Ravengill Energy Park

Environmental Impact Assessment Report

Volume 2: Main Report

June 2026

Contents

Glossary and Abbreviations

Glossary	
Term	**Definition**
Abnormal Indivisible Load	A load that cannot be divided into smaller, more manageable parts.
Acoustic screening	The presence of a solid barrier (natural landform or manmade) between a source of sound and a receiver that interrupts the direct line of sight between the two, thus reducing the sound level at the receiver compared to that in the absence of the barrier.
Ambient noise	All-encompassing noise associated with a given environment, usually a composite of sounds from many sources both far and near, often with no particular sound being dominant.
Annoyance	A feeling of displeasure in this case evoked by noise.
Annual Average Daily Traffic	The average over a full year of the number of vehicles passing a point in the road network each day.
Automatic Traffic Count	Data used to support transport planning and design.
Background noise	The noise level rarely fallen below in any given location over any given time period, often classed according to day time, evening or night time periods (for the majority of the population of the UK the lower limiting noise level is usually controlled by noise emanating from distant road, rail or air traffic).
Balance of Plant	Contractor responsible for all infrastructure and facilities of a project, excluding the main generating equipment itself.
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	Plan of habitat enhancement and management measures to be included as part of the Proposed Development.
Bird Disturbance Management Plan	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	500 m buffer used to create the analysis area for collision modelling.
Construction Traffic Management Plan	Document which outlines traffic management measures to mitigate adverse impacts associated with construction related traffic.
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.

Glossary

Term	Definition
dB(a)	Abbreviation for the decibel level of a sound that has been a-weighted.
Decibel	The unit normally employed to measure the magnitude of sound.
Department for Transport	Government Agency
Design Manual for Roads and Bridges	Details design criteria relating to roads and bridges in the UK and NI for the trunk road network.
Direct effects	Effects directly attributable to the Proposed Development.
EIA Report	A report that assesses the potential environmental impact of the Proposed Development.
Energy Consents Unit	Scottish Government agency that deals with certain energy related planning applications.
Environmental Impact Assessment	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.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations).
Environmental Impact Assessment Report	A document detailing the effects a project would have on the environment.
External noise level	The noise level, in decibels, measured outside a building.
Ground effects	The modification of sound at a receiver location due to the interaction of the sound wave with the ground along its propagation path from source to receiver.
Heavy Goods Vehicle	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.
Key Characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
L_{A10}	The abbreviation of the 10-percentile noise indicator, often used for the measurement of road traffic noise.
L_{A90}	The abbreviation of the 90-percentile noise indicator, often used for the measurement of background noise.
L_{Aeq}	The abbreviation of the a-weighted equivalent continuous sound pressure level.
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.

Glossary	
Term	**Definition**
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.
Level	The general term used to describe a sound once it has been converted into decibels.
Light Goods Vehicles	All commercial vehicles < 3.5 tonnes gross maximum weight.
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.
Miles Per Hour	Unit of measurement of speed.
National Cycle Network	Designated National Cycle Network Routes within the UK.
National Planning Framework 4	National spatial planning strategy for Scotland.
Noise	Physically: a regular and ordered oscillation of air molecules that travels away from the source of vibration and creates fluctuating positive and negative acoustic pressure above and below atmospheric pressure. Subjectively: sound that evokes a feeling of displeasure in the environment in which it is heard, and is therefore unwelcomed by the receiver.
Noise emission	The noise emitted by a source of sound.
Noise immission	The noise to which a receiver is exposed.
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	Port from which AILs are to be delivered.
Proposed Development	Ravengill Renewable Energy Park and associated infrastructure and ancillary features.
Receiver	A person or property exposed to the noise being considered.
Residential Visual Amenity Threshold	Where visual effects would result in serious harm to living conditions or residential amenity.
Residual effects	Effects attributable to the Proposed Development following assessment of any proposed design mitigation/ enhancements.
Residual noise	The ambient noise that remains in the absence of the specific noise whose effects are being assessed.

