - A Transport Management Plan for AIL deliveries;
 - All materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads;
 - Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
 - Wheel cleaning facilities may be established at the Site entrance, depending on the views of SLC and TS;
 - Normal Site working hours would be limited to between 0700 and 1900 Monday to Friday and 0700 and 1300 on Saturdays though component delivery and turbine erection may take place outside these hours i.e., depending on when police escort is available;
 - Appropriate traffic management measures would be put in place on the A702 and Daer Water road, to avoid conflict with general traffic, subject to the agreement of SLC. Typical measures would include HGV turning and crossing signs and/or banksmen at the Site access and warning signs;

- Provide construction updates on the project website, social media feeds and a newsletter to be distributed to residents within an agreed distance of the Site;
- Adoption of a voluntary reduced speed limits, for example on the A702 and Daer Water road depending on the selected access location and at other locations to be agreed with SLC;
- All drivers required to attend an induction to include:
 - A toolbox talk safety briefing;
 - The need for appropriate care and speed control;
 - A briefing on driver speed reduction agreements (to slow Site traffic at sensitive locations through the villages); and
 - Identification of the required access routes and the controls to ensure no departure from these routes.

Wear and Tear Agreement (TT02)

- 9.6.4. As part of the CTMP an agreement to cover the cost of abnormal wear on the local road network would be required by SLC. Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the condition of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction phase. Any necessary repairs would be coordinated with SLC's roads team. Any damage caused by traffic associated with the Proposed Development during the construction phase that would be hazardous to public traffic would be repaired immediately.
- 9.6.5. Damage to road infrastructure caused directly by construction traffic would be repaired and street furniture that is removed on a temporary basis would be fully reinstated.
- 9.6.6. There would be a regular road review and any debris and mud would be removed from the carriageway using an on-site road sweeper to ensure road safety for all road users.

Specific AIL Mitigation

- 9.6.7. There are a number of traffic management measures that can help reduce the effect of abnormal load convoys and these would be detailed in an AIL Transport Management Plan.
- 9.6.8. All AIL deliveries would be undertaken at appropriate times (to be discussed and agreed with SLC, TS and Police Scotland) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys would travel in the early morning periods, before peak times while general construction traffic would generally avoid the morning and evening peak periods.
- 9.6.9. The majority of potential conflicts between construction traffic and other road users would occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.
- 9.6.10. Potential conflicts between the abnormal loads and other road users can occur at a variety of locations and circumstances, including:
- On sections of single carriageway road or narrow road sections, for example on the A702;

- At locations where there are significant changes in the horizontal alignment of the carriageway, requiring the loads to use the full carriageway width;
- Where traffic turns at a road junctions, requiring other traffic to be restrained on other approach arms; and
- In locations where high speeds of general traffic are predicted.

9.6.11. Advance warning signs would be installed on the approaches to the affected road network. Information signage could be installed to help improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist).

9.6.12. The location and numbers of signs would be agreed post consent and would form part of the wider traffic management proposals for the Proposed Development.

AIL Traffic Management Plan (TT03)

9.6.13. The AIL Transport Management Plan would be prepared to cater for all AIL movements to and from the Proposed Development Site. This would include:

- Procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates, and agreeing communication protocols and lay over areas to allow overtaking;
- A diary of proposed delivery movements to liaise with the communities to avoid key dates such as local events;
- A protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and
- Proposals to establish a construction liaison group to ensure the smooth management of the project/public interface with the Applicant, the construction contractors, the local community, and if appropriate, the police forming the committee. This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

Public Information (TT04)

9.6.14. Information on the wind turbine convoys would be provided to local media outlets such as local papers and local radio to help assist the public. The applicant would also ensure information is distributed through its communication team via the project website, local newsletters, and social media.

9.6.15. Information would relate to expected vehicle movements from the POE through to the Site access junction. This would assist residents in understanding the timing of the convoy movements and may help reduce any potential conflicts.

Convoy System (TT05)

9.6.16. A police escort would be required to facilitate the delivery of the predicted AILs. The police escort would be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible.

- 9.6.17. The AIL convoys would be no more than three AILs vehicles long, or as advised by the police, to permit safe transit along the delivery route, and to allow limited overtaking opportunities for following traffic where it is safe to do so.
- 9.6.18. The times in which the convoys would travel would be agreed with Police Scotland who have sole discretion on when loads can be transported.

Staff Travel Plan (TT06)

- 9.6.19. A Staff Travel Plan would be deployed where necessary, to manage the arrival and departure profile of staff and to encourage sustainable modes of transport, especially car-sharing. A package of measures could include:
- Appointment of a Travel Plan Coordinator (TPC);
 - Provision of public transport information;
 - Mini-bus service for transport of Site staff;
 - Promotion of a car sharing scheme;
 - Car parking management; and
 - Restrictions on parking, for example on the public road network and verges in the vicinity of the Site entrance.

Outdoor Access Management Plan (OAMP) (TT07)

- 9.6.20. Within the Site, consideration has been given to pedestrians, cyclists and equestrians alike due to potential interactions between construction traffic and users of Core Paths/paths, cycle routes and public roads.
- 9.6.21. It should be noted that a permanent diversion would be provided so that users of the Core Path network can avoid infrastructure associated with the Proposed Development. The permanent diversion would not be used by construction traffic associated with the Proposed Development, instead it would provide continuing access for existing users away from the Proposed Development. A temporary diversion during construction would also be put in place for other parts of the SUW which would be impacted by construction traffic.
- 9.6.22. A detailed OAMP would be developed and would be secured via a planning condition.
- 9.6.23. A framework for the preparation of the detailed OAMP is provided as part of this application in **Technical Appendix 9.2 (EIAR Volume 4)**.
- 9.6.24. A summary of the specific mitigation is set out in **Table 9.17**.

Table 9.17: Summary of Specific Mitigation					
Description of Impact	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation	Consultation or Approval Required
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT01	CTMP	To mitigate adverse effects associated with construction traffic.	Construction	Yes. Subject to an appropriately worded planning condition.

Table 9.17: Summary of Specific Mitigation

Description of Impact	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation	Consultation or Approval Required
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT02	Wear and Tear Agreement	To cover the cost of abnormal wear on the local road network	Construction	Yes. Subject to an appropriately worded planning condition.
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT03	AIL TMP	To cater for AIL movements to and from the Site.	Construction	Yes. Subject to an appropriately worded planning condition.
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT04	Public Information	To assist residents in understanding the timing of the AIL convoy movements and may help reduce any potential conflicts.	Construction	Yes, in consultation with the appropriate road authority.
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT05	Convoy System	To facilitate the delivery of the predicted AILs.	Construction	Yes, as part of the AIL TMP.
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT06	Staff Travel Plan	To manage the arrival and departure profile of staff and to encourage sustainable modes of transport, especially car-sharing.	Construction	Yes. Subject to an appropriately worded planning condition.
Severance, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT07	OAMP	To provide a comprehensive framework for the management of public access and recreational amenities during the construction and operation of the Proposed Development	Construction Operation	Yes. Subject to an appropriately worded planning condition.

9.7. Assessment of Residual Effects

Residual Construction Effects

- 9.7.1. This section considers the assessment of traffic impacts following the incorporation of the identified mitigation measures. An evaluation of the potential effects of the increase in traffic on the Study Area roads used for construction traffic was undertaken. The summary of this assessment is provided in **Table 9.18**, with the maximum receptor significance shown.
- 9.7.2. Following the implementation of a comprehensive CTMP, together with a wear and tear agreement, an AIL TMP, public information, a convoy system, a staff travel plan and an OAMP, all effects will be minor and not significant. The traffic effects are transitory in nature and appropriate mitigation measures are proposed to reduce the potential impacts. No long-term detrimental transport or access issues are associated with the construction phase of the Proposed Development.

Residual Cumulative Construction Effects

- 9.7.3. No residual cumulative effects are predicted as part of the Proposed Development.

Enhancement Opportunities

- 9.7.4. The framework for preparation of the detailed OAMP (**Technical Appendix 9.2, EIAR Volume 4**) includes enhancement opportunities for the path network within the Site. Under Land Reform (Scotland Act 2003) it is proposed that the Site access tracks associated with the Proposed Development would be available for full public use for non-motorised users upon completion of the construction and commissioning phases, subject to following the Scottish Outdoor Access Code.
- 9.7.5. There would also be improvements to the existing track network in the Site including some of the Core Path network along which the SUW is routed.
- 9.7.6. The above is likely to result in long-term benefits for the local community and visitors using the land within the Site for recreation.

9.8. Monitoring

Construction Phase Monitoring

- 9.8.1. The Site entrance roads would be maintained and monitored during the construction phase and operational life of the Proposed Development. With regards to the construction phase, this would be done as part of the CTMP and would involve monitoring the Site access junction and public road network in the vicinity of the Site to ensure mud and debris from construction activities are not tracked on to the road network. Furthermore, monitoring of the public road network would be undertaken as part of the road conditions surveys, which would likely be required as part of the planning conditions attached to the consent.

9.9. Summary of Assessment

- 9.9.1. **Table 9.18** summarises the potential significant effects identified in the evaluation with mitigation in place.

Table 9.18: Summary of Traffic and Transport Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Daer Water road Users and Residents					
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT01, TT02, TT03, TT04, TT05, TT06, TT07	The implementation of a comprehensive CTMP, together with a wear and tear agreement, an AIL TMP, public information, a convoy system, a staff travel plan and an OAMP.	Through appropriately worded planning conditions. CTMP to be submitted to and approved by SLC in consultation with relevant stakeholders / consultees. OAMP to be submitted to and approved by SLC.	Minor (Not Significant)	Monitoring the Site access junction and public road network in the vicinity of the Site to ensure mud and debris from construction activities are not tracked on to the road network.
Core Path / Path Users					
Severance, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	TT01, TT03, TT04, TT05, TT06, TT07	The implementation of a comprehensive CTMP, together with, an AIL TMP, a staff travel plan and an OAMP.	Through appropriately worded planning conditions. CTMP to be submitted to and approved by SLC in consultation with relevant stakeholders / consultees. OAMP to be submitted to and approved by SLC.	Minor (Not Significant)	NA.

10. Noise

10.1 Introduction

- 10.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects of the noise associated with the construction, operation and decommissioning of the Proposed Development.
- 10.1.2 The specific objectives of the Chapter are to:
- Describe the existing noise baseline context and cumulative context;
 - Describe the assessment methodology and significance criteria used in completing the impact assessment;
 - Describe the potential effects, including direct, indirect and cumulative effects;
 - Describe the mitigation measures proposed to address likely significant effects; and
 - Assess the residual effects remaining following the implementation of mitigation.
- 10.1.3 The noise assessment has been undertaken by Alex Dell and reviewed and approved by Andrew Birchby, both of TNEI Services. Alex is a Senior Consultant who holds a PhD in Mechanical Engineering and is a Full Member of the Institute of Acoustics with over 4 years' of wind farm noise assessment experience. Andrew is a Principal Consultant and has over 15 years' of experience in the renewables industry and over 10 years' of acoustics experience with a particular focus on wind farm noise. Andrew has been involved in all stages of the assessment process from site feasibility through to planning applications, detailed design, construction and compliance monitoring. Andrew is a Full Member of the Institute of Acoustics and holds the Diploma in Acoustics & Noise Control, along with an MEng in Systems Engineering, and an MSc in Environmental Governance.
- 10.1.4 This Chapter is supported by the following figures and technical appendices:
- **Figures (EIAR Volume 3a):**
 - **Figure 10.1: Construction Noise Assessment Study Area;**
 - **Figure 10.2: Operational Noise Monitoring and Assessment Locations;** and
 - **Figure 10.3: Cumulative Wind Turbine Locations.**
 - **Technical Appendices (EIAR Volume 4):**
 - **Technical Appendix 10.1: Construction Noise Report;** and
 - **Technical Appendix 10.2: Operational Noise Report.**
- 10.1.5 Figures and technical appendices are referenced in the text where relevant.

10.2 Assessment Methodology

Overview

- 10.2.1 The construction noise assessment methodology is detailed in **Technical Appendix 10.1 (EIAR Volume 4)** and follows the principles set out in BS 5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites.'¹
- 10.2.2 The operational noise assessment methodology is detailed in **Technical Appendix 10.2 (EIAR Volume 4)** and follows the principles set out in ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms'² and the Institute of Acoustics (IOA) 'A Good Practice Guide

¹ British Standard BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' – Part 1: Noise

² The Working Group on Noise from Wind Turbines (1996). ETSU-R-97 The Assessment and Rating of Noise from Wind Farms. UK: Energy Technology Support Unit

to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'³. Hereafter these documents are referred to as ETSU-R-97 and the IOA GPG.

- 10.2.3 The assessment is presented with reference to specific 'areas' of the Site within the Site Boundary. These areas comprise the Wind Turbine Array and associated access routes, as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.
- 10.2.4 Effects considered to be significant for the purposes of the EIA Regulations⁴ are those classified as being '**Major**' or '**Moderate**'.

Scope of Assessment

Potential Effects Scoped In

- 10.2.5 The scope of this assessment is set out in **Table 10.1** which has been informed by the consultation responses detailed in **Technical Appendix 1.2 (EIAR Volume 4)** and the following guidelines/policies:
- National Planning Framework 4⁵;
 - Onshore Wind Policy Statement 2022⁶;
 - Planning Advice Note (PAN) 1/2011: 'Planning and Noise'⁷;
 - Web Based Renewables Advice: 'Onshore Wind Turbines'⁸;

Table 10.1: Effect Considered within the Noise Assessment			
Effect	Phase		
	C	O/M	D
Potential effect of construction activities at nearest Noise Sensitive Receptors (NSRs).	Yes	No	No
Potential cumulative construction noise effects should construction activities occur at the same time as those for the nearby proposed developments.	Yes	No	No
Potential effect of operational noise from the Proposed Development at NSRs located in proximity to the Proposed Development.	No	Yes	No
Potential effect of cumulative operational noise from the Proposed Development operating in conjunction with other proposed, operational and consented developments in the area	No	Yes	No

*C=construction, O/M=operation and maintenance and D=decommissioning.

- 10.2.6 The Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, inclusive of those which are either operational, under construction, consented or the subject of a valid planning application. Developments close to the end of the period of their consents, without having been implemented, are included to present the reasonable 'worst case scenario'.

³ Institute of Acoustics (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'. UK: Institute of Acoustics.

⁴ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

⁵ Scottish Government (2023). National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>

⁶ Scottish Government (2014). Onshore wind: policy statement 2022 [Online] Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/>

⁷ Scottish Government (2011). PAN 1/2011 Planning and Noise Scotland. Available at: <https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/>

⁸ Scottish Government (2014) Web Based Renewables Advice: 'Onshore Wind Turbines' [Online] Available From <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>

- 10.2.7 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**.

Potential Effects Scoped Out

- 10.2.8 The assessment focusses on likely significant effects and as such impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with reasoning for scoping them out is presented in **Table 10.2**.

Table 10.2: Effects Scoped Out of the Noise Assessment	
Impact	Reasoning
Decommissioning	Activities that occur during the decommissioning of the Proposed Development are unlikely to produce higher noise levels than those produced during the construction and many of the activities would be similar in nature. As such it is assumed that if construction noise levels are predicted to be below the threshold levels, then decommissioning noise would also be within the threshold levels.
Battery Energy Storage System (BESS) and Substation Operational Noise	Due to the separation distance between the proposed BESS and substation and the nearest NSRs to the west (Troloss Cottage - km) and northeast (Hitteril - 1.6 km), and the relatively small scale of the BESS (approximately 50 MW), operational noise levels from the BESS and substation at the nearest NSRs would be very low such that the noise limits recommended by the South Lanarkshire Council (SLC) Environmental Health Officer (EHO) at Scoping would be met by a comfortable margin. On this basis, operational noise from the BESS and Substation has been scoped out of the EIAR.
Vibration	Vibration from turbines is low therefore on that basis it was not considered necessary to carry out a specific assessment of perceptible vibration and it has been scoped out of the EIAR. However, further information on vibration can be found in Section 3.2 of Technical Appendix 10.2 (EIAR Volume 4) .
Blasting	The extent of any blasting requirement cannot be determined until intrusive site investigation tests are completed. Nevertheless, should blasting be required, a series of tests would be undertaken by the appointed Contractor in accordance with guidance outlined in BS 5228-2:2009+A1:2014 ¹ . In addition, blasts would be designed through appropriate specification of Maximum Instantaneous Charge (MIC) to ensure that vibration levels at the nearest NSR's would not exceed the guideline limits presented in BS 7385-2: 1993 'The Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration' and BS 6472-2: 2008 'Guide to evaluation of human exposure to vibration in buildings. Blast-induced vibration'. A Condition could be attached to the consent to require compliance with these limits. Given the relative distances between the potential locations of blasting and the closest NSRs, there is no reason to suggest that the guidance within BS 7385 and BS 6472 would not be met, and therefore this issue can be scoped out of further detailed consideration in the EIAR.
Low Frequency Noise and Infrasound – Wind Turbines	The term infrasound can be defined as the frequency range below 20 Hz, while low frequency noise (LFN) is typically in the frequency range 20 to 200 Hz. Wind turbines do not produce significant levels of infrasound or LFN, as supported by the studies discussed in Section 3.2 of Technical Appendix 10.2 (EIAR Volume 4) . As such, the assessment of infrasound and LFN from operational wind turbines has been scoped out of the EIAR.
Amplitude Modulation	In the context of wind turbine noise, Amplitude Modulation (AM) describes a variation in noise level over time; for example, observers may describe a 'whoosh whoosh' sound, which can be heard close to a wind turbine as the blades sweep past. AM of aerodynamic noise is an inherent characteristic of wind turbine noise and was noted in ETSU-R-97. The acoustics community, however, has sought to make a distinction between the AM discussed within ETSU-R-97, which is expected at most wind farms and as such may be considered as 'Normal Amplitude Modulation' (NAM), to the atypical AM that has sometimes been heard at some wind farms, hereinafter referred to as 'Other Amplitude Modulation' (OAM).

Table 10.2: Effects Scoped Out of the Noise Assessment

Impact	Reasoning
	OAM is used to describe an unusual feature of aerodynamic noise from wind turbines, where a greater than normal degree of regular fluctuation in sound level occurs at blade passing frequency, typically about once per second. At time of writing there is no agreed methodology which can be used to predict the occurrence of AM or an agreed methodology which can be used to determine whether the effects of AM, should it occur, are likely to be significant. In the event that there were any complaints linked to AM, this could be investigated in terms of the Statutory Nuisance provisions of the Environmental Protection Act 1990⁹, and on this basis, AM has been scoped out of the EIA.

Method of Baseline Characterisation

Extent of the Study Area

- 10.2.9 For the purposes of this assessment, residential properties that lawfully exist and are deemed habitable, or have extant planning permission, are considered to be NSRs. The NSRs chosen for assessment were qualitatively selected as the closest receptors to the Proposed Development in each direction and, where required, other wind farm developments (for the consideration of cumulative effects).

STUDY AREA – CONSTRUCTION NOISE

- 10.2.10 The Construction Noise Assessment Locations (CNALs) are shown on **Figure 10.1 (EIAR Volume 3a)** and these have been selected by TNEI through the identification of the closest NSRs to the Proposed Development construction activities. The CNALs were chosen on the assumption that if noise levels are within acceptable levels at the closest receptors, then it is reasonable to assume they would also be acceptable at more distant locations.
- 10.2.11 A total of ten CNALs were chosen, and these are presented on **Figure 10.1 (EIAR Volume 3a)**, and within **Technical Appendix 10.1 (EIAR Volume 4)**.
- 10.2.12 The CNALs refer to the position on the curtilage of a property where the predictions of construction noise levels have been made, as detailed in **Table 10.3** below.

Table 10.3: Construction Noise Assessment Locations

CNAL Name	Easting (BNG)	Northing (BNG)
CNAL1 – Troloss House	291661	608445
CNAL2 – Troloss Cottage	292959	609479
CNAL3 – Nether Fingland	293834	610753
CNAL4 – Bracadale	296483	610122
CNAL5 – Wintercleugh House	296534	609999
CNAL6 – Daerbank	296580	609796
CNAL7 – Hitteril	296194	609629
CNAL8 – Sweetshaw Foot	298356	609066
CNAL9 – Kirkhope Cleuch Cottage	296617	607218

⁹ Environmental Protection Act, 1990. Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>

Table 10.3: Construction Noise Assessment Locations

CNAL Name	Easting (BNG)	Northing (BNG)
CNAL10 - Kirkhope	296337	605455

STUDY AREA – OPERATIONAL NOISE

- 10.2.13 The operational wind farm Noise Assessment Locations (NALs) have been selected based on them having the loudest predicted noise levels within groups of nearby properties around the Proposed Development (when accounting for topographical corrections). NALs have been chosen to represent residential NSRs both around the Proposed Development and in the vicinity of the other wind turbine developments included in the cumulative assessment.
- 10.2.14 A total of 20 NALs were chosen, and they are shown on **Figure 10.2 (EIAR Volume 3a)** and detailed in **Table 10.4** below.
- 10.2.15 The NALs refer to the position on the curtilage of a property closest to the Proposed Development. Predictions of turbine noise have been made at each of the NALs as detailed in **Table 10.4**. This approach ensures that the assessment considers the worst case (highest) noise emission level expected at all of the NSRs. **Table 6.1 of Technical Appendix 10.2 (EIAR Volume 4)** details which Noise Monitoring Location (NML) has been selected for the setting of noise limits at each NAL listed below.

Table 10.4: Operational Noise Assessment Locations

NAL Name	Easting (BNG)	Northing (BNG)
NAL1 - High Gateslack	289617	602543
NAL2 - Greenbrae	289499	603791
NAL3 - Murcleuch	288500	605094
NAL4 - Merrick School	288439	607013
NAL5 - Troloss	291568	608181
NAL6 - Troloss House	291661	608445
NAL7 - Troloss Cottage	292936	609476
NAL8 - Nether Fingland	293834	610753
NAL9 - Peden Cottage	294550	612262
NAL10 - Potrail Cottage	295127	612751
NAL11 - Allershaw Lodge	296056	612355
NAL12 - Bracadale	296490	610118
NAL13 - Wintercleugh House	296534	609999
NAL14 - Daerbank	296580	609796
NAL15 - Hitteril	296194	609629
NAL16 - Sweetshaw Foot	298356	609066
NAL17 - Kirkhope Cleuch Cottage	296669	607218

Table 10.4: Operational Noise Assessment Locations

NAL Name	Easting (BNG)	Northing (BNG)
NAL18 - Crookburn	296607	605627
NAL19 - Kirkhope	296337	605455
NAL20 - Daerhead	296379	603041

- 10.2.16 There are a number of operational, consented and in planning wind farms in the vicinity of the Proposed Development, and these are shown on **Figure 10.3 (EIAR Volume 3a)** and summarised in **Table 10.5** below. It should be noted that even those projects which have a marginal contribution to cumulative operational wind farm noise, or are nearing the end of the period of their consents without having been implemented, were included to provide a worst-case approach.

Table 10.5: Cumulative Wind Developments

Wind Farm	Number of Turbines	Status	Make and Model of Turbine Considered in Modelling
Clyde Wind Farm	152	Operational	Siemens VS93m 2.3 MW
Clyde Extension Wind Farm	54	Operational	Siemens SWT-3.2-101 3.2 MW
Harestanes Wind Farm	68	Operational	Gamesa G87-2000CS
Minnygap Wind Farm	10	Operational	Nordex N100/2500
Crookedstane Wind Farm	4	Consented	Siemens SWT-2.3-82VS 2.3 MW
Lion Hill Wind Farm	4	Consented	Siemens SWT-2.3-82VS 2.3 MW
Daer Wind Farm	17	In Planning	Siemens-Gamesa SG6.6-155 6.6 MW, Mode AMO
Harestanes West Wind Farm	12	In Planning	Vestas V162 7.2 MW with Serrated Blades, Mode PO7200
Harestanes South Wind Farm	8	In Planning	Siemens-Gamesa SWT 5.0-145
Rivox Wind Energy Hub	29	In Planning	Vestas V162 6.8 MW with Serrated Blades, Mode PO6800

- 10.2.17 All of the wind turbine developments detailed above have been considered as part of the cumulative operational noise assessment.
- 10.2.18 Further information on the cumulative noise assessment can be found in and in **Technical Appendix 10.2 (EIAR Volume 4)**.

Desk Study

- 10.2.19 Prior to the commencement of the baseline noise survey, initial desktop noise modelling using the EMD software package 'windPRO' was undertaken in order to identify suitable locations at which to monitor background noise. Throughout the noise assessment, tasks such as data analysis and noise predictions were undertaken in appropriate computer software, as detailed within **Technical Appendix 10.1 (EIAR Volume 4)**, and **Technical Appendix 10.2 (EIAR**

Volume 4), respectively. The desk-based assessment was informed by data sources such as Google Earth Aerial Imagery and OS Terrain 50 height data and was complemented by site visit observations made as part of the noise survey.

Field Survey

- 10.2.20 The proposed NMLs were included in a consultation letter issued to SLC as part of the consultation process. The NMLs are shown on **Figure 10.2 (EIAR Volume 3a)** and summarised in **Table 10.6**.
- 10.2.21 The survey was undertaken to determine the baseline noise environment at the closest NSRs to the Proposed Development. The survey was planned and undertaken in accordance with the guidance contained within ETSU-R-97 and the IOA GPG, however, the collected data was analysed to also be suitable for use in the BS 5228 construction noise assessment¹.
- 10.2.22 The survey was undertaken within the period 18 February 2025 to 15 April 2025 at six NMLs. The selection of the NMLs considered local noise sources, such as watercourses, vegetation and existing operational turbines. More information on the NMLs and background noise survey can be found in Section 5 of **Technical Appendix 10.2 (EIAR Volume 4)**.

Table 10.6: Noise Monitoring Locations		
NML Name	Easting (BNG)	Northing (BNG)
NML1 – Troloss House	291621	608447
NML2 – Over Fingland	292791	609549
NML3 – Peden Gill	294825	612844
NML4 – Hitteril	296158	609613
NML5 – Kirkhope Cleuch Cottage	296574	607230
NML6 – Kirkhope	296303	605423

- 10.2.23 Simultaneous wind speed/direction data was recorded using a LIDAR unit, which was located within the Site. The wind speed data collected at a height of 155 m was standardised to 10 m height in accordance with good practice.
- 10.2.24 Wind speed/direction and rainfall data were collected throughout the survey and averaged over the same ten-minute periods as the noise data to allow analysis of the measured background noise as a function of wind speed and wind direction. All data analysis was undertaken in accordance with ETSU-R-97 and the IOA GPG.

Method of Assessment

Potential Effect Significance Criteria

CONSTRUCTION NOISE

- 10.2.25 BS 5228, Appendix E Part E.3.2¹ provides example thresholds for potential significant effects at dwellings, which can be used for assessing the significance of construction noise effects. Three categories of threshold levels are defined (A, B and C), and having due regard to the existing ambient noise levels measured at each of the NMLs, the Category A noise threshold values were deemed applicable for all NSRs.
- 10.2.26 The Category A threshold levels used for determining the significance of construction noise effects are provided in **Table 10.7** below:

Table 10.7: Construction Noise Category A Criteria

Significance of Effect	Criteria Thresholds	
	Criteria Met	Criteria Exceeded
Daytime (07:00 to 19:00) and Saturdays (07:00 to 13:00)	≤65dB L _{Aeq, 12 hr}	>65dB L _{Aeq, 12 hr}
Evenings (19:00 to 23:00) Weekends (13:00 to 23:00 Saturday and 07:00 to 23:00 Sunday)	≤55dB L _{Aeq, 12 hr}	>55dB L _{Aeq, 12 hr}
Nighttime (23:00 to 07:00)	≤45dB L _{Aeq, 12 hr}	>45dB L _{Aeq, 12 hr}

- 10.2.27 It should be noted that exceedance of the threshold limit does not in itself indicate a significant effect, rather, the standard states:

'If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.'

OPERATIONAL NOISE

- 10.2.28 PAN 1/2011⁷ refers to the web-based planning advice on renewable technologies for Onshore Wind Turbines⁸, which states that ETSU-R-97 should be used to assess and rate noise from wind energy developments. In addition, the Scottish Government's 'Onshore wind: policy statement 2022'⁶ states that ETSU-R-97 in conjunction with the IOA GPG should be used in the assessment and rating of noise from wind energy developments. It is acknowledged that the UK Government has been considering the extent to which ETSU-R-97 may require updating to align with the potential effects from more modern turbines. However, it is stated that until such time that new guidance is produced, ETSU-R-97 should still be used in the assessment and rating of noise from wind energy developments.
- 10.2.29 ETSU-R-97 does not define significance criteria. Rather, it describes a framework for the measurement of wind farm noise and gives indicative noise levels considered to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development. Achievement of ETSU-R-97 derived noise limits ensures that turbine noise would comply with current Government guidance.
- 10.2.30 The use of the term 'significance' in this Chapter in relation to operational wind turbine noise, therefore, refers to compliance/non-compliance with the ETSU-R-97 derived noise limits. For situations where predicted wind turbine noise meets or is less than the noise limits defined in ETSU-R-97, then the noise effects are deemed to be not significant. Any breach of the ETSU-R-97 derived noise limits due to the Proposed Development is deemed to result in a significant effect.

Limitations and Assumptions

- 10.2.31 As described in **Section 3.4 of Technical Appendix 10.1 (EIAR Volume 4)**, several assumptions have been made when predicting likely construction noise levels. These assumptions are considered to result in 'worst case' noise predictions, and realistically, noise levels are likely to be lower than predicted for much of the construction period.

- 10.2.32 A candidate wind turbine has been used for predictions of operational wind farm noise from the Proposed Development. The final model of wind turbine to be used may differ from that presented here, however the operational noise levels from the Proposed Development would have to comply with the noise limits imposed within the noise Condition attached to any deemed planning permission granted. No other assumptions or data gaps have been identified.
- 10.2.33 Whilst some limitations due to the assumptions made have been identified, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant noise effects.

10.3 Baseline Conditions

Current Baseline

- 10.3.1 **Table 10.8** and **Table 10.9** provide a summary of the background noise levels determined for the ETSU-R-97 Quiet Daytime and Nighttime periods. Further information regarding the background noise survey can be found in **Section 5** of **Technical Appendix 10.2 (EIAR Volume 4)**, within which it is noted that for NML3, due to the inability to minimise the potential influence of operational turbine noise, the background noise levels have been provided for context only, rather than for the setting of noise limits.

Table 10.8: Summary of Prevailing ETSU-R-97 Background Noise Levels during Quiet Daytime Periods (LA90, 10MINS dB)

Noise Monitoring Location (NML)	Wind Speed (ms ⁻¹) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NML1 – Troloss House	22.9	24.1	25.2	26.3	27.7	29.2	31.1	33.4	36.4	40.0	44.5	49.9
NML2 – Over Fingland	24.8	25.4	26.2	27.0	27.9	29.0	30.3	31.8	33.5	35.5	37.8	40.4
NML3 – Peden Gill	36.1	36.3	36.6	37.0	37.5	38.0	38.6	39.1	39.6	40.0	40.4	40.6
NML4 – Hitteril	23.3	24.0	24.8	25.9	27.0	28.2	29.4	30.6	31.7	32.8	33.7	34.4
NML5 – Kirkhope Cleuch Cottage	32.5	32.6	32.9	33.4	34.2	35.2	36.4	37.8	39.3	41.1	43.0	45.1
NML6 – Kirkhope	26.6	27.1	27.6	27.9	28.3	28.7	29.2	29.8	30.7	31.8	33.3	35.2

Table 10.9: Summary of Prevailing ETSU-R-97 Background Noise Levels during Nighttime Periods (LA90, 10MINS dB)

Noise Monitoring Location (NML)	Wind Speed (ms ⁻¹) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NML1 – Troloss House	22.1	23.5	24.4	24.9	25.3	25.8	26.6	27.9	29.8	32.6	36.4	41.5
NML2 – Over Fingland	25.9	26.1	26.5	27.0	27.6	28.5	29.5	30.6	31.9	33.4	35.1	36.9
NML3 – Peden Gill	37.4	38.4	38.9	39.1	39.0	38.7	38.3	37.8	37.5	37.3	37.4	37.8
NML4 – Hitteril	24.9	25.2	25.6	26.0	26.5	27.1	27.7	28.4	29.2	30.1	31.0	32.0
NML5 – Kirkhope Cleuch Cottage	34.0	34.7	35.1	35.3	35.3	35.2	35.2	35.3	35.7	36.3	37.4	38.9
NML6 – Kirkhope	28.8	28.9	29.0	29.2	29.3	29.4	29.6	29.8	30.0	30.2	30.4	30.6

Future Baseline

- 10.3.2 There are no other known current or predicted future processes that are likely to change the future baseline conditions in the absence of the Proposed Development.

Summary of Sensitive Receptors

- 10.3.3 A summary of the receptors considered likely to be affected by the Proposed Development and therefore scoped into the EIAR are set out in within **Table 10.3** and **Table 10.4**. These are assessed as part of the Construction Noise Assessment, and the Operational Noise Assessment, respectively.
- 10.3.4 Table 2.1 of TAN 1/2011¹⁰ provides examples of the sensitivities of various receptor types. Only residential receptors are considered in this assessment, as this is the only nearby receptor type that has been identified within the Study Area that are classified as having a high level of sensitivity.

10.4 Mitigation

- 10.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:
- Embedded mitigation - design stage mitigation as outlined in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and the design evolution narrative, as outlined in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**;
 - Standard/Best Practice mitigation – standard/best practice mitigation measures are considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness; and
 - Specific mitigation - bespoke mitigation determined as a result of the EIA (refer to **Section 10.6**).
- 10.4.2 The location of the NSRs were digitised as GIS data and the layout was initially developed with consideration of the proximity of the wind turbines, the BESS, substation, and other associated infrastructure to NSRs. As the design progressed, initial operational noise prediction modelling was undertaken to review whether the ETSU-R-97 and Site-Specific Noise Limits could be met at the identified NSRs, therefore avoiding significant effects without the need for further operational mitigation. Where it was identified that the ETSU-R-97 and/or the Site-Specific Noise Limits could not be met, a review of further operational mitigation (i.e., low noise mode management) was undertaken to determine the feasibility of implementing mode management to achieve these limits whilst also maintaining an acceptable output capacity of the Proposed Development, taking into consideration construction and operational costs.
- 10.4.3 A summary of the standard/best practice mitigation considered for the noise assessment is set out in **Table 10.10**.

¹⁰ Scottish Government (2011) Assessment of Noise: technical advice note. Available at: <https://www.gov.scot/publications/technical-advice-note-assessment-noise/>

Table 10.10: Summary of Standard/Best Practice Mitigation

ID	Phase*	Description	Purpose of Mitigation
NO01	Construction	Good site practices for construction of the Proposed Development would be implemented to minimise the likely effects as per Section 8 of BS 5228-1:2009+A1:2014. These measures would be included in the Construction Environmental Management Plan (CEMP).	To reduce noise impacts from construction activities at NSR.
NO02	Decommissioning	Good site practices for decommissioning of the Proposed Development would be implemented to minimise the likely effects as per Section 8 of BS 5228-1:2009+A1:2014 (refer to NO01 above). These measures would be included in the Decommissioning Environmental Management Plan (DEMP).	To reduce noise impacts from decommissioning activities at NSR.

10.4.4 In relation good site practices (mitigation ref: NO01 and NO02) BS 5228 recommends a number of simple control measures as summarised below that can be employed on-site:

- Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern.
- Ensure that any extraordinary site work continuing throughout 24 hours of a day (for example, crane operations lifting components onto the tower) would be programmed, when appropriate, so that haulage vehicles would not arrive at or leave the site outside of core hours or other specific delivery hours, with the exception of abnormal loads that would be scheduled to avoid significant traffic flows.
- Ensure all vehicles and mechanical plant would be fitted with effective exhaust silencers and be subject to programmed maintenance.
- Select inherently quiet plant where appropriate - all major compressors would be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which would be kept closed whenever the machines are in use.
- Ensure all ancillary pneumatic percussive tools would be fitted with mufflers or silencers of the type recommended by the manufacturers.
- Instruct that machines would be shut down between work periods or throttled down to a minimum.
- Regularly maintain all equipment used on site, including maintenance related to noise emissions.
- Vehicles would be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation.
- Ensure all ancillary plant such as generators and pumps would be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures should be provided.

10.4.5 As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where these mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented.

10.6 Assessment of Likely Effects

Potential Construction Effects

- 10.6.1 Construction of the Proposed Development would be undertaken in several successive phases. During each phase the plant and equipment, and the associated on-site movements, would influence the noise generated. The selection of plant and equipment to be used would be determined by the Principal Contractor and detailed arrangements for on-site management would be decided at that time. This assessment has therefore been based upon a typical selection of plant for a wind farm project of this size. Full details of the construction noise assessment inclusive of the selected plant, modelled scenarios, and predicted noise levels can be found in **Technical Appendix 10.1 (EIAR Volume 4)**.
- 10.6.2 The core hours for construction activity would be between the hours of 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 Saturday, however, the assessment also considers construction works outside of these hours. No scheduled construction is anticipated during the Nighttime period, although, there may be a requirement for some plant to be operational during Nighttime, for example, a portable generator to provide lighting.
- 10.6.3 **Chapter 2: Description of Proposed Development (EIAR Volume 2)** describes the outline tasks that would be undertaken during the construction period, which is estimated to last 18 months.
- 10.6.4 For the purposes of this assessment noise modelling has been undertaken for months 1 to 18 and an additional modelling scenario has been included to consider the Nighttime period. The modelled scenarios are summarised in the following construction activities, which are detailed in full in **Annex C of Technical Appendix 10.1 (EIAR Volume 4)**.
- **Months 1 to 6** – Road junction upgrades are completed in month 1; Forestry activities commence along the Site entrance (months 1 to 3); The temporary construction compound (TCC) is constructed and begins operation; Access track construction and upgrades are underway (month 2 onwards), and the first borrow pit begins operation, once this is established concrete batching commences in month 4; The second borrow pit is opened from month 6.
 - **Months 7 to 11** - TCC in use; Improvements along access tracks; Construction of turbine hardstanding and foundations begins starting with turbines closest to the Site entrance; Construction of the Substation and BESS commences in month 8.
 - **Months 12 to 18** - TCC in use; Construction of the BESS and Substation is completed in month 12; Crane deliveries (months 12 and 14 only); Erection of turbines (month 12 onwards); Removal of cranes (month 18 only).
 - **Nighttime model** - To consider potential occurrence of noise outside of core hours, a scenario has been modelled considering the operation of fixed plant during the Nighttime period (23:00 to 07:00), for example, the use of generators to provide power and lighting within the construction compounds.
- 10.6.5 These scenarios were modelled to try to represent some of the 'noisiest' anticipated scenarios. Other construction activities not included in the noise models would occur, however, the noise output from these would likely be less than those considered above.
- 10.6.6 Construction noise sources for any given scenario would generally comprise a mix of both moving and static sources. Mobile sources include mobile construction plant (excavators, dozers, dumpers etc.) and Heavy Goods Vehicles (HGVs), while static construction plant could include generators, lighting rigs and pumps. Static equipment is usually located at a fixed location for an extended period of time.

- 10.6.7 For much of the working day the noise associated with construction activities would be less than predicted, as the assessment has assumed all equipment is constantly operating at full power at the most likely activity areas closest to the NSRs, whereas in practice equipment load and precise location within the Site varies. Therefore, the predicted construction noise levels presented herein represent a conservative estimate of the likely noise levels that would be experienced at NSRs during the construction of the Proposed Development.
- 10.6.8 The calculated noise immission levels can be found in **Table 4-1**, within **Technical Appendix 10.1 (EIAR Volume 4)**.
- 10.6.9 The predicted construction noise levels are below the Category A Daytime Threshold Levels of 65 dB(A) at all CNALs, except for CNAL4. The immission levels are also below the Evening and Weekend Threshold Levels of 55 dB(A) at all but CNAL4 and CNAL7. The predicted Nighttime noise levels do not exceed the Nighttime Threshold Level of 45 dB(A). The predicted exceedance in the Daytime 65 dB(A) Threshold Level at CNAL4 is of 1 dB during month 1 associated with the junction works of the Eastern Access track. It also exceeds the 55 dB(A) Evening and Weekend Threshold by 11 dB during month 1 and by 3 dB in month 2. CNAL7 exceeds the 55 dB(A) Evening and Weekend Threshold Level by 1 dB during month 2.
- 10.6.10 Whilst the BS 5228 Category A Threshold Levels are exceeded, as any construction activities would typically fall within the core construction hours, and due to the short duration of works on the Eastern Access junction upgrade and the small magnitude of exceedance (1 dB) at CNAL4 during the Daytime hours, it has been determined that for the construction of the Proposed Development there would be **no significant effects**.
- 10.6.11 However, mitigation in the form of good practice during construction (mitigation ref: NO01) is recommended to keep noise to a minimum and recommendations in accordance with BS 5228¹ and as detailed in **Table 10.10**.

Potential Operational Effects

Setting the Total ETSU-R-97 Noise Limits (Stage 1)

- 10.6.12 Based on the prevailing background noise levels, the Total ETSU-R-97 Noise Limits have been established for each of the NALs detailed in **Table 10.4** and these are presented in **Table 10.12** and **Table 10.13**.
- 10.6.13 The Total ETSU-R-97 Noise Limits are based on the greater of an upper fixed minimum of 40 dB or background plus 5 dB (Daytime), and 43 dB or background plus 5 dB (Nighttime). For Financially Involved NALs, the Total ETSU-R-97 Noise Limits have been established based on the greater of a fixed minimum of 45 dB(A) (Daytime and Nighttime) or background plus 5 dB(A).

Table 10.12: Total ETSU-R-97 Noise Limits - Daytime (LA90, 10MINS dB)												
Noise Assessment Location (NAL)	Wind Speed (ms⁻¹) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL2 - Greenbrae	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL3 - Murcleuch	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL4 - Merrick School	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL5 - Troloss	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL6 - Troloss House	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.5	45.2	49.6	55.0
NAL7 - Troloss Cottage	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
NAL8 - Nether Fingland	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
NAL9 - Peden Cottage	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
NAL10 - Potrail Cottage	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
NAL11 - Allershaw Lodge	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
NAL12 - Bracadale	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL13 - Wintercleugh House	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL14 - Daerbank	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL15 - Hitteril	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL16 - Sweetshaw Foot**	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Table 10.12: Total ETSU-R-97 Noise Limits - Daytime (LA90, 10MINS dB)												
NAL17 - Kirkhope Cleuch Cottage*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.1	48.0	50.1
NAL18 - Crookburn*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL19 - Kirkhope*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL20 - Daerhead	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.2
*Financially Involved with the Proposed Development												
**Financially Involved with Daer Wind Farm												

Table 10.13: Total ETSU-R-97 Noise Limits – Nighttime (LA90, 10MINS dB)												
Noise Assessment Location (NAL)	Wind Speed (ms⁻¹) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL2 - Greenbrae	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL3 - Murcleuch	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL4 - Merrick School	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL5 - Troloss	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL6 - Troloss House	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
NAL7 - Troloss Cottage	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL8 - Nether Fingland	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL9 - Peden Cottage	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL10 - Potrail Cottage	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL11 - Allershaw Lodge	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL12 - Bracadale	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL13 - Wintercleugh House	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL14 - Daerbank	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL15 - Hitteril	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL16 - Sweetshaw Foot**	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Table 10.13: Total ETSU-R-97 Noise Limits – Nighttime (L_{A90, 10MINS} dB)												
NAL17 - Kirkhope Cleuch Cottage*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL18 – Crookburn*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL19 – Kirkhope*	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL20 - Daerhead	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
*Financially Involved with the Proposed Development												
**Financially Involved with Daer Wind Farm												

Predicting the Likely Effects and Requirement for a Cumulative Noise Assessment (Stage 2)

- 10.6.14 Predicted cumulative noise levels were compared to the Total ETSU-R-97 Noise Limits. As shown in **Table 10.14** and **Table 10.15**, the predicted cumulative turbine noise immission levels are below the Total ETSU-R-97 Noise Limits under all conditions and at all NALs during both Daytime and Nighttime periods. As such, there would be **no significant effects**.