Glossary	
Term	**Definition**
Scenarios	Combinations of wind farm developments at different stages in the planning system, used in the cumulative assessment.
Scoping Opinion	Determines the extent of the issues to be assessed and reported in the Environmental Impact Assessment Report.
Scoping Report	Defines the scope, key issues, and methodology for a project reported in the Environmental Impact Assessment Report.
Sensitivity	The specific receptors' (landscape or visual) 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. Viewpoint sensitivity depends on the context of the viewpoint; its importance; the current occupation and viewing opportunity of the groups of people being considered; and the number of people affected.
Significance of effect	A measure of the importance or gravity of the environmental effect as defined by significance criteria specific to the environmental topic.
Site	The area within the Site Boundary within which the Proposed Development lies.
Site of Special Scientific Interest	Statutory designation.
South Lanarkshire Council	South Lanarkshire Council
Special Protection Area	Statutory designation.
Study Area	The area for which the LVIA is concerned.
The Institute of Sustainability and Environmental Professionals	The Institute of Sustainability and Environmental Professionals.
Traffic Management and Monitoring Plan	Document which outlines traffic management measures to mitigate adverse impacts associated with construction related traffic for a number of projects.
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.
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 receptors	Individuals and/ or groups of people who have the potential to be affected by the Proposed Development.
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	**Description**
ACIfA	Associate of Chartered Institute for Archaeologists
ACoW	Archaeological Clerk of Works
ADLS	Aircraft Detection Lighting System
AECS	Agri-Environmental Climate Scheme
AEP	Annual Exceedance Probability
AGA	Air-Ground-Air communications
agl	above ground level
AIL	Abnormal Indivisible Load
AIP	Aeronautical Information Publication – published by NATS on behalf of the CAA – providing free aeronautical information for pilot and other aviation stakeholders
AM	Amplitude Modulation
amsl	above mean sea level
AIL	Abnormal Indivisible Load
ANO	Air Navigation Order
ANSP	Air Navigation Service Provider
AOD	Above Ordnance Datum
ATC	Automatic Traffic Count
ATC	Air Traffic Control
ATS	Air Traffic Service
AWI	Ancient Woodland Inventory
BDMP	Bird Disturbance Management Plan
BEMP	Biodiversity Enhancement Management Plan
BESS	Battery Energy Storage System
BGS	British Geological Survey
BoCC	Birds of Conservation Concern
BoP	Balance of Plant
BP	Borrow Pit
BS	British Standard
BTO	British Trust for Ornithology
C/I	Carrier / Interference
CA	Conservation Area
CAA	Civil Aviation Authority
Cd	Candela
CEMP	Construction Environmental Management Plan
CEnv	Chartered Environmentalist
CIEEM	Chartered Institute of Ecology and Environmental Management
CIfA	Chartered Institute for Archaeologists
CNS	Communications, Navigation and Surveillance

Abbreviations	
Abbreviation	**Description**
CoPA	The Control of Pollution Act
CRAA	Collision Risk Analysis Area
CRM	Collision Risk Model
CRTN	Control of Road Traffic noise
CTMP	Construction Traffic Management Plan
d/s	Downstream
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
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
DWPAs	Drinking Water Protected Areas
EASR	Environmental Authorisations (Scotland) Regulations
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
ECU	Energy Consents Unit
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EKA	Eskdalemuir Seismological Recording Station / Array
EnvCoW	Environmental Clerk of Works
FL	Flight Level
FLI	Fellow of the Landscape Institute
GA	General Aviation
GCN	Great Crested Newt
GDL	Inventory Garden and Designed Landscape
GET	Golden Eagle Topographical
GIS	Geographic Information System
GLA	Glasgow Airport
GLTA	Ground Level Tree Assessment
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GPA	Glasgow Prestwick Airport
GPG	Good Practice Guide
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HER	Historic Environment Record
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicle

Abbreviations	
Abbreviation	**Description**
HRA	Habitats Regulation Appraisal
ICAO	International Civil Aviation Organisation
IDW	Inverse Distance Weighted
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
IES	Institute of Environmental Science
IFP	Instrument Flight Procedures
IIZ	Impact Interference Zone
INNS	Invasive Non-Native Species
IOA	Institute of Acoustics
IOF	Important Ornithological Feature
IR	Infra-red
ISEP	Institute of Sustainability and Environmental Professionals
JNCC	Joint Nature Conservation Committee
Km	Kilometre
LB	Listed Building
LCT	Landscape Character Type
LDP	Local Development Plan
LFA	Low Flying Area
LGV / Lights	Light Goods Vehicles
LI	Landscape Institute
LNCS	Local Nature Conservation Site
LVIA	Landscape and Visual Impact Assessment
m	Metre
MCIWEM	Member of the Chartered Institution of Water and Environmental Management
MIEnvSc	Member of the Institute of Environmental Science
MOD	Ministry of Defence
mph	miles per hour
MRT	Multi-Radar Tracking
MSS	Marine Scotland Science
NATS	the holding company of NERL and NSL
NBN	National Biodiversity Network
NCI	Nature Conservation Importance
NCN	National Cycle Network
NCV	Nature Conservation Value
NERL	NATS (En Route) plc – the regulated monopoly providing en-route ATS in the UK
NHZ	Natural Heritage Zone

Abbreviations

Abbreviation	Description
NLS	National Library of Scotland
NPF4	National Planning Framework 4
NRHE	National Record of the Historic Environment
NSL	NATS (Services) Limited
NVC	National Vegetation Classification
NVD/NVG	Night Vision Device / Night Vision Goggles
OAMP	Outdoor Access Management Plan
OBEMP	Outline Biodiversity Enhancement Management Plan
OLS	Obstacle Limitation Surfaces
OPMP	Outline Peat Management Plan
ORRD	Onward Routed Radar Data
OS	Ordnance Survey
PAN	Planning Advice Note
PCA	Pearland Condition Assessment
PIA	Personal Injury Accident
PLHRA	Peat Landslide Hazard Risk Assessment
PMP	Peat Management Plan
PoE	Port of Entry
PPP	Pollution Prevention Plan
PRF	Potential Roost Feature
PSR	Primary Surveillance Radar
PWS	Private Water Supply
QQ	QinetiQ
RBD	River Basin District
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland
RLOS	Radar Line of Sight
RSPB	Royal Society for the Protection of Birds
RUN	Restoring Upland Nature
RVAA	Residential Visual Amenity Assessment
SBL	Scottish Biodiversity List
SEPA	Scottish Environment Protection Agency
SLC	South Lanarkshire Council
SM	Scheduled Monument
SNH	Scottish Natural Heritage (now NatureScot)
SPA	Special Protection Area
SPG	Supporting Planning Guidance
SPP	Species Protection Plan
SSGEP	South of Scotland Golden Eagle Project
SSR	Secondary Surveillance Radar

Abbreviations	
Abbreviation	**Description**
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
T	Turbine
TMA	Terminal Manoeuvring Area
TPC	Travel Plan Coordinator
TS	Transport Scotland
u/s	Up-stream
UHF	Ultra-High Frequency
UKBAP	UK Biodiversity Action Plan
VHF	Very High Frequency
WoSAS	West of Scotland Archaeology Service
WQFMP	Water Quality and Fish Monitoring Plan
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Introduction

1.1.1 This Environmental Impact Assessment Report (EIAR) has been prepared by Ramboll UK Limited (Ramboll) on behalf of Ravengill Energy Park Limited ('the Applicant') in relation to an application for consent[1] to construct and operate an electricity generating station with a generation capacity of greater than 50 MW ('the Application').

1.1.2 The project is to be referred to as Ravengill Energy Park ('the Proposed Development') within the EIAR. The Proposed Development would be located on a 2,555 hectare (ha) area ('the Site'), located approximately 530 m from Leadhills village (at its closest point) and 1 km south of Abington village, with the A74(M) motorway located to the east. The Site is entirely within the administrative boundary of South Lanarkshire Council (SLC) and its location is shown in **Figure 1.1**.