Table 10.14: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Daytime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	17.2	21.7	24.7	25.1	25.2	25.3	25.3	25.3	25.3
	Exceedance Level	-	-	-	-22.8	-18.3	-15.3	-14.9	-14.8	-16.1	-19.7	-24.2	-29.6
NAL2 - Greenbrae	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	17.6	22.1	25.0	25.4	25.5	25.5	25.6	25.6	25.6
	Exceedance Level	-	-	-	-22.4	-17.9	-15.0	-14.6	-14.5	-15.9	-19.4	-23.9	-29.3
NAL3 - Murcleuch	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	16.8	21.2	24.0	24.5	24.6	24.6	24.7	24.7	24.7
	Exceedance Level	-	-	-	-23.2	-18.8	-16.0	-15.5	-15.4	-16.8	-20.3	-24.8	-30.2
NAL4 - Merrick School	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	17.4	21.8	24.6	25.0	25.1	25.1	25.2	25.2	25.2
	Exceedance Level	-	-	-	-22.6	-18.2	-15.4	-15.0	-14.9	-16.3	-19.8	-24.3	-29.7
NAL5 - Troloss	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	25.6	30.2	32.8	32.9	33.0	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-	-14.4	-9.8	-7.2	-7.1	-7.0	-8.4	-12.0	-16.5	-21.9

Table 10.14: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Daytime													
NAL6 - Troloss House	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.4	45.0	49.5	54.9
	Cumulative Predictions LA90	-	-	-	25.8	30.5	33.0	33.2	33.2	33.3	33.3	33.3	33.3
	Exceedance Level	-	-	-	-14.2	-9.5	-7.0	-6.8	-6.8	-8.1	-11.7	-16.2	-21.6
NAL7 - Troloss Cottage	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
	Cumulative Predictions LA90	-	-	-	28.2	32.4	34.9	35.5	35.5	35.5	35.6	35.6	35.6
	Exceedance Level	-	-	-	-11.8	-7.6	-5.1	-4.5	-4.5	-4.5	-4.9	-7.2	-9.8
NAL8 - Nether Fingland	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
	Cumulative Predictions LA90	-	-	-	28.9	32.8	35.2	36.1	36.1	36.1	36.1	36.1	36.1
	Exceedance Level	-	-	-	-11.1	-7.2	-4.8	-3.9	-3.9	-3.9	-4.4	-6.7	-9.3
NAL9 - Peden Cottage	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
	Cumulative Predictions LA90	-	-	-	29.4	32.9	35.3	36.6	36.6	36.6	36.6	36.6	36.6
	Exceedance Level	-	-	-	-10.6	-7.1	-4.7	-3.4	-3.4	-3.4	-3.9	-6.2	-8.8
NAL10 - Potrail Cottage	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
	Cumulative Predictions LA90	-	-	-	31.4	34.7	37.1	38.7	38.7	38.7	38.7	38.7	38.7
	Exceedance Level	-	-	-	-8.6	-5.3	-2.9	-1.3	-1.3	-1.3	-1.8	-4.1	-6.7
NAL11 - Allershaw Lodge	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.5	42.8	45.4
	Cumulative Predictions LA90	-	-	-	32.6	36.0	38.4	39.9	39.9	40.0	40.0	40.0	40.0

Table 10.14: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Daytime													
	Exceedance Level	-	-	-	-7.4	-4.0	-1.6	-0.1	-0.1	0.0	-0.5	-2.8	-5.4
NAL12 - Bracadale	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Cumulative Predictions LA90	-	-	-	31.3	35.1	37.9	39.2	39.2	39.3	39.3	39.3	39.3
	Exceedance Level	-	-	-	-8.7	-4.9	-2.1	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
NAL13 - Wintercleugh House	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Cumulative Predictions LA90	-	-	-	31.3	35.1	37.9	39.2	39.2	39.2	39.3	39.3	39.3
	Exceedance Level	-	-	-	-8.7	-4.9	-2.1	-0.8	-0.8	-0.8	-0.7	-0.7	-0.7
NAL14 - Daerbank	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Cumulative Predictions LA90	-	-	-	31.2	35.0	37.7	39.0	39.0	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-	-8.8	-5.0	-2.3	-1.0	-1.0	-0.9	-0.9	-0.9	-0.9
NAL15 - Hitteril	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Cumulative Predictions LA90	-	-	-	30.7	34.5	37.2	38.5	38.5	38.6	38.6	38.6	38.6
	Exceedance Level	-	-	-	-9.3	-5.5	-2.8	-1.5	-1.5	-1.4	-1.4	-1.4	-1.4
NAL16 - Sweetshaw Foot**	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	31.6	35.8	38.4	38.9	39.0	39.1	39.2	39.2	39.2
	Exceedance Level	-	-	-	-13.4	-9.2	-6.6	-6.1	-6.0	-5.9	-5.8	-5.8	-5.8
NAL17 - Kirkhope Cleuch Cottage*	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.1	48.0	50.1
	Cumulative Predictions LA90	-	-	-	30.8	35.6	38.1	38.2	38.3	38.3	38.4	38.4	38.4

Table 10.14: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Daytime													
	Exceedance Level	-	-	-	-14.2	-9.4	-6.9	-6.8	-6.7	-6.7	-7.7	-9.6	-11.7
NAL18 – Crookburn*	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	31.3	36.0	38.5	38.7	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-	-	-	-13.7	-9.0	-6.5	-6.3	-6.3	-6.2	-6.2	-6.2	-6.2
NAL19 – Kirkhope*	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	32.0	36.8	39.3	39.4	39.4	39.4	39.4	39.4	39.4
	Exceedance Level	-	-	-	-13.0	-8.2	-5.7	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
NAL20 – Daerhead	Total ETSU-R-97 Noise Limit LA90	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.2
	Cumulative Predictions LA90	-	-	-	27.5	32.2	34.7	34.9	35.0	35.0	35.1	35.1	35.1
	Exceedance Level	-	-	-	-12.5	-7.8	-5.3	-5.1	-5.0	-5.0	-4.9	-4.9	-5.1
*Financially Involved with the Proposed Development **Financially Involved with Daer Wind Farm Note: For the cumulative noise predictions, the noise model considers the range of noise data available for each turbine type modelled. For some turbines noise data was not available for wind speeds less than 4 ms⁻¹ therefore no cumulative predictions are included for wind speeds less than 4 ms⁻¹.													

Table 10.15: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Nighttime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	17.2	21.7	24.7	25.1	25.2	25.3	25.3	25.3	25.3
	Exceedance Level	-	-	-	-25.8	-21.3	-18.3	-17.9	-17.8	-17.7	-17.7	-17.7	-21.2
NAL2 - Greenbrae	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	17.6	22.1	25.0	25.4	25.5	25.5	25.6	25.6	25.6
	Exceedance Level	-	-	-	-25.4	-20.9	-18.0	-17.6	-17.5	-17.5	-17.4	-17.4	-20.9
NAL3 - Murcleuch	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	16.8	21.2	24.0	24.5	24.6	24.6	24.7	24.7	24.7
	Exceedance Level	-	-	-	-26.2	-21.8	-19.0	-18.5	-18.4	-18.4	-18.3	-18.3	-21.8
NAL4 - Merrick School	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	17.4	21.8	24.6	25.0	25.1	25.1	25.2	25.2	25.2
	Exceedance Level	-	-	-	-25.6	-21.2	-18.4	-18.0	-17.9	-17.9	-17.8	-17.8	-21.3
NAL5 - Troloss	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	25.6	30.2	32.8	32.9	33.0	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-	-17.4	-12.8	-10.2	-10.1	-10.0	-10.0	-10.0	-10.0	-13.5
NAL6 - Troloss House	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Cumulative Predictions LA90	-	-	-	25.8	30.5	33.0	33.2	33.2	33.3	33.3	33.3	33.3

Table 10.15: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Nighttime													
	Exceedance Level	-	-	-	-17.2	-12.5	-10.0	-9.8	-9.8	-9.7	-9.7	-9.7	-13.2
NAL7 - Troloss Cottage	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	28.2	32.4	34.9	35.5	35.5	35.5	35.6	35.6	35.6
	Exceedance Level	-	-	-	-14.8	-10.6	-8.1	-7.5	-7.5	-7.5	-7.4	-7.4	-7.4
NAL8 - Nether Fingland	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	28.9	32.8	35.2	36.1	36.1	36.1	36.1	36.1	36.1
	Exceedance Level	-	-	-	-14.1	-10.2	-7.8	-6.9	-6.9	-6.9	-6.9	-6.9	-6.9
NAL9 - Peden Cottage	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	29.4	32.9	35.3	36.6	36.6	36.6	36.6	36.6	36.6
	Exceedance Level	-	-	-	-13.6	-10.1	-7.7	-6.4	-6.4	-6.4	-6.4	-6.4	-6.4
NAL10 - Potrail Cottage	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	31.4	34.7	37.1	38.7	38.7	38.7	38.7	38.7	38.7
	Exceedance Level	-	-	-	-11.6	-8.3	-5.9	-4.3	-4.3	-4.3	-4.3	-4.3	-4.3
NAL11 - Allershaw Lodge	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	32.6	36.0	38.4	39.9	39.9	40.0	40.0	40.0	40.0
	Exceedance Level	-	-	-	-10.4	-7.0	-4.6	-3.1	-3.1	-3.0	-3.0	-3.0	-3.0
	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0

Table 10.15: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Nighttime													
NAL12 - Bracadale	Cumulative Predictions LA90	-	-	-	31.3	35.1	37.9	39.2	39.2	39.3	39.3	39.3	39.3
	Exceedance Level	-	-	-	-11.7	-7.9	-5.1	-3.8	-3.8	-3.7	-3.7	-3.7	-3.7
NAL13 - Wintercleugh House	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	31.3	35.1	37.9	39.2	39.2	39.2	39.3	39.3	39.3
	Exceedance Level	-	-	-	-11.7	-7.9	-5.1	-3.8	-3.8	-3.8	-3.7	-3.7	-3.7
NAL14 - Daerbank	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	31.2	35.0	37.7	39.0	39.0	39.1	39.1	39.1	39.1
	Exceedance Level	-	-	-	-11.8	-8.0	-5.3	-4.0	-4.0	-3.9	-3.9	-3.9	-3.9
NAL15 - Hitteril	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	30.7	34.5	37.2	38.5	38.5	38.6	38.6	38.6	38.6
	Exceedance Level	-	-	-	-12.3	-8.5	-5.8	-4.5	-4.5	-4.4	-4.4	-4.4	-4.4
NAL16 - Sweetshaw Foot**	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	31.6	35.8	38.4	38.9	39.0	39.1	39.2	39.2	39.2
	Exceedance Level	-	-	-	-13.4	-9.2	-6.6	-6.1	-6.0	-5.9	-5.8	-5.8	-5.8
NAL17 - Kirkhope Cleuch Cottage*	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	30.8	35.6	38.1	38.2	38.3	38.3	38.4	38.4	38.4
	Exceedance Level	-	-	-	-14.2	-9.4	-6.9	-6.8	-6.7	-6.7	-6.6	-6.6	-6.6
	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Table 10.15: ETSU-R-97 Compliance Table – Likely Cumulative Noise – Nighttime													
NAL18 – Crookburn*	Cumulative Predictions LA90	-	-	-	31.3	36.0	38.5	38.7	38.7	38.8	38.8	38.8	38.8
	Exceedance Level	-	-	-	-13.7	-9.0	-6.5	-6.3	-6.3	-6.2	-6.2	-6.2	-6.2
NAL19 – Kirkhope*	Total ETSU-R-97 Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Cumulative Predictions LA90	-	-	-	32.0	36.8	39.3	39.4	39.4	39.4	39.4	39.4	39.4
	Exceedance Level	-	-	-	-13.0	-8.2	-5.7	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
NAL20 – Daerhead	Total ETSU-R-97 Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Cumulative Predictions LA90	-	-	-	27.5	32.2	34.7	34.9	35.0	35.0	35.1	35.1	35.1
	Exceedance Level	-	-	-	-15.5	-10.8	-8.3	-8.1	-8.0	-8.0	-7.9	-7.9	-7.9
*Financially Involved with the Proposed Development **Financially Involved with Daer Wind Farm Note: For the cumulative noise predictions, the noise model considers the range of noise data available for each turbine type modelled. For some turbines noise data was not available for wind speeds less than 4 ms⁻¹ therefore no cumulative predictions are included for wind speeds less than 4 ms⁻¹.													

Operational Phase - Derivation of Site-Specific Noise Limits for the Proposed Wind Farm (Stage 3)

- 10.6.15 As well as the cumulative operation of all turbines meeting the Total Noise Limits, each wind farm should operate within its own limit. To allow this to occur, a set of Site-Specific Noise Limits for the Proposed Development is required, and these have been derived for each NAL. The apportionment options of the Total Noise Limit provided in the IOA GPG were considered to determine the most appropriate option for each NAL, as summarised in **Table 6.8** of **Technical Appendix 10.2 (EIAR Volume 4)**.
- 10.6.16 The Site-Specific Noise Limits and noise predictions for the Proposed Development on its own, based on a candidate turbine of the Siemens-Gamesa SG7.0-170 7 MW with a hub height of 155 m, are summarised in **Table 10.16** and **Table 10.17**.
- 10.6.17 The results show that the predicted wind turbine noise levels from the Proposed Development operating on its own meet the Site-Specific Noise Limits under all conditions at all NALs during the Daytime and Nighttime periods with the exception of NALs 12 to 15. As such, other than NALs 12 to 15, there would be **no significant effects**.
- 10.6.18 At NALs 12 to 15, exceedances ranging from 1.1 dB to 3.1 dB are predicted between 6 ms⁻¹ and 12 ms⁻¹ during the Daytime period. At NAL15 an exceedance of 0.1 dB is predicted during the Nighttime between 6 ms⁻¹ and 12 ms⁻¹. As such, at these NALs there would be **Significant effects** prior to any mitigation.

Table 10.16: Site Specific Noise Limit Compliance Table – Daytime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9
	Predictions LA90	-	11.2	11.2	12.8	17.7	20.2	20.2	20.2	20.2	20.2	20.2	20.2
	Exceedance Level	-	-23.8	-23.8	-22.2	-17.3	-14.8	-15.9	-18.4	-21.2	-24.8	-29.3	-34.7
NAL2 - Greenbrae	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9
	Predictions LA90	-	12.2	12.2	13.8	18.7	21.2	21.2	21.2	21.2	21.2	21.2	21.2
	Exceedance Level	-	-22.8	-22.8	-21.2	-16.3	-13.8	-14.9	-17.4	-20.2	-23.8	-28.3	-33.7
NAL3 - Murcleuch	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9
	Predictions LA90	-	11.3	11.3	12.9	17.8	20.3	20.3	20.3	20.3	20.3	20.3	20.3
	Exceedance Level	-	-23.7	-23.7	-22.1	-17.2	-14.7	-15.8	-18.3	-21.1	-24.7	-29.2	-34.6
NAL4 - Merrick School	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9
	Predictions LA90	-	12.5	12.5	14.1	19.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5
	Exceedance Level	-	-22.5	-22.5	-20.9	-16.0	-13.5	-14.6	-17.1	-19.9	-23.5	-28.0	-33.4
NAL5 - Troloss	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9
	Predictions LA90	-	22.9	22.9	24.6	29.4	31.9	31.9	31.9	31.9	31.9	31.9	31.9
	Exceedance Level	-	-12.1	-12.1	-10.4	-5.6	-3.1	-4.2	-6.7	-9.5	-13.1	-17.6	-23.0
	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.1	38.6	41.4	45.0	49.5	54.9

Table 10.16: Site Specific Noise Limit Compliance Table – Daytime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL6 - Troloss House	Predictions LA90	-	23.3	23.3	24.9	29.8	32.3	32.3	32.3	32.3	32.3	32.3	32.3
	Exceedance Level	-	-11.7	-11.7	-10.1	-5.2	-2.7	-3.8	-6.3	-9.1	-12.7	-17.2	-22.6
NAL7 - Troloss Cottage	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.3	36.8	38.5	39.3	42.8	45.4
	Predictions LA90	-	23.8	23.8	25.4	30.3	32.8	32.8	32.8	32.8	32.8	32.8	32.8
	Exceedance Level	-	-11.2	-11.2	-9.6	-4.7	-2.2	-2.5	-4.0	-5.7	-6.5	-10.0	-12.6
NAL8 - Nether Fingland	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.3	36.8	37.5	38.4	41.7	45.4
	Predictions LA90	-	22.4	22.4	24.1	28.9	31.4	31.4	31.4	31.4	31.4	31.4	31.4
	Exceedance Level	-	-12.6	-12.6	-10.9	-6.1	-3.6	-3.9	-5.4	-6.1	-7.0	-10.3	-14.0
NAL9 - Peden Cottage	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.5	41.0	44.5
	Predictions LA90	-	18.4	18.4	20.0	24.9	27.4	27.4	27.4	27.4	27.4	27.4	27.4
	Exceedance Level	-	-16.6	-16.6	-15.0	-10.1	-7.6	-2.6	-2.6	-2.6	-3.1	-13.6	-17.1
NAL10 - Potrail Cottage	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.5	32.8	43.6
	Predictions LA90	-	13.8	13.8	15.5	20.3	22.8	22.8	22.8	22.8	22.8	22.8	22.8
	Exceedance Level	-	-21.2	-21.2	-19.5	-14.7	-7.2	-7.2	-7.2	-7.2	-7.7	-10.0	-20.8
NAL11 - Allershaw Lodge	Site Specific Noise Limit LA90	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.5	32.8	42.8
	Predictions LA90	-	17.7	17.7	19.3	24.2	26.7	26.7	26.7	26.7	26.7	26.7	26.7

Table 10.16: Site Specific Noise Limit Compliance Table – Daytime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-12.3	-12.3	-10.7	-5.8	-3.3	-3.3	-3.3	-3.3	-3.8	-6.1	-16.1
NAL12 - Bracadale	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.5	22.5	24.1	29.0	31.5	31.5	31.5	31.5	31.5	31.5	31.5
	Exceedance Level	-	-12.5	-12.5	-10.9	-6.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5
NAL13 - Wintercleugh House	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.1	22.1	23.8	28.6	31.1	31.1	31.1	31.1	31.1	31.1	31.1
	Exceedance Level	-	-12.9	-12.9	-11.2	-6.4	1.1	1.1	1.1	1.1	1.1	1.1	1.1
NAL14 - Daerbank	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.3	22.3	23.9	28.8	31.3	31.3	31.3	31.3	31.3	31.3	31.3
	Exceedance Level	-	-12.7	-12.7	-11.1	-6.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3
NAL15 - Hitteril	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	24.1	24.1	25.8	30.6	33.1	33.1	33.1	33.1	33.1	33.1	33.1
	Exceedance Level	-	-10.9	-10.9	-9.2	-4.4	3.1	3.1	3.1	3.1	3.1	3.1	3.1
NAL16 - Sweetshaw Foot	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.6	36.7	37.8	38.7	39.4
	Predictions LA90	-	20.2	20.2	21.8	26.7	29.2	29.2	29.2	29.2	29.2	29.2	29.2
	Exceedance Level	-	-14.8	-14.8	-13.2	-8.3	-5.8	-5.8	-6.4	-7.5	-8.6	-9.5	-10.2

Table 10.16: Site Specific Noise Limit Compliance Table – Daytime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL17 - Kirkhope Cleuch Cottage	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	43.8	43.7	43.6	43.6	45.0	48.0	50.1
	Predictions LA90	-	27.7	27.7	29.3	34.2	36.7	36.7	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-	-17.3	-17.3	-15.7	-10.8	-7.1	-7.0	-6.9	-6.9	-8.3	-11.3	-13.4
NAL18 – Crookburn	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	44.0	44.0	43.9	43.9	43.9	43.9	43.9
	Predictions LA90	-	28.2	28.2	29.8	34.7	37.2	37.2	37.2	37.2	37.2	37.2	37.2
	Exceedance Level	-	-16.8	-16.8	-15.2	-10.3	-6.8	-6.8	-6.7	-6.7	-6.7	-6.7	-6.7
NAL19 – Kirkhope	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	44.2	44.2	44.1	44.1	44.1	44.1	44.1
	Predictions LA90	-	29.5	29.5	31.1	36.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-	-15.5	-15.5	-13.9	-9.0	-5.7	-5.7	-5.6	-5.6	-5.6	-5.6	-5.6
NAL20 - Daerhead	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.7	36.8	37.7	38.0
	Predictions LA90	-	20.6	20.6	22.2	27.1	29.6	29.6	29.6	29.6	29.6	29.6	29.6
	Exceedance Level	-	-14.4	-14.4	-12.8	-7.9	-5.4	-5.4	-5.4	-6.1	-7.2	-8.1	-8.4

Table 10.17: Site Specific Noise Limit Compliance Table – Nighttime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - High Gateslack	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Predictions LA90	-	11.2	11.2	12.8	17.7	20.2	20.2	20.2	20.2	20.2	20.2	20.2
	Exceedance Level	-	-31.8	-31.8	-30.2	-25.3	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-26.3
NAL2 - Greenbrae	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Predictions LA90	-	12.2	12.2	13.8	18.7	21.2	21.2	21.2	21.2	21.2	21.2	21.2
	Exceedance Level	-	-30.8	-30.8	-29.2	-24.3	-21.8	-21.8	-21.8	-21.8	-21.8	-21.8	-25.3
NAL3 - Murcleuch	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Predictions LA90	-	11.3	11.3	12.9	17.8	20.3	20.3	20.3	20.3	20.3	20.3	20.3
	Exceedance Level	-	-31.7	-31.7	-30.1	-25.2	-22.7	-22.7	-22.7	-22.7	-22.7	-22.7	-26.2
NAL4 - Merrick School	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Predictions LA90	-	12.5	12.5	14.1	19.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5
	Exceedance Level	-	-30.5	-30.5	-28.9	-24.0	-21.5	-21.5	-21.5	-21.5	-21.5	-21.5	-25.0
NAL5 - Troloss	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5
	Predictions LA90	-	22.9	22.9	24.6	29.4	31.9	31.9	31.9	31.9	31.9	31.9	31.9
	Exceedance Level	-	-20.1	-20.1	-18.4	-13.6	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-14.6
	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	46.5

Table 10.17: Site Specific Noise Limit Compliance Table – Nighttime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL6 - Troloss House	Predictions LA90	-	23.3	23.3	24.9	29.8	32.3	32.3	32.3	32.3	32.3	32.3	32.3
	Exceedance Level	-	-19.7	-19.7	-18.1	-13.2	-10.7	-10.7	-10.7	-10.7	-10.7	-10.7	-14.2
NAL7 - Troloss Cottage	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions LA90	-	23.8	23.8	25.4	30.3	32.8	32.8	32.8	32.8	32.8	32.8	32.8
	Exceedance Level	-	-19.2	-19.2	-17.6	-12.7	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2
NAL8 - Nether Fingland	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	42.0	41.9	41.9	41.9	41.9	41.9
	Predictions LA90	-	22.4	22.4	24.1	28.9	31.4	31.4	31.4	31.4	31.4	31.4	31.4
	Exceedance Level	-	-20.6	-20.6	-18.9	-14.1	-11.6	-10.6	-10.5	-10.5	-10.5	-10.5	-10.5
NAL9 - Peden Cottage	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	41.9	41.3	41.3	41.3	41.3	41.3	41.3
	Predictions LA90	-	18.4	18.4	20.0	24.9	27.4	27.4	27.4	27.4	27.4	27.4	27.4
	Exceedance Level	-	-24.6	-24.6	-23.0	-18.1	-14.5	-13.9	-13.9	-13.9	-13.9	-13.9	-13.9
NAL10 - Potrail Cottage	Site Specific Noise Limit LA90	41.8	41.8	41.8	41.8	41.8	40.7	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	13.8	13.8	15.5	20.3	22.8	22.8	22.8	22.8	22.8	22.8	22.8
	Exceedance Level	-	-28.0	-28.0	-26.3	-21.5	-17.9	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2
NAL11 - Allershaw Lodge	Site Specific Noise Limit LA90	41.4	41.4	41.4	41.4	41.4	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	17.7	17.7	19.3	24.2	26.7	26.7	26.7	26.7	26.7	26.7	26.7

Table 10.17: Site Specific Noise Limit Compliance Table – Nighttime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
	Exceedance Level	-	-23.7	-23.7	-22.1	-17.2	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3
NAL12 - Bracadale	Site Specific Noise Limit LA90	41.8	41.8	41.8	41.8	41.8	40.3	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	22.5	22.5	24.1	29.0	31.5	31.5	31.5	31.5	31.5	31.5	31.5
	Exceedance Level	-	-19.3	-19.3	-17.7	-12.8	-8.8	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
NAL13 - Wintercleugh House	Site Specific Noise Limit LA90	41.8	41.8	41.8	41.8	41.8	40.3	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	22.1	22.1	23.8	28.6	31.1	31.1	31.1	31.1	31.1	31.1	31.1
	Exceedance Level	-	-19.7	-19.7	-18.0	-13.2	-9.2	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
NAL14 - Daerbank	Site Specific Noise Limit LA90	41.8	41.8	41.8	41.8	41.8	40.4	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	22.3	22.3	23.9	28.8	31.3	31.3	31.3	31.3	31.3	31.3	31.3
	Exceedance Level	-	-19.5	-19.5	-17.9	-13.0	-9.1	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
NAL15 - Hitteril	Site Specific Noise Limit LA90	42.0	42.0	42.0	42.0	42.0	40.9	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	24.1	24.1	25.8	30.6	33.1	33.1	33.1	33.1	33.1	33.1	33.1
	Exceedance Level	-	-17.9	-17.9	-16.2	-11.4	-7.8	0.1	0.1	0.1	0.1	0.1	0.1
NAL16 - Sweetshaw Foot	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	43.0	42.9	42.9	42.8	42.7	42.7	42.7
	Predictions LA90	-	20.2	20.2	21.8	26.7	29.2	29.2	29.2	29.2	29.2	29.2	29.2
	Exceedance Level	-	-22.8	-22.8	-21.2	-16.3	-13.8	-13.7	-13.7	-13.6	-13.5	-13.5	-13.5

Table 10.17: Site Specific Noise Limit Compliance Table – Nighttime													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL17 – Kirkhope Cleuch Cottage	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	43.8	43.7	43.6	43.6	43.6	43.6	43.6
	Predictions LA90	-	27.7	27.7	29.3	34.2	36.7	36.7	36.7	36.7	36.7	36.7	36.7
	Exceedance Level	-	-17.3	-17.3	-15.7	-10.8	-7.1	-7.0	-6.9	-6.9	-6.9	-6.9	-6.9
NAL18 – Crookburn	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	44.0	44.0	43.9	43.9	43.9	43.9	43.9
	Predictions LA90	-	28.2	28.2	29.8	34.7	37.2	37.2	37.2	37.2	37.2	37.2	37.2
	Exceedance Level	-	-16.8	-16.8	-15.2	-10.3	-6.8	-6.8	-6.7	-6.7	-6.7	-6.7	-6.7
NAL19 – Kirkhope	Site Specific Noise Limit LA90	45.0	45.0	45.0	45.0	45.0	44.2	44.2	44.1	44.1	44.1	44.1	44.1
	Predictions LA90	-	29.5	29.5	31.1	36.0	38.5	38.5	38.5	38.5	38.5	38.5	38.5
	Exceedance Level	-	-15.5	-15.5	-13.9	-9.0	-5.7	-5.7	-5.6	-5.6	-5.6	-5.6	-5.6
NAL20 – Daerhead	Site Specific Noise Limit LA90	43.0	43.0	43.0	43.0	43.0	42.1	42.0	42.0	42.0	42.0	42.0	42.0
	Predictions LA90	-	20.6	20.6	22.2	27.1	29.6	29.6	29.6	29.6	29.6	29.6	29.6
	Exceedance Level	-	-22.4	-22.4	-20.8	-15.9	-12.5	-12.4	-12.4	-12.4	-12.4	-12.4	-12.4

Potential Decommissioning Effects

- 10.6.19 Decommissioning noise has been scoped out of the EIA (refer to **Table 10.2**).

Potential Cumulative Construction Effects

- 10.6.20 The construction noise assessment predicts that noise levels may exceed the Daytime Threshold Levels (by 1 dB) for a short period of time as the Eastern Access road junction is upgraded (month 1) at one property (CNAL4). For the remainder of the construction phase (notably months 3 onwards), construction noise levels attributable to the Proposed Development would be much lower. Specifically, noise levels would be at least 10 dB below Threshold Levels, such that cumulative construction noise levels could not result in an exceedance of the Threshold Levels. Although the Threshold Levels may be exceeded during months 1 and 2 (noting that predicted noise levels are within 10 dB of the Daytime Threshold Level during month 2), the duration of this exceedance would be short term in nature. As such, **no significant cumulative construction noise effects** are anticipated.

Potential Cumulative Operational Effects

- 10.6.21 The result of the likely cumulative operational wind farm noise assessment show that the Proposed Development can operate concurrently with the operational, consented and proposed wind farms near to the NALs, whilst still meeting the Total ETSU-R-97 Noise limits established in accordance with ETSU-R-97 at all NALs. There would be **no significant cumulative operational noise effects**.

10.7 Specific Mitigation

- 10.7.1 Should the Proposed Development operate unconstrained, with the Siemens-Gamesa SG7.0-170 7 MW as the candidate turbine, significant operational effects are predicted at four NSRs. Therefore, mitigation measures through the adoption of low noise modes are required for some wind speed and wind directions to meet the Site-Specific Noise Limits at NALs 12 to 15 during the Daytime, and NAL15 during the Nighttime.
- 10.7.2 There are a number of wind turbine makes and models that would be suitable for the Proposed Development that may not require the use of low noise modes. Should the proposal receive planning consent, the final choice of turbine would be subject to a competitive tendering process and as such predictions of wind turbine noise are for information only. The final choice of turbine would, however, have to meet the noise limits determined and contained within any planning condition imposed.
- 10.7.3 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 10.7.4 A summary of the specific mitigation is set out in **Table 10.18**.

Table 10.18: Summary of Specific Mitigation					
Description of Impact	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation	Consultation or Approval Required
Potential construction noise effects on noise sensitive receptors.	NO03	Eastern Access road junction upgrades and access track construction/upgrade to take place during BS 5228 Daytime hours only.	Minimise construction noise levels and restrict noisiest activities to Daytime periods as defined in BS 5228.	Construction	Forms part of CEMP which would be submitted to and approve by SLC.

Table 10.18: Summary of Specific Mitigation

Potential operational noise effects on noise sensitive receptors.	NO04	Noise limits to be conditioned and requirement for mode management to be confirmed for final selected wind turbine model.	To ensure that operational noise levels meet acceptable noise limits.	Operation	No

10.8 Assessment of Residual Effects

Residual Construction Effects

- 10.8.1 Due to the low background noise levels at some locations, elements of construction noise may be audible at the closest residential receptors for certain periods during the construction phases. If there are concurrent construction activities including the Proposed Development and any neighbouring developments, then there may be the possibility that the assessment criteria are exceeded. However, the duration of any exceedances would be short term in nature in the unlikely event this does occur.
- 10.8.2 Additionally, whilst some exceedances of the BS 5228 Category A Threshold Levels are predicted, any construction activities would typically fall within the core construction hours, and due to the short duration of works on the Eastern Access junction upgrade and the small magnitude of exceedance (1 dB) at CNAL4, it has been determined that there would be **no significant residual construction effects**. Nevertheless, good practice construction mitigation measures (mitigation ref: NO01), including a specific requirement for upgrade works to the Eastern Access junction to be in Daytime hours only (mitigation ref: NO03), would be adopted which would further reduce noise emissions.

Residual Operational Effects

- 10.8.3 For the purpose of demonstrating the effectiveness of a potential noise mitigation measure for the candidate wind turbine considered here, the predicted noise levels in **Table 10.19** and **Table 10.20** have been reduced to ensure that the limits are met, this would be achieved by the adoption of low noise modes (mitigation ref: NO04), but this would only be required for a limited range of wind speeds and directions. With this mitigation in place there would be **no significant residual operational effects**.

Table 10.19: Site Specific Noise Limit Compliance Table – Daytime – With Mitigation													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL12 - Bracadale	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.5	22.5	24.1	29.0	30*	30*	30*	30*	30*	30*	30*
	Exceedance Level	-	-12.5	-12.5	-10.9	-6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NAL13 - Wintercleugh House	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.1	22.1	23.8	28.6	30*	30*	30*	30*	30*	30*	30*
	Exceedance Level	-	-12.9	-12.9	-11.2	-6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NAL14 - Daerbank	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	22.3	22.3	23.9	28.8	30*	30*	30*	30*	30*	30*	30*
	Exceedance Level	-	-12.7	-12.7	-11.1	-6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NAL15 - Hitteril	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
	Predictions LA90	-	24.1	24.1	25.8	30.6	30*	30*	30*	30*	30*	30*	30*
	Exceedance Level	-	-10.9	-10.9	-9.2	-4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
* Predicted noise levels inclusive of indicative mitigation.													

Table 10.20: Site Specific Noise Limit Compliance Table – Nighttime – With Mitigation													
Noise Assessment Location (NAL)		Wind Speed (ms⁻¹) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL15 - Hitteril	Site Specific Noise Limit LA90	42.0	42.0	42.0	42.0	42.0	40.9	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions LA90	-	24.1	24.1	25.8	30.6	33.1	33*	33*	33*	33*	33*	33*
	Exceedance Level	-	-17.9	-17.9	-16.2	-11.4	-7.8	0.0	0.0	0.0	0.0	0.0	0.0
* Predicted noise levels inclusive of indicative mitigation.													

Residual Decommissioning Effects

- 10.8.4 Decommissioning noise has been scoped out of the EIAR (refer to **Table 10.2**). However, good practice measures would be employed during decommissioning and these measures would be included in a DEMP (mitigation ref: NO02).

Residual Cumulative Construction Effects

- 10.8.5 No additional mitigation measures are proposed to lessen the impacts and **no significant residual cumulative construction effects are anticipated.**

Residual Cumulative Operational Effects

- 10.8.6 Predicted cumulative wind farm operational noise levels at all the NALs lie below the Total ETSU-R-97 Daytime and Nighttime Noise Limits. There would be **no significant residual cumulative operational effects.**

10.9 Monitoring

Construction Phase Monitoring

- 10.9.1 Not required.

Operational Phase Monitoring

- 10.9.2 Not required.

Decommissioning Phase Monitoring

- 10.9.3 Not required.

10.10 Summary of Assessment

- 10.10.1 Construction noise activities associated with the Proposed Development were assessed in accordance with guidance and acceptable threshold noise values presented within BS 5228¹.
- 10.10.2 Results show that the predicted construction noise levels would be below the most stringent of the noise Threshold Levels detailed in BS 5228¹, with the exception of one residential receptor (CNAL4) during BS 5228's defined Daytime period, and two receptors during the defined Weekend and Evening period for a short period of time due to the construction of the Eastern Access road junction (month 1). However, the effects are deemed to be not significant; this is due to the short duration of the works and small magnitude of the exceedance (1 dB) where the Daytime Threshold is exceeded, and that no works are anticipated during the Weekend and Evening assessment period. Nevertheless, mitigation in the form of good practice during construction is recommended to keep noise to a minimum and recommendations in accordance with BS 5228¹ have been made in this report. No significant residual construction noise effects are anticipated.
- 10.10.3 Although the construction noise assessment predicts that noise levels may exceed the Daytime Threshold Levels for a short period of time as the Eastern Access road junction is upgraded at one property (refer to above), for the remainder of the construction phase (notably months 3 onwards), construction noise levels attributable to the Proposed Development would be much lower. Specifically, noise levels would be at least 10 dB below Threshold Levels, such that cumulative construction noise levels could not result in an exceedance of the Threshold Levels. Although the Threshold Levels may be exceeded during months 1 and 2, the duration of this exceedance would be short term in nature. As such, **no significant cumulative construction noise effects are anticipated.**

- 10.10.4 The guidance contained within ETSU-R-97 was used to assess the likely operational noise effects of the Proposed Development. Predicted wind turbine noise levels from the Proposed Development operating on its own meet the Site-Specific Noise Limits under all conditions at all NALs during the Daytime and Nighttime, with the exception of NALs 12 to 15. As such at NALs 12 to 15 there would be **significant operational noise effects** prior to any specific mitigation.
- 10.10.5 For the purpose of demonstrating the effectiveness of a potential noise mitigation measure for the candidate wind turbine considered in the assessment, the predicted noise levels have been reduced to ensure that the limits are met, this would be achieved by the adoption of low noise modes, but this would only be required for a limited range of wind speeds and directions. There are a range of turbine models that could be appropriate for the Proposed Development. If the proposal receives consent, the final choice of turbine model would need to be operated in compliance with the Site-Specific Noise Limits specified in any planning conditions. As such, **no significant residual operational noise effects are anticipated.**
- 10.10.6 Predicted cumulative wind farm operational noise levels at all the NALs lie below the Total ETSU-R-97 Daytime and Nighttime Noise Limits. As such there would be **no significant residual cumulative operational effects.**
- 10.10.7 **Table 10.21** summarises the potential significant effects and the proposed mitigation and monitoring requirements.

Table 10.21: Summary of Noise Assessment					
Potential Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect	Monitoring
Construction					
Potential construction noise effects on NSRs	NO01	Standard good practice during construction as detailed in the CEMP as per Section 8 of BS 5228.	Embedded in a CEMP as good practice measures to be implemented during construction. To be submitted to and approved by SLC.	Not significant	Not required
Potential construction noise effects on NSRs	NO03	Eastern Access road junction upgrades and access track construction/upgrade to take place during BS 5228 Daytime hours only.	Detailed in the CEMP for implementation during construction. To be submitted to and approved by SLC.	Not significant	Not required
Operation					
Potential operational noise effects on NSRs	NO04	Noise limits to be conditioned and requirement for mode management to be confirmed for final selected wind turbine model.	Planning condition.	Not significant	Triggered in the event of a complaint.
Decommissioning					
Potential decommissioning noise effects on NSRs	NO02	Standard good practice during construction as detailed in the DEMP as per Section 8 of BS 5228.	Embedded in a DEMP as good practice measures to be implemented during decommissioning. To be submitted to and approved by SLC.	Not significant	Not required.
Cumulative construction					
Potential cumulative construction noise effects on NSRs	-	No additional mitigation measures required.	-	Not significant	Not required.
Cumulative operational					
Potential cumulative operational noise effects on NSRs	-	No additional mitigation measures required.	-	Not significant	Not required.

11. Aviation

11.1 Introduction

11.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects associated with the construction, operation and decommissioning of the Proposed Development on aviation.

11.1.2 The specific objectives of this Chapter are to:

- Describe the existing aviation baseline context and cumulative context;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

11.1.3 The assessment has been carried out by Malcolm Spaven of Gladhouse Planning Ltd (trading as Aviatica). Malcolm Spaven holds an MA (Hons) and MSc and has more than 25 years' of experience of assessing the impacts of wind energy developments on aviation. This has included the preparation of more than 100 EIA chapters for projects across the UK.

11.2 Assessment Methodology

Overview

11.2.1 The aviation assessment follows the principles set out in Civil Aviation Authority (CAA) guidance, CAA Policy and Guidance on Wind Turbines (Civil Aviation Publication (CAP) 764)¹.

11.2.2 Effects considered to be significant for the purposes of the EIA Regulations² are those classified as being '**Major**' or '**Moderate**'.

Scope of Assessment

Potential Effects Scoped In

11.2.3 This Chapter considers all potentially significant effects on aviation. Review of the aviation baseline and the responses to scoping consultation (refer to **Technical Appendix 1.2, EIAR Volume 4**) identified the following aviation receptors as potentially subject to significant effects:

- The National Air Traffic Services (NATS) En Route (NERL) Lowther Hill and Cumbernauld Primary Surveillance Radars (PSRs);
- The Prestwick Airport PSR;
- Prestwick Airport instrument flight procedures (IFPs);
- Prestwick Airport Very High Frequency (VHF) air-ground-air (AGA) radio communications; and
- Military low flying.

¹ Civil Aviation Authority (2016). Policy and Guidelines on Wind Turbines (CAP 764). Available at: <https://www.caa.co.uk/publication/download/14561>

² The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>

11.2.4 Consultation responses that have informed the scope of the assessment are summarised in **Table 11.1**. Refer to **Technical Appendix 1.2 (EIAR Volume 4)** for further details of consultation.

Table 11.1: Aviation consultation responses	
Consultee	Response
NERL	NERL stated in their scoping response that they currently object to the proposal on grounds of impacts on the Lowther Hill and Cumbernauld PSRs.
Prestwick Airport	The airport raised an initial holding objection in relation to potential effects on PSR, IFPs and AGA radio communications.
Ministry of Defence (MoD)	Noted that the addition of turbines in this location has the potential to introduce a physical obstruction to low flying aircraft operating in the area.

11.2.5 Guidance and policy documents that have informed the assessment are as follows:

- The Air Navigation Order (ANO) 2016³;
- The Town and Country Planning (Safeguarded Aerodromes, Technical Sites, Meteorological Technical Sites and Military Explosives Storage Areas) (Scotland) Direction 2016⁴;
- Civil Aviation Authority (CAA) Policy and Guidelines on Wind Turbines (CAP 764)¹;
- CAA, Air Traffic Services Safety Requirements (CAP 670)⁵;
- CAA, Safeguarding of Aerodromes (CAP 738)⁶;
- CAA, Implementation and Safeguarding of Instrument Flight Procedures in the UK (CAP 785B)⁷; and
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level (June 2017)⁸.

11.2.6 Aviation effects considered within the assessment are summarised in **Table 11.2**.

³ The Air Navigation Order (ANO) 2016. Available at: <https://www.legislation.gov.uk/ukxi/2016/765/contents>

⁴ Scottish Government (2016) The Town and Country Planning (Safeguarded Aerodromes, Technical Sites, Meteorological Technical Sites and Military Explosives Storage Areas) (Scotland) Direction, 2016. Available at: <https://www.gov.scot/publications/planning-circular-2-2003-scottish-planning-series-town-country-planning-0755923111/pages/4/>

⁵ Civil Aviation Authority (2019). Air Traffic Services Safety Requirements (CAP 670). Available at: <https://www.caa.co.uk/publication/download/17362>

⁶ Civil Aviation Authority (2020). Safeguarding of Aerodromes (CAP 738). Available at: <https://www.caa.co.uk/our-work/publications/documents/content/cap-738/>

⁷ Civil Aviation Authority (2022). Implementation and Safeguarding of Instrument Flight Procedures (IFPs) in the UK (CAP 785B). Available at: <https://www.caa.co.uk/publication/download/13875>

⁸ Civil Aviation Authority (2017). Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level. Available at: <https://www.caa.co.uk/publication/download/16178>

Table 11.2: Effects Considered within the Assessment			
Effect	Phase*		
	C	O/M	D
Effects on NERL Lowther Hill and Cumbernauld PSRs	No	Yes	No
Effects on Prestwick Airport PSR	No	Yes	No
Effects on Prestwick Airport IFPs	Yes	Yes	Yes
Effects on Prestwick Airport AGA radio communications	Yes	Yes	Yes
Effects on military low flying	Yes	Yes	Yes

*C=construction, O/M=operation and maintenance and D=decommissioning.