1.1.3 The Proposed Development includes 21 wind turbines with maximum blade tip height of 220 m above ground level (agl). It is expected that each wind turbine would have a rated capacity of around 7.0-7.5 MW per turbine giving a total generating capacity for the wind energy element of the Proposed Development >50MW. In addition, the Site will accommodate a battery energy storage system (BESS) approximately 50 MW capacity, capable of delivering 200 MWh of electricity.

1.1.4 The EIAR comprises five volumes:

- Volume 1: Non-Technical Summary (NTS);
- Volume 2: Main Report;
- Volume 3a: Figures;
- Volume 3b: Visualisations;
- Volume 4: Technical Appendices;
- Volume 5: Confidential Documents.

1.2 Purpose and Scope of the EIAR

1.2.1 The EIAR has been prepared to accompany an application to Scottish Ministers under Section 36 of the Electricity Act 1989[2]. 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 Environmental Management and Assessment (IEMA) Quality Mark Criteria.

1.2.2 The Proposed Development is of a type listed in Schedule 2 of the EIA Regulations (item (1) "a generating station"); and on the basis that "the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location" it is

[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 50MW and below are authorised under the Town and Country Planning (Scotland) Act 1997. Those over 50MW are authorised under Section 36 of the Electricity Act 1989.

considered that an EIA will be required. In this case, the Applicant has volunteered to undertake an EIA rather than request a formal screening opinion.

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

- up to 21 wind turbines with a maximum tip height of 220 m;
- permanent foundations supporting each wind turbine, and associated crane hardstanding at each wind turbine base;
- a temporary construction site entrance from the A74(M) motorway, to allow delivery of only abnormal indivisible loads (AIL) required for turbine component delivery. Empty AIL vehicles would return to the road network via the B797 road, rejoining the M74 at Junction 14;
- two new junctions on the B797 road for site traffic and two new junctions on the C class road between the B797 and Crawfordjohn, one to the west and one to the east;
- a series of new on-site access tracks with associated watercourse crossings (where the final layout dictates), which may include upgrade and/or relocation of existing access tracks across the Site;
- underground power cables, generally laid in trenches alongside access tracks;
- on-site substation and control building;
- temporary construction compounds and laydown areas; and
- a BESS, with approximately 50 MW capacity, co-located with the on-site substation; and
- four temporary construction compounds and laydown areas, the main one located adjacent to the substation and BESS sites and three satellite compounds: two located in the western area of the Site and the other located in the northern area.

1.2.4 In addition, the following ancillary works would be necessary:

- extraction of rock from borrow pits. Four borrow pit search areas have been located within the Site;
- temporary on-site concrete batching plant. This would be located within the temporary compound areas and/or one of the borrow pit search areas; and
- where necessary, works on land outside the main development area and immediately adjacent to the A74(M) to facilitate the delivery of AIL (e.g. construction of over-run areas and temporary modifications to street furniture etc).

1.3 Other Planning Documents

1.3.1 The EIAR is accompanied by the following documents that do not form part of the report:

- Planning Statement;
- Design and Access Statement;
- Pre-Application Consultation Report;
- Economic and Community Impact Report; and
- Community Benefit Statement.

1.4 Site Location

1.4.1 The Site, covering an area of approximately 2,554.5 hectares (ha), is located north of Leadhills village, south of Abington village and west of the A74(M) motorway. The Site predominantly comprises open moorland, improved grassland and semi-improved grassland, with areas of forestry located in the valleys, predominantly to the east of the B797. The Site terrain is undulating with multiple hills within the boundary such as Ravengill Dod (499 m Above Ordnance Datum (AOD)), Coom Dod (553 m AOD) and Brown Dod (489 m AOD). This landscape is typical of the wider location within the Southern Uplands.

1.4.2 There are multiple watercourses and waterbodies located within the Site, including tributaries of the River Clyde such as Glengonnar Water in the north, Snar Water in the west and Elvan Water in the south. The River Clyde lies approximately 1 km to east of the Site boundary at its closest point.