- 11.2.7 In addition, this Chapter considers the requirements for the provision of aviation lighting on the turbines. This is not driven by any specified adverse effects on aviation. It is a legal requirement in UK civil air law, derived from international standards and recommended practices promulgated by the International Civil Aviation Organisation (ICAO). Lighting requirements are addressed in this Chapter, with effects as a result of lighting on visual amenity considered as part of **Chapter 4: Landscape and Visual Amenity (EIAR Volume 2)**.
- 11.2.8 Cumulative effects arising from the addition of the Proposed Development in-combination with other cumulative wind energy developments which are the subject of a valid planning application are also assessed. Operational, under construction and consented developments are considered as part of the assessment. Developments close to the end of their operational life are included to present a 'worst case scenario'. Projects at scoping stage are not included due to uncertainty as to whether they will progress to planning, and in what form.
- 11.2.9 The assessment is based on the Proposed Development as described in **Chapter 2: Description of Proposed Development (EIAR Volume 2)**. Reference is made to the 'Site' the boundary of which is shown on **Figure 1.2 (EIAR Volume 3a)**.

Potential Effects Scoped Out

- 11.2.10 The assessment focusses on likely significant effects and as such those effects which are not considered likely to be significant have been scoped out of the assessment.
- 11.2.11 A summary of the effects scoped out, together with reasoning for scoping them out is presented in **Table 11.3**.

Table 11.3: Effects Scoped Out of the Assessment	
Effect	Reasoning
Effects on Glasgow Airport IFPs	All turbines in the Proposed Development are located beyond the areas within which obstacles must be assessed for potential effects on Glasgow Airport's current and proposed future IFPs.
Effects on NERL Lowther Hill Secondary Surveillance Radar (SSR)	Potential impacts on the Lowther Hill SSR are not referred to in the NERL scoping response.
Effects on NERL Green Lowther AGA facilities	The NERL scoping response advises that " <i>No impact is anticipated on NATS' radio communications infrastructure.</i> "
Effects on NERL Green Lowther Distance Measuring Equipment (DME)	The NERL scoping response advises that " <i>No impact is anticipated on NATS' navigation aids.</i> "

Method of Baseline Characterisation

Extent of the Study Area

11.2.12 The Study Areas for the aviation assessment were selected using the recommended distances set out in CAA guidance (CAP 764)¹, modified to ensure that all radars with the range to detect wind turbines are included. The distances used are radii from the closest turbine position, as follows:

- 110 km for air defence and air traffic control PSRs;
- 10 km for SSRs, aeronautical radio navigation aids and AGA facilities;
- 60 km for aerodromes with IFPs;
- 20 km for all other licensed or certificated aerodromes;
- 10 km for unlicensed aerodromes and landing sites; and
- 25 km for meteorological office radars.

Desk Study

11.2.13 The aviation baseline assessment was carried out by consulting the UK Aeronautical Information Publication (AIP), the UK Military AIP, civil and military aeronautical charts, published Ministry of Defence (MoD) and NERL radar coverage charts and Aviatika in-house databases of aviation infrastructure and assets. The determination of the aviation baseline has also been informed by consultation responses from aviation stakeholders (refer to **Technical Appendix 1.2, EIAR Volume 4**).

Method of Assessment

Overview

11.2.14 The aviation assessment has followed the CAA guidance in CAP 764¹. Radar line of sight (LOS) has been modelled using Global Mapper software supplemented with digital terrain data at an appropriate resolution. Effects on Prestwick Airport IFPs have been assessed by a preliminary review of turbine blade tip heights against existing Prestwick Airport IFP minimum altitudes. The Applicant is in the process of commissioning a formal IFP assessment from Prestwick Airport's Approved Procedure Design Organisation (APDO). Effects on military low flying have

been assessed by reviewing the Proposed Development against airspace boundaries, existing terrain and obstacle constraints.

- 11.2.15 Significance criteria for assessment of effects on aviation, unlike those for environmental effects, are not based on the sensitivity of the receptor. Further, while magnitude of effect can be determined in some circumstances, it typically does not provide a standardised metric on which to measure the significance of any effects.
- 11.2.16 In this context, the significance of effects on aviation has been determined by application of professional judgement, underpinned by consideration of the magnitude of effect (where measurable); the regulations and procedures in place for ensuring that aviation infrastructure meets required performance standards; the safeguarding policies and practices in use by specific aviation stakeholders; and the consultation responses from those stakeholders. The criteria used to assess the significance of effects on aviation are set out in **Table 11.4**.

Table 11.4: Significance Criteria		
Term	Definition	Significance level
Major	Regular, frequent or permanent effects which require changes to existing operational and/or technical practice in order to mitigate adequately, or which are not capable of being mitigated adequately; or the owner of the affected aviation asset requires mitigation; or mitigation is required by law.	Significant
Moderate	Periodic effects experienced which may require alterations to existing operational practice and/or technical practice in order to mitigate adequately; or the owner of the affected aviation asset requires mitigation; or mitigation is required by law.	Significant
Minor	Occasional effects experienced which do not require any alteration of existing operational and technical practice.	Not significant
Negligible	Normally no measurable change from baseline conditions; occasional, fleeting or very short-term effects experienced which do not require any alteration of existing operational and technical practice.	Not significant
No effect	No measurable change from baseline conditions.	Not significant

Limitations and Assumptions

- 11.2.17 No limitations were encountered in the assessment.

11.3 Baseline Conditions

Current Baseline

- 11.3.1 The Site is located in uncontrolled (Class G) airspace extending from ground level to 5,500 ft above mean sea level (amsl).
- 11.3.2 Above 5,500 ft is Class D controlled airspace, part of the Scottish Terminal Control Area (TMA) where air traffic services are provided by NERL, mainly using radars located at Lowther Hill (5 km northeast), Cumbernauld (69 km north) and Great Dun Fell (105 km southeast), with all distances from the closest turbine on the Site.
- 11.3.3 The NERL Lowther Hill combined PSR and SSR is located 5 km from the closest turbine to the northeast of the Site.

- 11.3.4 The NERL Green Lowther AGA radio communications transmitter/receivers are located 5 km from the closest turbine to the northeast of the Site.
- 11.3.5 The NERL Green Lowther DME aeronautical radio navigation aid is located 5 km from the closest turbine to the northeast of the Site.
- 11.3.6 Prestwick Airport is located 60 km from the closest turbine to the northeast of the Site.
- 11.3.7 Glasgow Airport is located 74 km from the closest turbine to the northeast of the Site.
- 11.3.8 The Site is within the daytime military Low Flying Area (LFA) 16, where fixed wing aircraft are permitted to fly no lower than 250 ft Minimum Separation Distance (MSD). It is also within LFA 20(T), where fixed wing aircraft may be permitted to fly as low as 100 ft MSD. For military low flying at night, the Site is located in Allocated Region 2B, which covers southwest Scotland.
- 11.3.9 There are no Meteorological Office radars, air defence radars or unlicensed aerodromes within the Study Area.

Future Baseline

- 11.3.10 There are no known significant planned changes to the aviation baseline.

Summary of Sensitive Receptors

- 11.3.11 A summary of the receptors considered likely to be affected by the Proposed Development, and therefore scoped into the EIAR, are set out in **Table 11.5**, together with justification as to why the receptors were chosen.

Table 11.5: Summary of Sensitive Receptors	
Receptor	Justification
NERL Lowther Hill PSR	NERL stated in the Scoping response that they object to the Proposed Development.
NERL Cumbernauld PSR	NERL stated in the Scoping response that they object to the Proposed Development.
Prestwick Airport PSR	Prestwick Airport has issued a holding objection.
Prestwick Airport IFPs	Prestwick Airport has issued a holding objection.
Prestwick Airport radio communications	Prestwick Airport has issued a holding objection.
Military low flying	MoD scoping response expresses concerns.

11.4 Mitigation

- 11.4.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy, as follows:
- Embedded mitigation - design stage mitigation as outlined in **Chapter 2: Description of Proposed Development (EIAR Volume 2)** and the design evolution narrative, as outlined in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.
 - Standard/Best Practice mitigation – standard/best practice mitigation is considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness.
 - Specific mitigation - bespoke mitigation determined as a result of the EIA (refer to **Section 11.6**).

- 11.4.2 No design (embedded) mitigation was available in relation to aviation constraints. In the latter stages of the design process a review was undertaken on the location of Turbine 5 and 15 in relation to the effects on Glasgow Prestwick Airport PSR. However, this review confirmed that the turbines would still be located within the theoretical LOS of the radar.
- 11.4.3 A summary of the standard/best practice mitigation considered for the aviation assessment is set out in **Table 11.6**.

Table 11.6: Summary of Standard/Best Practice Mitigation			
ID	Phase*	Description	Purpose of Mitigation
AV01	Pre-construction	Provision of details of the development to South Lanarkshire Council (SLC), the MoD and CAA.	To enable the Proposed Development to be marked on aeronautical charts prior to construction.
AV02	Pre-construction/ Construction	Provision of aviation lighting as required in UK civil air law, derived from international standards and recommended practices promulgated by the International Civil Aviation Organisation (ICAO).	Enable aircrew flying at low level at night to identify the wind farm.

- 11.4.4 As the embedded and standard/best practice mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures are implemented.

11.5 Assessment of Likely Effects

Potential Construction Effects

Military Low Flying

- 11.5.1 The erection of tall structures during the construction phase has the potential to create additional hazards to military aircraft flying at low altitude.
- 11.5.2 The Proposed Development is located in LFA 20(T), whose overall designation by the MoD has historically been as a "*high priority military low flying area likely to raise considerable and significant concerns*" in relation to wind turbine developments due to aircraft flying at less than the normal minimum of 250 ft (known as Operational Low Flying (OLF)). However, the Site is located wholly within a part of LFA 20(T) that is defined by the MoD as "*a low priority military low flying area less likely to raise concerns*"⁹ because it is away from the valleys that are typically used for OLF. Further, LFA 20(T) has not been activated since summer 2023¹⁰ and the MoD scoping response states that any effects on military low flying would be acceptably mitigated by adding conditions to any consent requiring that proposed wind turbines with tip heights of 150 m or more are fitted with aviation safety lighting, and that sufficient data is submitted to ensure that structures can be accurately charted to allow deconfliction. These provisions are already required by Articles 222 and 225A of the Air Navigation Order 2016³ and would be implemented as part of the Proposed Development. It is therefore assessed that the effects of the Proposed Development on military low flying are **Minor** adverse and **Not Significant**.

⁹ Ministry of Defence, Defence Infrastructure Organisation, Low Flying Consultation Zones, Map Reference DE090071, Version 007, 7 October 2011.

¹⁰ <https://www.gov.uk/government/publications/operational-low-flying-training-timetable>

Prestwick Airport IFPs

- 11.5.3 The Proposed Development is located within the 30 nautical mile (nm) (56 km) radius IFP assessment area for Prestwick Airport. The Applicant is in the process of commissioning a formal IFP assessment from the airport's APDO. Pending the conclusion of that assessment, a preliminary analysis of the potential IFP effects of the Proposed Development has been conducted by Aviatica. This concluded the following:
- Prestwick Airport's Standard Arrival Routes (STARs) do not extend below 6000 ft and would be unaffected by the Proposed Development which has a maximum structure height of 3033 ft above mean sea level (amsl);
 - The closest part of Prestwick Airport's Approach Transitions, which extend to a minimum of 4000 ft, lie approximately 24 km from the Site and would, therefore, not be affected by the Proposed Development;
 - The closest point of any of Prestwick Airport's Standard Instrument Departure (SID) routes is at waypoint SUMIN, approximately 24 km west of the nearest turbine on the Site, at a minimum level of 6000 ft amsl, and would be unaffected by the Proposed Development;
 - The Proposed Development is located beyond the area depicted on Prestwick Airport's Air Traffic Control Surveillance Minimum Altitude Chart (ATCSMAC);
 - The closest turbine on the Site is located approximately 32.2 nm (59.6 km) from the Prestwick Non-Directional Beacon (NDB) "PIK" and is therefore beyond the 25 nm radius, plus 5 nm buffer, upon which the Minimum Sector Altitudes (MSAs) for all of Prestwick Airport's conventional instrument approach procedures (IAPs) are based;
 - The closest turbine on the Site is located approximately 32.8 nm (60.7 km) from the Prestwick Aerodrome Reference Point (ARP) and is therefore beyond the 25 nm, plus 5 nm buffer, upon which the MSAs for all of Prestwick Airport's Required Navigation Performance (RNP) IAPs are based;
 - The closest turbine on the Site is located approximately 27.1 nm (50.2 km) southeast of waypoint MIJAG, the Initial Approach Fix (IAF) for the RNP IAP to runway 20 at Prestwick Airport, and therefore within the buffer zone for the Terminal Arrival Altitude (TAA) from that waypoint, where the minimum altitude is 3800 ft. The Proposed Development would require that level to be raised to 4100 ft;
 - The closest turbine on the Site is located approximately 18.8 nm (34.8 km) east of waypoint SKARV, the IAF for the RNP IAP to runway 30 at Prestwick Airport, and therefore within the 25 nm TAA area from that waypoint, where the minimum altitude is 3800 ft. The Proposed Development would require that level to be raised to 4100 ft; and
 - The Proposed Development is located beyond the obstacle assessment areas for all of Prestwick Airport's IAPs other than the RNP TAAs.
- 11.5.4 The raising of the level of the 25 nm TAA around MIJAG to 4100 ft would require a revision of the IAP chart to reflect the higher TAA level and raising of the minimum procedure level at MIJAG to 4100 ft. Initial assessment suggests that no further consequent changes to procedure levels in the RNP IAP for runway 20 would be required.
- 11.5.5 The raising of the level of the 25 nm TAA around SKARV to 4100 ft would require a revision of the IAP chart to reflect the higher TAA level. Initial assessment suggests that no consequent changes to procedure levels in the RNP IAP for runway 30 would be required since the minimum procedure level at SKARV is already 4500 ft.

11.5.6 Changes to the TAA levels for the RNP procedures to runways 20 and 30 would be achieved through revision of the relevant charts by Prestwick Airport's APDO and their approval by the CAA.

11.5.7 Since the predicted effects on IFPs would require alterations to the published procedures, they are classified as **Major** adverse effects under the definitions used in **Table 11.4** and are therefore considered **Significant**.

Prestwick Airport Radio Communications

11.5.8 Multipath effects on VHF AGA radio communications may occur due to the reflection of radio signals by the turbine towers and therefore may occur during the construction phase once they are erected, although not operating.

11.5.9 Radio LOS assessment has been conducted from Prestwick Airport's AGA transmitter and receiver antennae to the Proposed Development. This found:

- Two turbines (Turbine 5 and Turbine 6) would be within radio LOS of transmitter TX1 and receiver RX2 at the blade tip height of 240 m; and
- No turbines would be within radio LOS of transmitter TX1 and receiver RX2 at the hub height of 155 m.

11.5.10 Since no turbine towers would be within radio LOS of the AGA antennae, multipath effects on Prestwick Airport's AGA facilities would not occur.

11.5.11 Amplitude modulation effects on VHF AGA communications may occur when the turbine blades are rotating. During the construction phase, the turbines would either have no blades mounted or would have turbine rotors stationary. In these circumstances, amplitude modulation effects would not occur.

11.5.12 The distance from the closest of Prestwick Airport's AGA antennae to Turbine 5 and Turbine 6 is approximately 60.4 km. CAA guidance in CAP 670⁵ advises that 'Large Industrial' turbines do not have unacceptable effects on AGA facilities at ranges greater than 17.2 km. While the 'Large Industrial' category is defined as turbines up to 158 m in tip height, significantly smaller than those of the Proposed Development, there is no evidence that 240 m tip height turbines could generate adverse effects at 3.5 times the maximum range advised by the CAA in CAP670. The largest operator of AGA facilities in the UK, NERL, safeguards those facilities against wind turbine developments to a maximum radius of 10 km from the facility, irrespective of turbine size.

11.5.13 It is therefore assessed that there would be no effect on any possible amplitude modulation effects on Prestwick Airport AGA facilities during the construction phase.

11.5.14 Prestwick Airport has confirmed that, following further assessment, it is content that the Proposed Development would not be within LOS of its VHF transmitters and has withdrawn this element of its raised objection.

Potential Operational Effects

Military Low Flying

11.5.15 The potential effects of the Proposed Development on military low flying in the operational phase would be the same as those during the construction phase (**Minor** adverse, **Not Significant**).

Instrument Flight Procedures (IFPs)

- 11.5.16 The potential effects of the Proposed Development on Prestwick Airport IFPs in the operational phase would be the same as those during the construction phase (**Major adverse, Significant**).

Primary Surveillance Radars (PSRs)

- 11.5.17 The Proposed Development has the potential to generate significant effects on the PSRs at NERL Lowther Hill, NERL Cumbernauld and Prestwick Airport. These consist of false radar returns generated by detection of the moving turbine blades and the potential for reduced probability of detection of aircraft flying over the wind farm.
- 11.5.18 Radar LOS assessment has found that the Lowther Hill PSR would be capable of detecting all the turbines in the Proposed Development and the Cumbernauld PSR would be capable of detecting all turbines except Turbine 13. These would be **Major** adverse effects requiring mitigation and therefore **Significant**.
- 11.5.19 NERL has advised the Applicant that the effects of the Proposed Development on the Lowther Hill Indra 3D PSR are expected to be capable of mitigation using the inherent data processing capabilities of the radar. This is discussed further in **Section 11.6**.
- 11.5.20 Following further assessment, Prestwick Airport has confirmed that it is content that the Proposed Development would not be detectable by its Terma radar and has withdrawn that element of its objection. It is therefore considered there would be no effect on Prestwick Airport PSR.

Prestwick Airport Radio Communications

- 11.5.21 Prestwick Airport has confirmed that, following further assessment, it is content that the Proposed Development would not be within LOS of its VHF transmitters and has withdrawn this element of its objection. It is therefore considered there would be no effects on Prestwick airport VHF transmitters.

Potential Decommissioning Effects

- 11.5.22 The effects of the Proposed Development on aviation in the decommissioning phase are anticipated to be the same as those as a result during the construction phase.

Potential Cumulative Construction Effects

- 11.5.23 The potential cumulative effects of the Proposed Development on aviation have been assessed in relation to operational, under construction, consented and in planning wind farm developments within a 10 km radius of the Proposed Development¹¹. The following cumulative developments have been considered the location of which is shown on **Figure 4.12 (EIAR Volume 3a)**:
- Minnygap;
 - Clyde;
 - Harestanes;
 - Crookedstane;
 - Lion Hill;

¹¹ The cut-off date for confirming the cumulative developments, and their status, to be included within the EIAR was 18 December 2025.

- Daer; and
- Rivox.

Military Low Flying

- 11.5.24 Of the seven developments considered for cumulative assessment, six are located, unlike the Proposed Development, outside the part of LFA 20(T) designated by the MoD as a “*low priority military low flying area*”. The seventh, Daer, has five turbines inside the “*low priority*” zone and 12 immediately outside, in the zone designated by the MoD as a “*high priority military low flying area*”. However, the MoD has not raised a low flying objection to any of these developments. It is therefore assessed that the cumulative effects of the Proposed Development on military low flying are **Minor** adverse and **Not Significant**.

Prestwick Airport IFPs

- 11.5.25 Cumulative effects do not occur on IFPs because the minimum altitudes specified in IFPs are always driven by the single highest structure within the obstacle assessment area. Thus, any structures within the TAAs for the RNP approaches to runways 20 and 30 that are lower than the highest turbine in the Proposed Development have no cumulative effect with the Proposed Development. Concomitantly, the stand-alone effect of the Proposed Development on Prestwick Airport IFPs would be no effect if a structure higher than the Proposed Development was erected. The highest turbine in the Proposed Development would be the tallest structure of all the cumulative developments considered. Therefore, there would be no cumulative effects on IFPs over and above the stand-alone effects of the Proposed Development.

Prestwick Airport Radio Communications

- 11.5.26 Cumulative effects on Prestwick Airport AGA radio communications facilities are assessed as no effect, since Prestwick Airport has withdrawn its objection to the Proposed Development on these grounds and there are no other wind farm developments within 10 km of the Proposed Development to which the Prestwick AGA transmitters/receivers have radio LOS.

Potential Cumulative Operational Effects

NERL PSRs

- 11.5.27 Cumulative effects on NERL PSRs may occur where there are other wind farms in the vicinity that are visible to the same radars.
- 11.5.28 The main consideration in relation to cumulative effects is whether the Proposed Development renders technical mitigations that are applied to adjacent existing wind farms unviable or, where different technical mitigation techniques must be applied to adjacent developments or, there is difficulty in ensuring compatibility between the techniques. The Applicant is in dialogue with NERL on the mitigation techniques to be applied to the Proposed Development and there is no indication that cumulative effects would present any such difficulties.
- 11.5.29 Of the seven cumulative developments considered, two (Harestanes and Minnygap) were consented with no objection from NERL and have no technical mitigation applied. The other five have agreements in place with NERL for technical mitigation of impacts on PSR. There is no indication that these agreements would be impeded in any way by a similar agreement in relation to the Proposed Development. Therefore, the cumulative effects of the Proposed Development on NERL PSRs are assessed as **Minor** adverse and **Not Significant**.

Prestwick Airport PSR

- 11.5.30 Cumulative effects on the Prestwick Airport PSR would not occur because Prestwick Airport has withdrawn its objection to the Proposed Development on these grounds and there are no other wind farms within 10 km of the Proposed Development that are within LOS of the Prestwick PSR.

11.6 Specific Mitigation

- 11.6.1 Specific mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.
- 11.6.2 A summary of the specific aviation mitigation is set out in **Table 11.7**.

Table 11.7: Summary of Specific Mitigation					
Description of Effect	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation	Consultation or Approval Required
Effects on low flying military aircraft	AV03	Infra-red lighting on turbines	Enhance wind farm visibility to military aircrew using night vision systems	Pre-Construction/ Construction	MoD consultation required
Effects on Lowther Hill and Cumbernauld PSRs	AV04	Adjustment of elevation beam and radar data processing parameters on Lowther Hill PSR	Mitigate the effects of the wind farm on the Lowther Hill and Cumbernauld PSRs	Pre-Construction	Approval by NERL Engineering and ATC required; signature of mitigation contract with NERL required
Effects on Prestwick Airport IFPs	AV05	Re-design of Prestwick Airport IFP charts	To accommodate required increases in procedure minimum altitudes	Pre-Construction	Requires commissioning of IFP Assessment from Prestwick Airport's APDO; approval by Prestwick Airport ATC; and approval by CAA.

11.7 Assessment of Residual Effects

Residual Construction Effects

- 11.7.1 The residual effects of the Proposed Development on low flying military aircraft in the construction phase are assessed as **Minor** adverse and **Not Significant** since the MoD has stated that planning Conditions requiring turbine lighting, including infra-red lighting, and pre-construction notification of the development (mitigation ref: AV01, AV02 and AV03) would mitigate the effects on low flying.
- 11.7.2 The residual effects of the Proposed Development on Prestwick Airport IFPs in the construction phase are assessed as **Minor** adverse and **Not Significant** since any required revisions to IFPs (mitigation ref: AV05) would be required to meet international and UK aviation safety standards.

Residual Operational Effects

- 11.7.3 The residual effects of the Proposed Development on low flying military aircraft and on Prestwick Airport IFPs in the operational phase would be the same as during the construction phase (**Minor** adverse and **Not Significant**).
- 11.7.4 The residual effects of the Proposed Development on the Lowther Hill and Cumbernauld PSRs in the operational phase are assessed as **Minor** adverse and **Not Significant** since the application of data processing techniques in the Lowther Hill Indra 3D radar (mitigation ref: AV04) is designed to filter out wind turbine returns.

Residual Decommissioning Effects

- 11.7.5 The residual effects of the Proposed Development on low flying military aircraft and on Prestwick Airport IFPs in the decommissioning phase would be the same as during the construction and operational phases (**Minor** adverse and **Not Significant**).

Residual Cumulative Construction Effects

- 11.7.6 The residual cumulative effects of the Proposed Development on low flying military aircraft in the construction phase are assessed as **Minor** adverse and **Not Significant** since the MoD has stated that planning Conditions requiring turbine lighting, including infra-red lighting and pre-construction notification of the development (mitigation ref: AV01, AV02 and AV03) would mitigate the effects on low flying.

Residual Cumulative Operational Effects

- 11.7.7 The residual cumulative effects of the Proposed Development on low flying military aircraft in the operational phase would be the same as during the construction phase.
- 11.7.8 The residual cumulative effects of the Proposed Development on the Lowther Hill and Cumbernauld PSRs in the operational phase are assessed as **Minor** adverse and **Not Significant** since the application of data processing techniques in the Lowther Hill Indra 3D radar (mitigation ref: AV04) is designed to filter out wind turbine returns, and this mitigation is not expected to impede other technical mitigation proposed for nearby wind farms.

11.8 Monitoring

- 11.8.1 No monitoring is required.

11.9 Summary of Assessment

- 11.9.1 The potential significant effects of the Proposed Development on aviation are summarised in **Table 11.8**.

Table 11.8: Summary of Aviation Assessment					
Likely Significant Effect	Mitigation ID	Description of Mitigation	Means of Implementation	Residual Effect*	Monitoring
Construction/Decommissioning					
Effects on low flying military aircraft	AV01 AV02 AV03	Prior notification of details of development to SLC, CAA and MoD. Aviation lighting on selected turbines Infra-red lighting on all turbines	Planning condition	Minor	Not required
Effects on Prestwick Airport IFPs	AV05	Re-design of Prestwick Airport IFP charts	Planning condition; commercial agreement with Prestwick Airport	Minor	Not required
Operation					
Effects on low flying military aircraft	AV01 AV02 AV03	Prior notification of details of development to SLC, CAA and MoD Aviation lighting on selected turbines Infra-red lighting on all turbines	Planning condition	Minor	Not required
Effects on Prestwick Airport IFPs	AV05	Re-design of Prestwick Airport IFP charts	Planning condition; commercial agreement with Prestwick Airport	Minor	Not required
Effects on Lowther Hill and Cumbernauld PSRs	AV04	Adjustment of data processing parameters on Lowther Hill PSR	Commercial agreement with NERL; planning condition	Minor	Not required
Cumulative Construction					
Effects on low flying military aircraft	AV01 AV02 AV03	Prior notification of details of development to SLC, CAA and MoD. Aviation lighting on selected turbines Infra-red lighting on all turbines	Planning condition	Minor	Not required
Cumulative Operational					
Effects on Lowther Hill and Cumbernauld PSRs	AV04	Adjustment of data processing parameters on Lowther Hill PSR	Commercial agreement with NERL; planning condition	Minor	Not required

**all effects are adverse unless otherwise stated, with effects Moderate or above considered significant.*

12. Shadow Flicker

12.1 Introduction

- 12.1.1 This Chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects on residential amenity from shadow flicker associated with the operation of the Proposed Development.
- 12.1.2 The term 'shadow flicker' refers to the flickering effect caused when rotating wind turbine blades periodically cast shadows over neighbouring properties as they turn, through constrained openings such as windows. The magnitude of the shadow flicker varies both spatially and temporally and depends on a number of environmental conditions coinciding at any particular point in time, including, the position and height of the sun, wind speed, direction, cloudiness, and position of the turbine to a sensitive receptor'¹.
- 12.1.3 The specific objectives of the Chapter are to:
- Describe the shadow flicker baseline;
 - Describe the assessment methodology and significance criteria used in completing the impact assessment;
 - Describe the potential effects, including direct, indirect and cumulative effects;
 - Describe the mitigation measures proposed to address likely significant effects; and
 - Assess the residual effects remaining following the implementation of mitigation.
- 12.1.4 The assessment has been carried out by Ramboll UK Limited (Ramboll). The Lead author is Peter Bruce MSc BSc (Hons) MISEP CEnv, Director – Impact Assessment. Mr Bruce has over 19 years' of experience in environmental consultancy, specialising in Impact Assessment for renewable energy developments (refer to **Technical Appendix 1.2, EIAR Volume 4** for further details).
- 12.1.5 This Chapter is supported by the following figures and technical appendices:
- Figures (EIAR Volume 3a):
 - **Figure 12.1: Shadow Flicker Study Area and Receptors.**
 - Technical Appendices (EIAR Volume 4):
 - **Technical Appendix 12.1: Shadow Flicker Modelling Output.**
- 12.1.6 Figures and technical appendices are referenced in the text where relevant.

12.2 Consultation

- 12.2.1 The Scoping Report (**Technical Appendix 1.4, EIAR Volume 4**) proposed to scope out an assessment of shadow flicker on the basis that if shadow flicker effects could not be avoided through design then a Shadow Flicker Mitigation Protocol would be implemented with a suitably worded planning Condition included as part of any consent requiring shadow flicker to be appropriately mitigated. No consultation responses were received as part of the Scoping Opinion on this proposed approach, however, following a further review of the layout of the Proposed Development and the potential for significant effects, the Applicant has included a specific Shadow Flicker assessment as part of the EIAR.

¹ UK Government's Shadow Flicker Evidence Base as reported for DECC by Parsons Brinckerhoff. Available at: [Update of UK Shadow Flicker evidence base - GOV.UK](#)

12.3 Assessment Methodology

Legislation, Policy and Guidance

- 12.3.1 National Planning Framework 4 (NPF4)² requires onshore wind proposals to demonstrate that impacts on residential amenity, including shadow flicker, are addressed, with effective mitigation secured where necessary.
- 12.3.2 There is no statutory standard in the UK for the assessment of shadow flicker and no nationally prescribed thresholds for acceptable exposure. However, relevant planning guidance, contained within the Scottish Government's Online Renewables Planning Advice: Onshore Wind Turbines (2014)³, states:
- "Under certain combinations of geographical position, time of day and time of year, the sun may pass behind the rotor and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as "shadow flicker". It occurs only within buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site.*
- Where this could be a problem, developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem. However, there is scope to vary layout/reduce the height of turbines in extreme cases."*
- 12.3.3 This is similar to advice from the UK Government's Shadow Flicker Evidence Base¹ which considers that shadow flicker effects are only considered to affect properties within 10 rotor diameters of a turbine and within 130 degrees either side of north relative to a turbine.
- 12.3.4 While there are currently no UK guidelines which quantify what exposure levels of shadow flicker are acceptable, Predac⁴, an EU sponsored organisation that promotes best practice in energy use and supply, recommends that a maximum of 30 hours of shadow flicker in any calendar year or 30 minutes per day is acceptable for properties within 500 m of a turbine. These benchmarks are also set out in Northern Ireland's PPS18 Best Practice Guidance⁵.
- 12.3.5 Supplementary Guidance⁶ to South Lanarkshire Council Local Development Plan 2 reiterates the Scottish Government's Planning Advice on shadow flicker assessments, expecting any wind farm developers to follow any Scottish Government guidance.

Scope of Assessment

Potential Impacts Scoped In

- 12.3.6 Based on the above guidance, potential shadow flicker effects are considered for properties within 10 rotor diameters (RD) of the proposed turbine locations.
- 12.3.7 Using proprietary specialist modelling software 'Windfarm' (RESOFT Windfarm V5.0.2.2), an annual analysis of shadow flicker for the Proposed Development was carried out, taking into account the behaviour of the sun, the local topography and the turbine layout and dimensions.

² Scottish Government, National Planning Framework 4 (2023) Available online from [National Planning Framework 4 - gov.scot](https://www.gov.scot/publications/national-planning-framework-4/pages/1-1-introduction.aspx)

³ Scottish Government, Online Renewables Planning Advice: Onshore Wind Turbines (2014) Available online from: [Onshore wind turbines: planning advice - gov.scot](https://www.gov.scot/publications/online-renewables-planning-advice-onshore-wind-turbines/pages/1-1-introduction.aspx)

⁴ Predac - European Actions for Renewable Energies (2004). Spatial Planning of Wind Turbines

⁵ Northern Irish Government, Best Practice Guidance to PPS 18 'Renewable Energy' (2019) Available online from <https://www.infrastructure-ni.gov.uk/publications/best-practice-guidance-pps-18-renewable-energy>

⁶ South Lanarkshire Council LDP2 Supplementary Guidance - Renewable Energy (2021) Available online from <https://www.southlanarkshire.gov.uk/developmentplan2>

12.3.8 It should be noted that the modelling analysis was performed using the following standard (worst-case) assumptions:

- The sun will always be visible during daylight hours;
- The turbine blades are always turning at these times;
- The alignment of the turbine rotor blades with respect to the sun's position will always produce maximum shadow casting (it is unlikely that the wind, and therefore the rotor blades, will track the sun in practice);
- The analysis looks at shadow casting over the receptors from all directions rather than over vertical orientated receptors only;
- The intensity of the sun will be insufficient to cast strong shadows at elevations less than 2.0°; and
- While terrain shielding is modelled based on a digital terrain model, shielding due to features such as trees or other obstacles has not been taken into account.

12.3.9 The assessment of significance of the shadow flicker effect to the surrounding properties has been informed by the UK Shadow Flicker Evidence Base report¹. On this basis, significant effects are taken to be where shadow flicker at neighbouring offices and dwellings within 10 rotor diameters exceeds 30 hours per year or 30 minutes per day.

12.3.10 As shadow flicker effects only occur when the wind turbines are operational, any effects from shadow flicker in relation to construction or decommissioning have been scoped out of the assessment.

Table 12.1: Effects Considered within the Assessment			
Effect	Phase*		
	C	O/M	D
Effects to residential amenity from shadow flicker	No	Yes	No

*C=construction, O/M=operation and maintenance and D=decommissioning.

12.3.11 An assessment of cumulative effects from the Proposed Development in-combination with other operational, under-construction, and consented wind farm schemes is also considered. Developments nearing the end of their operational life are also considered to present a 'worst case scenario'. The cumulative assessment considers other wind farms within 10 RDs of any identified receptor as part of the shadow flicker assessment for the Proposed Development.

Potential Impacts Scoped Out

12.3.12 The assessment focusses on likely significant effects and as such impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with reasoning for scoping them out is presented in **Table 12.2**.

Table 12.2: Impacts Scoped Out of the Assessment	
Impact	Reasoning
Shadow flicker effects as a result of the construction and decommissioning phases of the Proposed Development	As shadow flicker is a phenomenon caused by the moving shadow of the turbine rotor being cast over a narrow opening, such as a window or open door, no shadow flicker effects as a result of the construction or decommissioning of the Proposed Development are likely. Assessments of potential shadow flicker effects resulting from the construction and

Table 12.2: Impacts Scoped Out of the Assessment

	decommissioning of the Proposed Development have therefore been scoped out of the shadow flicker assessment.
Impacts to visual amenity due to reflected light stroboscopic effect	A related visual effect to shadow flicker is that of reflected sunlight. Theoretically, should light be reflected off a rotating turbine blade onto an observer then a stroboscopic effect could be experienced. In practice, a number of factors limit the severity of this phenomenon. Firstly, wind turbines have a semi-matt surface finish which means that they do not reflect light as strongly as materials such as glass or polished vehicle bodies. Secondly, due to the convex surfaces found on a turbine, the light would generally be reflected in a divergent manner. Thirdly, the variability in flow within a wind farm results in slightly differing orientation of rotor directions. Therefore, it is unlikely that an observer would experience simultaneous reflections from a number of turbines. Fourthly, as with shadow flicker, certain weather conditions and solar positions are required before an observer would experience the phenomenon. Therefore, it is concluded that the Proposed Development would not cause a material reduction to amenity owing to the reflected light. With this considered, impacts to visual amenity due to reflected light stroboscopic effect is scoped out and has not been considered further.
Impacts to human health	People with photosensitive epilepsy are usually sensitive to flickering light that is between 3 to 60 Hertz (Hz). According to the Parsons Brinckerhoff paper ¹ "the maximum frequency of the shadowing effect arising from commercial-scale wind turbines is less than 1 Hz". Therefore, any potential shadow flicker effects arising from the Proposed Development are purely an effect on amenity, rather than having the potential to affect the health or wellbeing of people.

Method of Baseline Characterisation

Extent of the Study Area

12.3.13 The Shadow Flicker Study Area is a 10 RD radius around each proposed turbine (1.7 km), extended to 1.8 km to account for potential micro-siting, and within this radius the Study Area is limited to 130 degrees either side of north of turbine location.

12.3.14 The Study Area in relation to shadow flicker is shown in **Figure 12.1 (EIAR Volume 3a)**.

Desk Study

12.3.15 A desktop assessment was undertaken in November 2025 using Royal Mail address base data and publicly available aerial and satellite images in order to identify all residential and commercial properties located within the Study Area.

Modelling Methodology

12.3.16 The computer software 'WindFarm' (RESOFT Windfarm V5.0.2.2) was used to identify potential areas susceptible to shadow flicker, and the extent of shadow flicker effects. This software identified the Study Area for the assessment based on candidate turbine dimensions and

orientations, as well as model periods of predicted shadow flicker. The following model parameters were used:

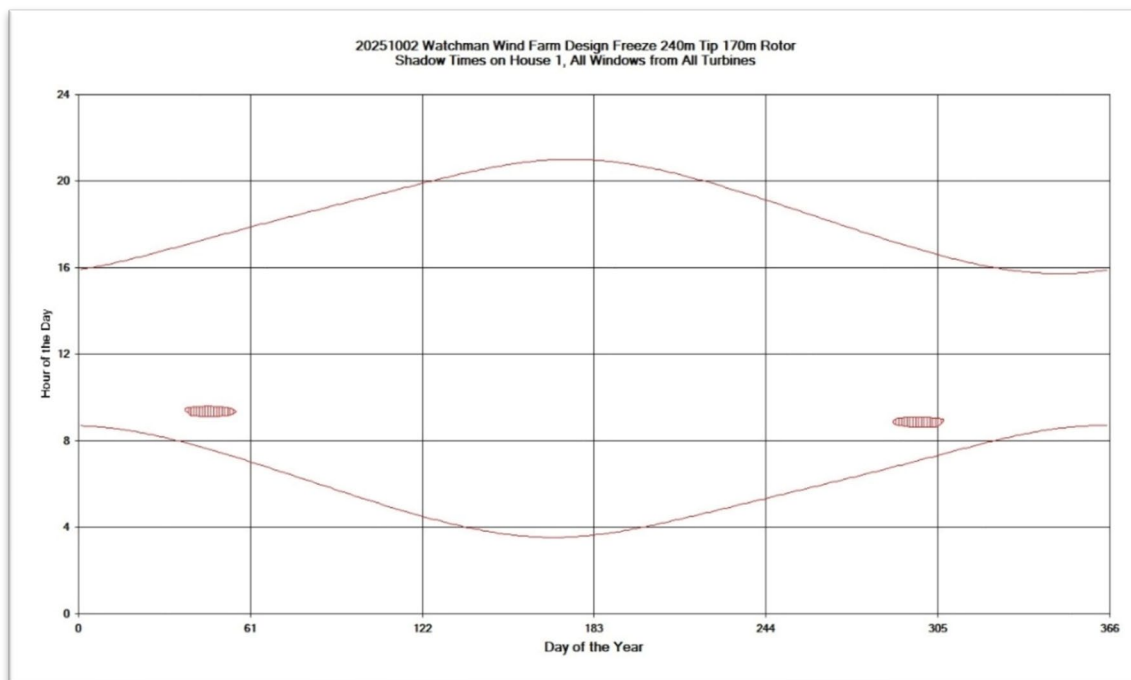
- A candidate wind turbine with a hub height of 155 m, a rotor diameter of 170 m and a blade tip height of 240 m;
- The maximum distance of shadow flicker influence considered is 10 times the RD plus 100 m micro-siting allowance ($(170 \text{ m} \times 10) + 100 \text{ m} = 1,800 \text{ m} = 1.8 \text{ km}$);
- The centre of the window (viewing height) is 3 m above ground level;
- Each property has two windows facing the Proposed Development;
- Each window is 1 m by 1 m⁷;
- The calculation year is 2025;
- The maximum sun height is 2° above the horizon; and
- Topography has been considered using 20 m grid spaced digital terrain model (DTM) data and the Earth's curvature has been accounted for.

Model Output

12.3.17 For each property within the Study Area, the model predicted the number of days per year, maximum and mean minutes per day, and total hours per year (including an adjustment for sunlight) that the property would experience shadow flicker. A summary of model output is presented in **Table 12.5**, with the full output set out within **Technical Appendix 12.1 (EIAR Volume 4)**.

12.3.18 In addition, the model has produced a graph illustrating the time of day and time of year shadow flicker effects could potentially arise for each property within the Study Area. An example graph for House 1 (H1) is illustrated below in **Graph 12.1**.

⁷ These are generic assumption and have not been verified in the field, but are considered to be a reasonable basis upon which to base an assessment to identify potential shadow flicker effects because the model assumes that the façade facing the turbines has an unobstructed line of sight to the turbines and that there are windows to habitable rooms on the façade of a size that could experience a flicker effect.

Graph 12.1: Potential Shadow Flicker Effects at House 1

- 12.3.19 The area between the two red lines in **Graph 12.1** represent daylight hours over the course of a calendar year (calculation year 2025). The red circular areas represent times when the shadow flicker effects as a result of the Proposed Development could potentially occur at this property. A similar graph for each receptor that is predicted to experience shadow flicker effects is provided in **Technical Appendix 12.1 (EIAR Volume 4)**.

CRITERIA FOR ASSESSMENT OF EFFECTS

- 12.3.20 No formal guidance is available regarding what levels of shadow flicker may be considered acceptable in Scotland. In the absence of this, the significance of the shadow flicker effect to the surrounding properties has been assessed according to the thresholds detailed in the UK Shadow Flicker Evidence Base report¹, which recommends that shadow flicker at neighbouring offices and dwellings should not exceed 30 hours per year or 30 minutes per day.
- 12.3.21 For the purposes of the assessment, values greater than 30 hours per year or 30 minutes per day are considered **Significant**.

Limitations and Assumptions

- 12.3.22 A number of worst-case assumptions were made to generate the modelling output for the assessment. It should also be noted that even if shadow flicker effects occur at a specific location, this does not imply that it would be witnessed. Potential receptors may be occupying a room on the other side of the house, or indeed absent from the location altogether (e.g., at work, on holiday) during the times of the shadow flicker effects.
- 12.3.23 The use of these assumptions is considered to provide a precautionary basis for the purpose of this assessment.
- 12.3.24 The instances of shadow flicker would always be less than that predicted by the model. The occurrence of shadow flicker is only possible during the operation of the wind turbine (i.e., when the rotor blades are turning, excluding times when wind speeds are below the cut-in

threshold, or during maintenance and shutdown periods) and when the sky is clear enough for the sun to cast strong shadows.

12.3.25 It is important to consider the following facts when making an assessment:

- Climatic conditions dictate that the sun is not always shining. Met Office data gives average annual sunshine hours for the west of Scotland to be 29% of total daylight hours⁸, based on climate data from 1981 to 2010. Cloud cover during other times may obscure the sun and prevent shadow flicker occurrence. While some shadow may still be cast under slightly overcast conditions, no shadow at all would be cast when heavy cloud cover prevails.
- Objects such as trees or walls may surround windows and obscure the view of the turbine and hence prevent or limit shadow flicker.
- During operation, the turbine rotors would automatically orientate themselves to face the prevailing wind direction. This means the turbine rotors would not always be facing the affected receptor and in fact would sometimes be 'side-on' to the receptor. Very little of the blade movement would be visible during such occurrences and therefore the potential for shadow flicker is reduced.