1.4.3 The immediate vicinity of the Site is sparsely populated, with settlement largely confined to the valleys. Key settlements within the vicinity of the Site include the villages of Leadhills, Abington, Elvanfoot, Wanlockhead, and Crawfordjohn. Other residential properties are located sporadically in the vicinity of the Site, with three residential properties located within the Site boundary.

1.5 Site History

1.5.1 This Site lies within the historic Leadhills–Wanlockhead mining district of South Lanarkshire, an area known for metal mining activity dating back to at least the sixteenth century. The upland landscape surrounding Leadhills has been shaped by centuries of mineral extraction, principally for lead, with additional working for silver, zinc, copper and gold. Mining activity in the wider district is recorded from the late 1500s and continued intermittently through to the early twentieth century, with the main period of intensive working occurring during the seventeenth to nineteenth centuries.

1.5.2 Lead mining is the dominant historic land use influence on the Site. Mineralisation occurs within steeply dipping veins, which were typically worked using underground methods accessed by vertical shafts and horizontal adits driven into hillsides. Evidence of the mining legacy in this area remains widespread in the form of abandoned shafts, adits, spoil tips, drainage levels and disturbed ground; some of which are visible within and adjacent to the Site.

1.5.3 The area is also historically important for gold extraction, particularly alluvial gold recovered from river and burn sediments. Evidence of former gold workings survives along watercourses within and near the Site, most notably around Shortcleuch Water and Long Cleuch. These activities have contributed to localised ground disturbance within valley floors and lower slopes.

1.5.4 Most mining activity within the Site had ceased by the mid-nineteenth century, although lead mining continued in parts of the wider Leadhills and Wanlockhead area until the early twentieth century. This was followed by a gradual reversion of the land to rough grazing and open moorland, which comprises the predominant land use today. The legacy of historic mining remains an important consideration for development, in terms of both ground conditions and cultural heritage, which is reflected in the designation of Scheduled Monuments within and adjacent to the Site.

1.5.5 In 2024, the Applicant commissioned Wardell Armstrong (now part of SLR Consulting) to undertake a Mining Risk Assessment for the Site as defined at the Scoping stage, which covered a larger area than the current Site boundary (see Figure 3.1, EIAR Volume 3a). The Mining Risk Assessment is included in **Technical Appendix 8.8, EIAR Volume 4**). The assessment confirmed that evidence of historic lead mining is present within the Site boundary across the central, western and eastern areas, although the extent and intensity of activity varies spatially. Mining within the central part of the site, particularly in the vicinity of Wellgrain Dod, Bulmer Moss and Long Cleuch, was the most extensive, with several named veins worked during the eighteenth and early nineteenth centuries. In contrast, mining in the western and eastern areas was more limited and largely comprised prospecting activity and isolated underground workings.

1.5.6 The history of mining in the area, and its potential environmental effects, are well documented and have been taken into account in the preparation of this EIAR. Potential contamination risk arising from historic mining activity, including the risk of mobilisation of contaminants, are addressed in **Chapter 8: Hydrology, Hydrogeology and Geology (EIAR Volume 2).** Chapter 8 sets out the mitigation measures to be implemented throughout the construction, operation and decommissioning phase of the Proposed Development, including but not limited to, pre-construction investigation to ensure site safety. Mitigation measures would be formalised within the Construction Environmental Management Plan (CEMP) before construction begins, and would include, where relevant, regular sampling of soil, water and vegetation, together with defined management procedures for excavations and soil disturbance.

1.6 The Applicant

1.6.1 Ravengill Energy Park Ltd is a wholly owned subsidiary of Renewco Power Limited. Renewco Power is a renewable energy developer focussed on developing utility-scale wind, solar and energy storage projects across the UK and Europe. Headquartered in Glasgow and with offices in Edinburgh and London, Renewco Power blends experienced entrepreneurial talent with commercial, operational and technical expertise across the clean energy and environmental sectors. The team have developed and delivered wind, solar and BESS projects across the UK and internationally.

1.7 EIA Process

1.7.1 EIA is a process that includes the identification, description and assessment of the potential significant environmental effects (both beneficial and adverse) of a proposed development and proposes mitigation to avoid, reduce and offset any adverse environmental effects.