12.4 Baseline Conditions

Current Baseline

12.4.1 The desk study identified four properties within the Study Area, the location of which is shown on **Figure 12.1 (EIAR Volume 3a)**:

- House (H) 1 – Troloss Cottage (E 292931, N 609473) located approximately 1.5 km northwest of Turbine 2;
- H2 - Kirkhope Cleuch (E 296642, N 607224) located approximately 1.3 km northeast of Turbine 11;
- H3 – Crookburn (E 296598, N605638) located approximately 0.9 km southeast of Turbine 11; and
- H4 - Kirkhope (E 296321, N605455) located approximately 0.8 km southeast of Turbine 11.

12.4.2 H2, H3 and H4 are all financially involved in the Proposed Development. Notwithstanding this these properties are still considered as part of the shadow flicker assessment.

Future Baseline

12.4.3 If a new property were to be constructed within the Study Area during the operational phase of the Proposed Development, this would create a potential new shadow flicker receptor. No consented or proposed residential developments have been identified within the Study Area on the South Lanarkshire Council Planning Portal at the time of writing (November 2025).

12.4.4 In addition, if any of the existing properties within the Study Area were modified, for example, a new window or door was installed, or the property is extended, this could alter the individual property's sensitivity to shadow flicker. No consented or proposed planning applications to modify existing properties within the Study Area have been identified on the South Lanarkshire Council Planning Portal.

12.4.5 No further changes to the shadow flicker baseline are anticipated.

⁸ Calculated based on figures available at <https://www.metoffice.gov.uk/public/weather/climate/>

Summary of Sensitive Receptors

- 12.4.6 A summary of the receptors considered likely to be affected by shadow flicker from the Proposed Development and therefore scoped into the EIAR are set out in **Table 12.3**.

Table 12.3: Summary of Sensitive Receptors		
Receptor		Justification
H1 - Troloss Cottage	Residential property	Located within 1.8 km and within 130 degrees either side of north of a turbine
H2 - Kirkhope Cleuch	Residential property	
H3 - Crookburn	Residential property	
H4 - Kirkhope	Residential property	

12.5 Mitigation

- 12.5.1 Mitigation for the Proposed Development has been developed in line with a three-tiered hierarchy as follows:

- Embedded mitigation - design stage mitigation as outlined in **Chapter 2: Description of the Proposed Development (EIAR Volume 2)** and the design evolution narrative (refer to **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**).
- Standard/Best Practice mitigation – standard/best practice mitigation considered to be an integral part of the Proposed Development with high level of certainty in relation to their effectiveness.
- Specific mitigation - bespoke mitigation determined as a result of the EIA (refer to **Section 12.7**).

- 12.5.2 The location of the sensitive receptors in relation to shadow flicker were digitised as GIS data and the layout initially developed with consideration of the proximity of the wind turbines to these sensitive receptors, with the aim to maintain a 10 RD separation distance. As part of the design process the number of turbines was reduced from 16 to 13 which reduced the lateral extent of the potential shadow flicker effects. Due to other environmental and technical constraints, a 10 RD separation distance was not feasible for all turbine locations, and where required sensitive receptors were included within the shadow flicker assessment.

- 12.5.3 Prior to the assessment of likely significant effects there are no standard/best practice mitigation measures to be considered. If shadow flicker effects are predicted as part of the assessment, mitigation would include the development of a Shadow Flicker Mitigation Protocol (mitigation ref: SF01). Further details on this are provided in **Section 12.7**.

12.6 Assessment of Likely Effects

- 12.6.1 A summary of the outputs from the shadow flicker model for the Proposed Development are detailed in **Table 12.5**.

Table 12.5: Summary of Model Output							
Receptor	Easting	Northing	Shadow Flicker Predictions				
			Days per Year	Max Minutes per Day	Mean Minutes Per Day	Total Hours per Year	Total Hours per Year (incl. adjustment for sunlight)*
H1	292931	609473	38	28.8	22.2	14	4.1
H2	296642	607224	101	31.8	24	40.2	11.7
H3	296598	605638	92	31.2	24	37	10.7
H4	296321	605455	89	39.6	28.2	41.6	12.1
<i>*The Met Office data shows that the west of Scotland receives an average of 29% sunshine of the total daylight hours annually. This percentage is applied to total annual hours column to estimate the expected total sunshine hours for the year.</i> <i>Grey highlighted cells represent where the assessment indicates that the potential number of shadow flicker hours experienced at the receptor exceeds 30 hours per year (based on adjustment for sunlight) and/or 30 minutes per day.</i>							

- 12.6.2 The assessment indicates that all four properties located within the Study Area could be subject to shadow flicker from the proposed turbines.
- 12.6.3 H1 would experience acceptable levels of shadow flicker in accordance with assessment criteria. The shadow flicker levels at H1 would be less than 30 minutes per day and 30 hours year (inclusive of adjustment for sunlight) and as such these effects are considered to be **non-significant** adverse.
- 12.6.4 The impact of shadow flicker on H2, H3, and H4 is greater than 30 minutes per day but less than 30 hours per year (inclusive of adjustment for sunlight). As such, the impact of shadow flicker on H2, H3 and H4 is deemed **Significant** adverse in terms of daily exposure and **Non-Significant** adverse in terms of yearly total.
- 12.6.5 It should be emphasised that this analysis provides a reasonable worse case estimate of the extent to which properties would experience effects in relation to shadow flicker. In addition to the frequent cloud cover which is factored into **Table 12.5**, low irradiance intensity, turbines not turning at all times and turbine rotors not being aligned with the sun in a way to cast maximum shadow onto the proposed property, would further reduce the actual amount of shadow flicker affecting the aforementioned properties.

Potential Cumulative Operational Effects

- 12.6.6 To assess potential cumulative shadow flicker effects, neighbouring wind farms were reviewed to establish their respective shadow flicker study areas in relation to that of Proposed Development and the identified sensitive shadow flicker receptors. Daer Wind Farm, situated approximately 1 km to the east of the Proposed Development, at its closest point, was identified as having an overlapping shadow flicker study area. Three receptors within the overlapping area were deemed sensitive to cumulative shadow flicker effects (H2, H3, and H4). Daer Wind Farm, which is currently at the application stage, consists of 17 wind turbines, with a maximum blade tip height of up to 180 m.
- 12.6.7 To assess the potential cumulative effect, the assessment has modelled the worst-case shadow flicker assuming Daer Wind Farm is operational (based on a candidate turbine with 180 m tip height and 155 m rotor diameter) in addition to the Proposed Development. The

latest publicly available turbine layout for Daer Wind Farm has been used as part of the assessment.

- 12.6.8 The results of the cumulative operational shadow flicker assessment are presented in **Table 12.7** and **Technical Appendix 12.1 (EIAR Volume 4)**.

Table 12.7: Summary of Cumulative Model Output					
Receptor	Shadow Flicker Prediction				
	Days per Year	Max. Minutes per Day	Mean Minutes per Year	Total Hours per Year	Total Hours per Year (incl. adjustment for sunlight)*
H2	139	31.8	23.4	54.3	15.7
H3	165	31.2	23.4	65.1	18.9
H4	144	39.6	24.0	57.7	16.7

- 12.6.9 The modelling outputs show that the Proposed Development and Daer Wind Farm would potentially cause in-combination cumulative effects in relation to H2, H3, and H4. Daer Wind Farm is expected to increase the number of days and total annual hours of potential shadow flicker effects at H2, H3, and H4. Despite this, after adjusting for average sunlight hours, these effects remain below the 30 hours per year significance threshold. Since Daer Wind Farm is east of the receptors while the Proposed Development turbines are west, shadow flicker occurrences do not overlap in time and with limited overlap in the days, with Daer having the potential to cause shadow flicker in the morning between September and March, and the Proposed Development potentially causing shadow flicker in the afternoon and evening mainly between March and September.
- 12.6.10 The maximum potential minutes of shadow flicker per day at each receptor remain unchanged in the cumulative scenario; however the number of days per year where a potentially significant effect could occur (i.e., >30 mins per day) (if the weather conditions combine to cause shadow flicker) are increased in the cumulative scenario. The total hours of potential shadow flicker are also increased with the cumulative scenario, although they remain under the 30 hours per year threshold for significant effects when adjusted for average sunlight hours.
- 12.6.11 On this basis, there would be additional potential for significant effects as a result of cumulative effects with Daer Wind Farm based on there being a greater number of days per year, where if the conditions (wind speed, direction, cloud cover, sunlight and operational status of the respective developments and turbines) all combine to give rise to shadow flicker, there could be impacts for more than 30 minutes.

12.7 Specific Mitigation

- 12.7.1 Three receptors are potentially affected by shadow flicker as a result of the Proposed Development and the Proposed Development in combination with Daer Wind Farm (cumulatively).
- 12.7.2 The Applicant proposes that prior to the erection of the first turbine, a Wind Farm Shadow Flicker Protocol (mitigation ref: SF01) would be submitted to and approved in writing by the Local Planning Authority. This would set out the protocol to be followed should a shadow flicker complaint be received from a receptor within the Study Area and the potential mitigation measures. These mitigation measures may include the provision of internal or external

screening at the property of the complainant, or programming of the turbines to reduce effects. Operation of the Proposed Development would be undertaken in accordance with the Wind Farm Shadow Flicker Protocol. The requirement for the Wind Farm Shadow Flicker Protocol would be secured through a condition attached to the consent.

12.7.3 A summary of the specific mitigation is set out in **Table 12.8** below.

Table 12.8: Summary of Specific Mitigation.					
Description of Impact	ID	Description of Mitigation	Purpose of Mitigation	Timing of Mitigation	Consultation or Approval Required
Potential operational shadow flicker effects on residential receptors	SF01	Wind Farm Shadow Flicker Protocol to be submitted and approved by the LPA ahead of the erection of the first turbine. This would set out the protocol that would be followed should a shadow flicker complaint be received from a receptor within the Study Area. Mitigation measures may include the provision of internal/ external screening at the property of the complainant, or programming of the turbines.	To reduce shadow flicker effects to a non-significant level at the property of a complainant.	Pre-construction Operation	Yes

12.8 Assessment of Residual Effects

12.8.1 With appropriate mitigation measures in place the residual effects during operation of the Proposed Development on all receptors would be **Not Significant**.

12.9 Monitoring

12.9.1 No monitoring is required as no significant residual effects as a result of the operation of the Proposed Development are predicted.

12.10 Summary of Assessment

12.10.1 Three receptors are potentially significantly affected by shadow flicker as a result of the Proposed Development and the Proposed Development in combination with Daer Wind Farm (cumulatively). However, with the implementation of a Wind Farm Shadow Flicker Mitigation protocol (mitigation ref: SF01) no significant residual effects are predicted on any sensitive receptors.

13. Schedule of Environmental Mitigation

13.1 Introduction

- 13.1.1. This Chapter summarises the environmental mitigation measures proposed in each of the technical chapters of the Environmental Impact Assessment (EIA) Report (EIAR) to avoid, reduce or offset impacts which could otherwise give rise to significant residual environmental effects as a result of the Proposed Development. In addition, good practice environmental management measures and commitments have been proposed to further reduce environmental effects which are not considered to give rise to likely significant effects with or without mitigation.
- 13.1.2. The main aim of the design process was to 'design out' the potential for significant environmental effects as far as possible. Embedded mitigation in the form of design solutions is presented in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**, in particular in **Table 3.1**. As such, these measures have not been replicated here.
- 13.1.3. Most of the pre-construction and construction phase mitigation would be delivered through a Construction Environmental Management Plan (CEMP). The outline content of the proposed CEMP is provided in **Technical Appendix 2.1 (EIAR Volume 4)**. Further details on specific measures to be included in the final CEMP are contained in each of the technical chapters of the EIAR, where relevant.
- 13.1.4. A Decommissioning Environmental Management Plan (DEMP) would be prepared at the point of decommissioning, which would include similar measures to those set out for the CEMP.
- 13.1.5. Throughout the EIAR, technical disciplines have considered the likely significant effects of the Proposed Development with consideration of embedded (design) mitigation and standard/best practice mitigation. Where significant effects have been identified, additional specific mitigation is proposed to minimise these effects where possible. A summary of these mitigation measures is provided in **Table 13.1**. It is anticipated that the mitigation measures outlined in this table would be secured through appropriately worded planning conditions attached to any consent granted.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
General Mitigation	GE01	Pre-construction Construction	An Outline Construction Environmental Management Plan (OCEMP) has been prepared as part of the EIA process for the Proposed Development (Technical Appendix 2.1, EIAR Volume 4). The appointed Contractor will prepare detailed method statements which will be incorporated into the final CEMP. The CEMP will provide: ▪ a schedule of all construction stage mitigation measures required to address likely significant effects identified in the EIAR; ▪ a schedule of all additional construction and decommissioning stage good practice management measures included as part of the proposed construction work, in line with industry good practice guidance; ▪ a schedule of roles and responsibilities for delivering the requirements of the CEMP, including a statement of responsibility to 'stop the job/activity' if in potential breach of a mitigation or legislation occurs; ▪ a method statement for monitoring, auditing, and templates for reporting and communication of environmental management performance on-site with the Applicant, planning authority and other relevant parties; and ▪ construction stage environmental management measures, based on both compliance with relevant regulations and relevant good practice. An appropriately qualified Ecological Clerk of Works (ECoW) to be appointed to monitor the implementation of the CEMP.	The CEMP details the environmental management and construction methods to be employed during the construction of the Proposed Development, in accordance with the environmental mitigation measures identified in the EIAR.	Submitted to South Lanarkshire Council (SLC) for approval, in consultation with relevant statutory bodies and regulatory authorities.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
General Mitigation	GE02	Construction	Locations of proposed turbines, other infrastructure and borrow pits to be subject to a micro-siting allowance of 100 m forming a condition of consent. Any repositioning will not encroach into environmentally constrained areas and will be carried out under the supervision of an ECoW and an appropriately experienced engineer.	To ensure environmental constraints are considered if micro-siting is required.	Micrositing allowance condition of consent. Updated Site plan submitted to SLC showing the final position of all wind turbines and other infrastructure forming part of the Proposed Development.
Forestry	FO01	Construction Operation	All forestry works, felling and replanting, to be carried out in accordance with the relative UKFS supporting guidelines.	To ensure forestry works are undertaken in line with relevant guidance.	Forms part of the CEMP which will be approved by SLC in consultation with Scottish Forestry.
Forestry	FO02	Construction	Inclusion and implementation of the forestry operations as detailed in the CEMP.	To ensure environmental effects as a result of forestry works are managed through implementation of best practice guidance.	Forms part of the CEMP which will be approved by SLC in consultation with Scottish Forestry.
Forestry	FO03	Construction Operation	Compensatory planting, at least the same area of woodland lost, will be provided, preferably within the Site, and will deliver the equivalent woodland-related net public benefits of the woodland removed. Compensatory planting likely to complement areas of native broadleaved woodland planting proposed as part of the Outline Biodiversity Enhancement and Management Plan (OBEMP) (Technical Appendix 6.7, EIA Volume 4).	To replace woodland lost through construction of Proposed Development.	Detailed Compensatory Planting Plan to be submitted to SLC for approval in consultation with Scottish Forestry.
Landscape and Visual	LV01	Construction Decommissioning	Effective management of the construction and decommissioning phases using measures as set out in the CEMP, and appointment of experienced contractors.	To mitigate direct effects within Site as a result of ground disturbance and works.	Forms part of the CEMP which will be submitted to and approved by SLC.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Landscape and Visual	LV02	Operation	Reduced lighting scheme (i.e., not all turbines lit) and reduced intensity of turbine aviation lighting. Proposing use of 2000 candela (cd) steady red lights reducing to 200 cd in clear weather with no mid-tower lighting. Includes the reduction of intensity of the lights during conditions of clearer visibility, such that the lights would only operate at full intensity of 2000 cd when visibility is less than 5 km. At other times they will be at 10%, i.e. 200 cd. Candidate lights are designed to give a horizontal beam with reduced upward and downward spill of light, such that the brightness of the light is decreased for viewers close to the turbines viewing them from below.	To mitigate the nighttime visual effects of the Proposed Development on visual amenity for non-aviation receptors.	Reduced lighting scheme submitted to SLC for approval in consultation with the Civil Aviation Authority (CAA).
Cultural Heritage	CH01	Construction	Construction works to proceed in accordance with the measures set out in the Outline CEMP in relation to cultural heritage assets (see Technical Appendix 2.1, EIAR Volume 4).	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.	Forms part of the CEMP which will be approved by SLC in consultation with Historic Environment Scotland (HES) and West of Scotland Archaeology Service (WoSAS).
Cultural Heritage	CH02	Construction	A qualified Archaeological Contractor to be appointed to act as an Archaeological Clerk of Works (ACoW) to provide advice to the appointed Contractor regarding micro-siting of development components, where there is a possibility of intersecting with identified heritage assets, and to undertake archaeological monitoring of topsoil stripping operations in areas designated and approved by the Council's Archaeological Advisors (WoSAS).	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.	Appointment of ACoW. Activities of the ACoW to be approved by WoSAS in advance of development works commencing and to be set out in the Written Scheme of Investigation (WSI).

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Cultural Heritage	CH03	Pre-Construction	Scheduled Monuments within the Site to be marked out with a suitable stand-off buffer, agreed prior to construction, with protective fencing erected and a site-protection plan implemented if required. Fencing to remain in place for the duration of the construction activities on Site.	To avoid direct impacts on Scheduled Monuments.	Stand-off buffers to be approved by HES/WoSAS in advance of development works commencing and these will be set out in the WSI.
Cultural Heritage	CH04	Construction	Construction machinery to operate only within defined working areas and access corridors, limiting ground disturbance.	To avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains.	Forms part of the CEMP which will be approved by SLC in consultation with HES and WoSAS.
Cultural Heritage	CH05	Construction	Upstanding cultural heritage remains to be retained where possible. Where necessary, existing cultural heritage features may be fenced off or otherwise visibly marked out to signal their presence to construction workers. The fence/markers to remain in place for the duration of the construction activities on Site.	To avoid potential direct or indirect impacts to known heritage assets.	Fencing/markers to be approved by WoSAS in advance of development works commencing and will be set out in the WSI.
Cultural Heritage	CH06	Construction	Archaeological monitoring (watching briefs) and set-piece excavation may be undertaken to record heritage assets (e.g., 12130, 50865) where these cannot be avoided through design. Scope of the works to be agreed with WoSAS (as advisors to SLC) and detailed in a WSI.	To preserve archaeological remains 'by record' where preservation in situ is not practicable.	Watching briefs and set piece excavation to be approved by WoSAS in advance of development works commencing and will be set out in the WSI.
Cultural Heritage	CH07	Construction	Should they be encountered, previously unidentified archaeological remains to be subject to a programme of archaeological works to be developed in consultation with WoSAS and detailed in a WSI.	To preserve archaeological remains 'by record' where preservation in situ is not practicable.	Approach to discovery of unidentified remains to be approved by WoSAS prior to construction and set out in the WSI.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Ecology	EC01	Pre-Construction Construction	Species Protection Plan (SPP) to be implemented as part of the CEMP or similar during the construction phase to ensure that all reasonable precautions are taken to adhere to the relevant wildlife legislation. SPP to include preconstruction surveys and good practice measures during construction. Pre-construction surveys to be used to update the outline SPP ahead of construction starting. The SPP will remain a live document to be updated as required and in agreement with the ECoW where changes to the distribution and status of protected species and features are recorded. Outline SPP provided in Technical Appendix 6.6 (EIAR Volume 4).	To ensure the safeguarding of protected species known or likely to be in the area.	Forms part of the CEMP which will be approved by SLC in consultation with NatureScot.
Ecology	EC02	Pre-Construction Construction	A suitably qualified ECoW to be appointed prior to the commencement of construction to advise the appointed Contractor on all ecological matters. ECoW required to be present on-site during the construction phase and will carry out monitoring of works and briefings with regards to any ecological sensitivities on the Site to the relevant staff of the appointed Contractor and sub-contractors.	To ensure the appropriate implementation of ecological mitigation measures.	Appointment of ECoW.
Ecology	EC03	Pre-Construction Construction	Pre- and during-construction surveys to be carried out by an ECoW or suitably qualified ecologist. Requirement will form part of the SPP.	To ensure the safeguarding of protected species known or likely to be in the area.	Appointment of ECoW Forms part of SPP, and requirement of CEMP, which will be submitted to and approved by SLC in consultation with NatureScot.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Ecology	EC04	Pre-Construction Construction	Any micro-siting of infrastructure would be based on a review of existing ecological data and the completion of pre-construction surveys, to take into consideration the potential for direct encroachment onto protected species features, sensitive habitats or GWDTEs, or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micro-siting will also take consideration of any buffer distances on protected features identified, as detailed within the SPP.	To ensure any micro-siting does not adversely affect any sensitive ecological features.	ECoW to review all proposed micro-siting.
Ecology	EC05	Pre-Construction Construction	Construction works to proceed in accordance with the measures set out in the CEMP in relation to how the appointed Contractor will manage the works in accordance with all commitments and mitigation detailed in the EIAR, the SPP, statutory consents and authorisations, and good industry practice and guidance for environmental management, including implementation of appropriate pollution prevention and biosecurity (particularly in relation to watercourses). Outline CEMP provided in Technical Appendix 2.1 (EIAR Volume 4) .	Minimise impacts on habitats/protected species.	Forms part of the CEMP which will be approved by SLC in consultation with NatureScot.
Ecology	EC06	Construction	Biosecurity methods to be put in place to ensure there is no spread or release of signal crayfish including: - Boundaries should be clearly marked with appropriate signage for the catchment of water that flows into watercourses where signal crayfish are present versus those watercourses where signal crayfish are absent. - Separate plant should be used for operations in one catchment or another, or plant washed down if moved between these catchments.	To comply with legislation; prevent the introduction of signal crayfish into watercourses where the species is not currently known to have reached, and restrict the spread of the species across the Site.	Forms part of the CEMP (and SPP) which will be approved by SLC in consultation with NatureScot.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
			- A drive through wheel wash should be set up at key sites to prevent potential spread between catchments. - Personnel working on or between watercourses should ensure their clothing and footwear are cleaned where appropriate to prevent spread. - All vehicles leaving the infested area must be thoroughly pressure-washed in a designated wash-down area before being used for other work. - Material/water left after vehicles have been pressure-washed must be contained, collected and disposed of appropriately. Measures will be included as part of the CEMP and SPP.		
Ecology	EC07	Operation	The Proposed Development will utilise the method of reduced rotation speed whilst idling by feathering for all turbines, to reduce collision risks to bats during the bat active period (April to October). This measure will be put in place from the start of the operational period of the Proposed Development.	To mitigate potential collision risks to bats during the bat active period.	Through operational procedures.
Ecology	EC08	Operation	Operational phase environmental management plans following relevant best practice and guidance will be in place during operation of the Proposed Development, these will for example include provisions for, but not limited to, ongoing pollution prevention control measures.	To ensure operational activities are carried out in a such a manner to reduce impacts on the environment.	Through operational procedures.
Ecology	EC09	Decommissioning	Based on the time between construction and decommissioning, the mitigation required at decommissioning cannot be accurately identified at this stage. However, it will include decommissioning surveys, adherence to the DEMP, presence of an ECoW and adherence to a SPP.	To minimise risks to habitats and species during the decommissioning phase of the Proposed Development.	DEMP submitted to SLC for approval in consultation with NatureScot.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Ecology	EC10	Construction Operation	Implementation of a Biodiversity Enhancement Management Plan (BEMP). The BEMP aims to achieve significant biodiversity enhancement at the Proposed Development. The BEMP includes provisions for the protection, maintenance, restoration and/or enhancement of blanket bog and peatland and upland habitats locally (including within the Shiel Dod SSSI) and within the Site. Furthermore, the BEMP will deliver additional proposals including native broadleaved woodland and riparian corridor creation, and grassland enhancement to benefit waders and biodiversity in general. The Outline BEMP is provided in Technical Appendix 6.7 (EIAR Volume 4). The OBEMP is based on a number of identified habitat management units (HMU) for each respective habitat management and biodiversity enhancement proposal. These HMUs will likely be refined following further specialist surveys and feedback from relevant consultees and the Applicant remains committed to delivering significant biodiversity enhancement at the Proposed Development.	Ensure the Proposed Development secures significant biodiversity enhancements.	The aims, objectives and prescriptions of management measures outlined in the BEMP to be agreed and finalised with SLC, in consultation with NatureScot, relevant landowners and the advisory of an appointed Biodiversity Advisory Committee (BAC).

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Ornithology	OR01	Pre-construction Construction Operation Decommissioning	Bird Disturbance Management Plan (BDMP) to be prepared which details good practice and species-specific measures to be implemented during construction, decommissioning and where relevant during operational maintenance activities. Additional species-specific measures for black grouse are to be included informed by pre-commencement surveys: 750 m buffer to be applied around any identified active lek locations, within which suitable working restrictions would be applied before 9am in the months of April and May; - installation of markers on any required temporary fencing; and - no blasting to be undertaken before 9am in the months of April and May.	To enable legislative compliance and safeguarding of all wild and sensitive bird species including those listed on Schedule A1, 1 and 1 A of the Wildlife and Countryside Act 1981 (as amended).	BDMP submitted to SLC for approval in consultation with NatureScot.
Ornithology	OR02	Pre-construction Construction Decommissioning	Suitably qualified ECoW to be appointed prior to construction to advise appointed Contractor on all ornithological matters. ECoW required to be present on-site during construction phase and will carry out monitoring of works and briefings with regards to ornithological sensitivities to the relevant staff of the appointed Contractor and sub-contractors.	To oversee the implementation of the BDMP and ensure all reasonable precautions are taken to avoid disturbance to birds and comply with environmental legislation.	Appointment of ECoW.
Ornithology	OR03	Construction Operation Decommissioning	Construction works to proceed in accordance with measures set out in CEMP in relation to how the appointed Contractor will manage works in accordance with commitments and mitigation detailed in the EIAR, BDMP, statutory consents and authorisations, and good industry practice and guidance for environmental management. Outline CEMP provided in Technical Appendix 2.1 (EIAR Volume 4) .	To ensure works are undertaken in accordance with industry standards and temporary working areas, including borrow pits, are restored.	Forms part of the CEMP which will be approved by SLC in consultation with NatureScot.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Ornithology	OR04	Operation	Operational carcass recovery protocol would be prescribed and implemented for the Proposed Development. This would include for regular searching of the turbine array area for fallen livestock and removal to an agreed disposal site.	Minimise collision mortality risks for red kite.	Submitted to SLC for approval in consultation with NatureScot.
Ornithology	OR05	Operation	Biodiversity Enhancement Management Plan (BEMP) (refer to EC10) will serve to improve nesting and foraging opportunities for the breeding waders, black grouse, nightjar and foraging raptors, including in areas away from operational infrastructure.	Ensure the Proposed Development secures significant biodiversity enhancements.	The aims, objectives and prescriptions of management measures outlined in the BEMP will be agreed and finalised with SLC, in consultation with NatureScot, relevant landowners and the advisory of an appointed Biodiversity Advisory Committee (BAC).
Hydrology/ Hydrogeology	HH01	Pre-Construction Construction	Preparation of a CEMP to include best working practice to be employed at the Site, particularly with respect to works on or near watercourses and measures for the control of pollution (including sediment laden water) at the Site. The CEMP will include construction methods and environmental protection measures applying best practice guidance as set out in applicable SEPA Guidance for Pollution Prevention. Implementation of these measures during all aspects of the construction phase will ensure construction activity will not cause adverse effects to sensitive receptors. Outline CEMP is provided in Technical Appendix 2.1 (EIAR Volume 3a) .	Mechanism for implementation of best working practice in relation to the water environment.	Forms part of the CEMP to be approved by SLC, in consultation with SEPA.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology/ Hydrogeology	HH02	Pre-Construction Construction	Appointed Contractor to compile a Pollution Prevention Plan (PPP) which will include details of proposals for the storage and handling of potentially contaminative materials, construction phase Sustainable Drainage Systems (SuDS), construction site plans and proposed drainage management measures.	To ensure water quality is maintained and prevent the release of pollutants to the water environment.	Forms part of CEMP which will be submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH03	Pre-Construction Construction	Storage of potentially contaminative materials at least 50 m from watercourses. Fuels, oils or chemicals stored on-site will be located over an impervious base and in accordance with the Environmental Authorisations (Scotland) Regulations 2018 (EASR). Petrol interceptors and spill kits will be utilised where chemical spillage is a possibility.	To ensure water quality is maintained and prevent the release of pollutants to the water environment.	Forms part of CEMP/PPP which will be submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH04	Pre-construction Construction	Implementation of construction phase SuDS to provide a surface water management and treatment train. Measures will ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased.	To ensure water quality is maintained and maintain pre-development run-off rates.	Forms part of CEMP which will be submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH05	Construction	Installation of SuDS measures to be supervised by the ECoW.	Management of surface water runoff rates and prevention of the release of sediment laden water.	Appointment of ECoW and requirement detailed in the CEMP to be approved by SLC in consultation with SEPA.
Hydrology/ Hydrogeology	HH06	Pre-Construction Construction	Any requirement for monitoring of water quality within watercourses downstream of the Proposed Development will be approved by SLC in consultation with SEPA and procedures for this will be detailed in the CEMP.	Monitor the effectiveness of mitigation measures implemented at the Site with regards to water quality.	Forms part of CEMP which will be approved by SLC in consultation with SEPA
Hydrology/ Hydrogeology	HH07	Pre-Construction Construction	Sediment capture methods to be implemented at the Site will be detailed in a Drainage Impact Assessment (DIA). DIA to be prepared by the appointed Contractor.	Prevention of the release of sediment laden water.	Submitted to SLC for approval.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology/ Hydrogeology	HH08	Pre-Construction Construction	Detailed proposals for the management of surface water runoff at the Site will be prepared by the appointed Contractor. These proposals will be submitted to SLC for approval in consultation with SEPA.	Management of surface water runoff rates and prevention of the release of sediment laden water or pollutants to controlled waters.	Submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH09	Pre-Construction Construction	Drainage design to be prepared by the appointed Contractor at the detailed design stage to ensure that surface water supply is maintained to downslope habitats. Measures to include: ▪ Installation of upslope cut off drains to collect surface water runoff from upslope locations and distribute runoff to downslope areas; ▪ Installation of cross drains below tracks at regular intervals to ensure the distributed conveyance of runoff across linear features (i.e., the collection and downslope release of runoff should not create new preferential surface water flow paths); ▪ Consideration to be given to the installation of granular, permeable sub-base materials on tracks to maintain flows of soil water; and ▪ Installation of SuDS measures to ensure the settlement of sediments, prior to distributed release over downslope vegetated area.	Distribution of surface water to potentially sensitive habitats.	Submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH10	Pre-Construction Construction	Watercourse crossings to be designed, in line with SEPA requirements, to accommodate flows of a 1 in 200 (0.5%) annual probability, inclusive of an allowance for climate change. Additionally, watercourse crossing designed to minimise disruption to bed and banks and allow the continued passage of aquatic and non-aquatic species.	Flood risk management, watercourse protection.	Watercourse Crossing Plan to be submitted to SLC for approval in consultation with SEPA.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
			Closed culverts, where employed, will be oversized to allow naturalisation of the culvert bed substrate, ensuring they don't obstruct passage of fish or other fauna. Watercourse Crossing Plan to be prepared by appointed Contractor setting out details of all watercourse crossings.		
Hydrology/ Hydrogeology	HH11	Pre-Construction Construction	Eastern Access track level will be raised above the 1 in 200 with climate change flood level to maintain access to the Site. Any sections of raised track would be designed to ensure no upstream increase in flood risk would occur i.e. suitable additional capacity would be provided at the crossing or flow paths provided below the track.	Flood risk management, watercourse protection.	Submitted to SLC for approval in consultation with SEPA.
Hydrology/ Hydrogeology	HH12	Operation	Site maintenance programme with regard to site plant and infrastructure will be implemented by the appointed Contractor. Programme to include a maintenance schedule which would be developed for all SuDS and drainage assets, including watercourse crossings, installed at the construction stage to ensure that the function and benefit provided by the assets remains for the lifetime of the Proposed Development.	Ensure the effective operation of SuDS and prevent as far as practicable alteration to in-channel or overland flow regimes during operation. measures during the operational phase.	Maintenance Programme submitted to SLC for approval.
Hydrology/ Hydrogeology	HH13	Operation	All maintenance during operation to be carried out in accordance with pollution prevention guidance, setting out best practice measures for working with potentially contaminative materials (e.g., oils and fuels) and spill response procedures in case of the unlikely event of accidental release.	Minimise contamination of soils and prevent the release of pollutants to the water environment.	Forms part of CEMP/PPP which will be submitted to and approved by SLC in consultation with SEPA.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology/ Hydrogeology	HH14	Decommissioning	At the time of decommissioning, a DEMP would be prepared and implemented by an appointed Contractor. It is likely that a DEMP would include mitigation measures implemented during the construction phase for protection of the water environment.	Ensure the protection of the water environment during the decommissioning phase.	Submitted to and approved by SLC in consultation with SEPA.
Geology and Soils	GE01	Pre-Construction Construction	Preparation of a CEMP to include best working practice to be employed at the Site, particularly with respect to works on or near peat/carbon rich soils. Outline CEMP is provided in Technical Appendix 2.1 (EIAR Volume 3a) .	Mechanism for implementation of best working practice in relation to management of peat/carbon rich soils.	Submitted to and approved by SLC in consultation with SEPA.
Geology and Soils	GE02	Pre-Construction Construction Operation	The appointed Contractor would prepare a detailed Peat Management Plan (PMP) prior to the commencement of construction. PMP will also include operational mitigation as required. Outline PMP provided in Technical Appendix 8.5 (EIAR Volume 4) .	Mechanism for implementation of best working practices in relation to peat/carbon rich soils.	Submitted to and approved by SLC in consultation with SEPA.
Geology and Soils	GE03	Pre-Construction Construction Operation	Measures to manage peat slide risk (as detailed in the PLHRA (Technical Appendix 8.6, EIAR Volume 4)) to be included in the detailed PMP (refer to GE02). To include standard mitigation measures and specific measures such as micrositing of infrastructure following additional post-consent ground investigation. Where micrositing is not practicable then excavation of the peat to remove the potential risk would be required.	To manage the risk of peat land slide at the Site.	Updated PHLRA based on detailed design submitted to and approved by SLC in consultation with SEPA.
Geology and Soils	GE04	Pre-Construction Construction	Micrositing tolerances to be used in the event of encountering unexpected pockets of deep peat. All micrositing to be supervised by a ECoW or appropriately experienced engineer.	To reduce as far as practicable the potential for loss/ disturbance to peat and carbon rich soils.	Appointment of ECoW who would review all proposed micrositing.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Geology and Soils	GE05	Decommissioning	At the time of decommissioning, a DEMP to be prepared and implemented by an appointed Contractor. It is likely that a DEMP would include mitigation measures implemented during the construction phase for protection of the peat/carbon rich soils.	Ensure the protection of peat/carbon rich soils during the decommissioning phase.	Submitted to and approved by SLC in consultation with SEPA.
Traffic and Transport	TT01	Construction	Construction Traffic Management Plan (CTMP) would be prepared and implemented. The CTMP would include, but is not limited to, the following measures: ▪ Agreement on Abnormal Indivisible Loads (AIL) route modification and improvements; ▪ Staff Travel Plan; ▪ Transport Management Plan for AIL deliveries; ▪ Specific training and disciplinary measures to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway; ▪ Establishment of wheel cleaning facilities at the Site entrance; ▪ Appropriate traffic management on relevant roads to avoid conflict with general traffic; ▪ Adoption of a voluntary reduced speed limit for all construction vehicles, as required; and ▪ Induction and toolbox talk safety briefings for all drivers.	To reduce potential effects on road users.	To be submitted to SLC for approval in consultation with Transport Scotland.
Traffic and Transport	TT02	Construction	Any damage to road infrastructure caused directly by construction traffic will be made good, and street furniture that is removed on a temporary basis will be fully reinstated. Any damage caused by traffic associated with the Proposed Development, during the construction period that would be hazardous to public traffic, will be repaired immediately.	To mitigate any damage caused by traffic associated with the Proposed Development.	Forms part of the CTMP which will be submitted to and approved by SLC in consultation with Transport Scotland.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
			There will be a regular road review and any debris and mud will be removed from the carriageway using an on-site road sweeper to ensure road safety for all road users.		
Traffic and Transport	TT03	Construction	Abnormal Indivisible Load (AIL) Transport Management Plan would be prepared to cater for all AIL movements to and from the Proposed Development. To include: - Procedures for liaising with the emergency services to ensure that police, fire, and ambulance vehicles are not impeded by the loads. - Diary of proposed delivery movements to liaise with local communities to avoid key dates such as popular local events etc. - Protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic. - Proposals to establish a construction liaison committee to ensure the smooth management of the Proposed Development/public interface with the Applicant, the Contractor, the local community, and if appropriate, the police forming the committee.	To reduce potential effects on road users.	Forms part of the CTMP which will be submitted to and approved by SLC in consultation with Transport Scotland, emergency services and relevant stakeholders.
Traffic and Transport	TT04	Construction	Information on the wind turbine convoys provided to local media outlets such as local papers and local radio. Applicant to ensure information is distributed through its communication team via the project website, local newsletters, and social media.	To assist residents in understanding the timing of the AIL convoy movements and may help reduce any potential conflicts.	To be agreed with SLC and Transport Scotland.
Traffic and Transport	TT05	Construction	Police escort, supplemented with civilian pilot car, will facilitate the delivery of the AILs.	To facilitate the delivery of the predicted AILs.	To be agreed with SLC, Police Scotland and Transport Scotland.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
			Proposed that advance escort will warn oncoming vehicles of the convoy, with one escort staying with the convoy at all times. The escorts and convoy to remain in radio contact where possible. AIL convoys will be no more than three AILs vehicles, or as advised by the police, to permit safe transit, and to allow limited overtaking opportunities. Times in which the convoys will travel will be agreed with Police Scotland who have sole discretion on when loads can be transported.		
Traffic and Transport	TT06	Construction	Staff Travel Plan to manage arrival and departure of staff and encourage sustainable modes of transport, especially car-sharing. Measures could include: ▪ Appointment of a Travel Plan Coordinator (TPC); ▪ Provision of public transport information; ▪ Mini-bus service for transport of Site staff; ▪ Promotion of a car sharing scheme; ▪ Car parking management; and ▪ Restrictions on parking, for example on the public road network and verges in the vicinity of the Site entrance.	To manage the arrival and departure profile of staff and to encourage sustainable modes of transport, especially car-sharing.	Forms part of the CTMP which will be submitted to SLC for approval in consultation with Transport Scotland.
Traffic and Transport	TT07	Construction Operation	Detailed Outdoor Access Management Plan (OAMP) will be developed prior to construction for the management of public access and recreational amenities during the construction and operation of the Proposed Development. To include provisions for the temporary and permanent diversions of the Southern Upland Way (SUW). A framework for the preparation of the detailed OAMP is provided as part of the EIAR within Technical Appendix 9.2 (EIAR Volume 4).	To provide a comprehensive framework for the management of public access and recreational amenities during the construction and operation of the Proposed Development.	To be submitted to and approved by SLC.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Traffic and Transport	TT08	Decommissioning	A decommissioning phase Traffic Management Plan will be prepared prior to decommissioning.	To reduce potential effects on road users.	To be submitted to SLC for approval in consultation with Transport Scotland.
Noise	NO01	Construction	Good site practices for construction of the Proposed Development will be implemented to minimise the likely effects as per Section 8 of BS 5228-1:2009+A1:2014. Measures to include: ▪ Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern. ▪ Ensure that any extraordinary site work continuing throughout 24 hours of a day (for example, crane operations lifting components onto the tower) will be programmed, when appropriate, so that haulage vehicles will not arrive at or leave the site outside of core hours or other specific delivery hours, with the exception of abnormal loads that will be scheduled to avoid significant traffic flows. ▪ Ensure all vehicles/mechanical plant are fitted with effective exhaust silencers and subject to programmed maintenance. ▪ Select inherently quiet plant where appropriate - all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever machines are used. ▪ Fit all ancillary pneumatic percussive tools with mufflers or silencers of the type recommended by the manufacturers. ▪ Instruct that machines will be shut down between work periods or throttled down to a minimum.	To reduce noise impacts from construction activities at Noise Sensitive Receptors (NSR).	Forms part of the CEMP which would be submitted to and approved by SLC.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
			- Regularly maintain all equipment used on site, including maintenance related to noise emissions. - Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation. - Ensure all ancillary plant such as generators and pumps are positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures should be provided. Measures to form part of the CEMP, with an outline CEMP provided in Technical Appendix 2.1 (EIAR Volume 4).		
Noise	NO02	Decommissioning	Good site practices for decommissioning of the Proposed Development will be implemented to minimise the likely effects as per Section 8 of BS 5228-1:2009+A1:2014. Measures would include those noted above for construction. These measures will be included in the DEMP.	To reduce noise impacts from decommissioning activities at NSR.	Forms part of the DEMP which would be submitted to SLC for approval.
Noise	NO03	Construction	Eastern Access road junction upgrades and access track construction/upgrade to take place during BS 5228 Daytime hours only.	Minimise construction noise levels and restrict the noisiest activities to Daytime periods as defined in BS 5228.	Forms part of the CEMP which would be submitted to SLC for approval.
Noise	NO04	Operation	Noise limits to be conditioned and requirement for mode management to be confirmed for final selected wind turbine model.	Ensure that operational noise levels meet acceptable noise limits	Operational Noise Condition stating noise limits.
Aviation	AV01	Pre-construction	Provision of details of the Proposed Development, including the location of the turbines and turbine dimensions, to SLC, the MoD and Civil Aviation Authority (CAA).	Enable the Proposed Development to be marked on aeronautical charts prior to construction.	Submitted to SLC, MoD and CAA.

Table 13.1: Schedule of Mitigation and Environmental Management Measures					
Topic	Mitigation ID	Timing of Mitigation Measure	Description	Purpose of Mitigation Measure	Means of Implementation
Aviation	AV02	Pre-construction/ Construction	Provision of aviation lighting as required in UK civil air law, derived from international standards and recommended practices promulgated by the International Civil Aviation Organisation (ICAO). Refer to LV02 or details of reduced lighting scheme.	Enable aircrew flying at low level at night to identify the wind farm.	Lighting scheme submitted to SLC for approval in consultation with the Civil Aviation Authority (CAA).
Aviation	AV03	Pre-Construction Construction	Infra-red lighting installed on all turbines.	Enhance wind farm visibility to military aircrew using night vision systems.	Lighting scheme submitted to SLC for approval in consultation with MoD.
Aviation	AV04	Pre-Construction	Adjustment of elevation beam and radar data processing parameters on Lowther Hill PSR.	Mitigate the effects of the wind farm on the Lowther Hill and Cumbernauld PSRs	Approval by NERL Engineering and ATC; signature of mitigation contract with NERL.
Aviation	AV05	Pre-Construction	Re-design of Prestwick Airport IFP charts to accommodate required increases in procedure minimum altitudes prior to the construction.	Accommodate required increases in procedure minimum altitudes	Requires commissioning of IFP Assessment from Prestwick Airport's APDO; approval by Prestwick Airport ATC; and approval by CAA.
Shadow Flicker	SF01	Pre-construction Construction Operation	Prior to the erection of the first turbine, a Wind Farm Shadow Flicker Protocol will be submitted to and approved by SLC. Protocol will set out the steps to be followed should a shadow flicker complaint be received from a receptor within the study area and potential mitigation measures. Mitigation measures may include the provision of internal/external screening at the property of the complainant, or programming of the turbines.	To reduce shadow flicker effects to a non-significant level at the property of a complainant.	Shadow Flicker Protocol to be submitted to SLC for approval.