1.7.2 As stated above, the Proposed Development is of a type listed in Schedule 2 of the EIA Regulations (item (1) "a generating station"). On the basis that "*the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location*", an Environmental Impact Assessment (EIA) is required.

1.7.3 All relevant assumptions made and limitations inherent to the EIA have been recorded with a view to demonstrating that the resulting EIAR provides a robust basis upon which the competent authorities can make a planning determination.

1.7.4 The key stages in the EIA process adopted for the Proposed Development to date are summarised below.

Scoping and Consultation

1.7.5 The Applicant submitted a request for a Scoping Opinion (ECU00006172) to Scottish Ministers in relation to the Proposed Development under the EIA Regulations on 5th June 2025. This request was accompanied by a Scoping Report, 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.

1.7.6 A Scoping Opinion was received from ECU on 10th September 2025. The contents of this and other consultation responses received are summarised in **Technical Appendix 1.1: Consultation Register (EIAR Volume 4)**, along with a list of all bodies consulted during the scoping exercise.

1.7.7 In addition to seeking a Scoping Opinion, the Applicant conducted a public consultation event to seek the views of the local community.

1.7.8 A first round of consultation events were held as follows:

- 20th May 2025, Leadhills Community Hall; and
- 21st May 2025, Crawfordjohn Community Hall.

1.7.9 A further round of public consultation was undertaken as follows:

- 10th February 2026, in Leadhills Community Hall; and
- 11th February 2026, in Crawfordjohn Community Hall.

1.7.10 For the purposes of this project and other projects in the local area, the Applicant established a Community Liaison Group (CLG) in Spring 2025, comprised of representatives from Renewco Power Limited and the following community councils: Duneaton, Douglas, Crawford & Elvanfoot, Syminghton, Quothquan & Thankerton, and Carmichael. Formal meetings have taken place on a bi-monthly basis.

1.7.11 A summary of the representations received during the public consultation events is provided in the Pre-Application Consultation Report submitted with the consent application.

1.7.12 Further detail on the key issues identified through the scoping and consultation process are described in **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.

1.7.13 The Applicant submitted a Gate Check Report to the Energy Consents Unit (ECU) on 6th February 2026.

1.7.14 Following scoping and baseline characterisation, the EIAR provides an impact assessment chapter for each of the following topics:

- Landscape and visual amenity;
- Cultural heritage;
- Ecology;
- Ornithology;
- Hydrology, hydrogeology and geology;
- Traffic and transport; and
- Noise.

Topics Scoped Out of the EIAR

1.7.15 During the scoping process, there were a number of areas where it was identified that the Proposed Development would not give rise to significant effects on the environment. These areas are described below.

AIR QUALITY

1.7.16 The Proposed Development is not considered likely to give rise to significant effects on air quality. There is potential for it to give rise to some localised and temporary construction-related air quality effects associated with dust (e.g. from foundation construction and the passage of vehicles along access tracks) and construction plant and traffic exhaust emissions. However, the nature of air quality impacts associated with the construction activities is that they will be relatively short term, intermittent and controllable through the application of good construction practice, and also at sufficient distance from sensitive receptors to be considered low/negligible impact.

1.7.17 The potential for nuisance effects on residential or recreational amenity will be limited and will be strictly controlled in accordance with a detailed Construction Environmental Management Plan (CEMP). An Outline CEMP is included in **Technical Appendix 2.1 (EIAR Volume 4)**. On this basis, there is no potential for significant construction or operational air quality effects, and no Air Quality assessment has been undertaken as part of the EIAR.

CLIMATE CHANGE

1.7.18 The Proposed Development itself will contribute to climate change mitigation through the production of renewable energy and a corresponding reduction in carbon emissions from other more carbon intensive generation sources.

1.7.19 However, it is acknowledged that the Proposed Development will still give rise to carbon emissions associated with its construction. Accordingly, a Carbon Balance assessment has been prepared and submitted as a Technical Appendix to the EIAR (**Technical Appendix 2.3, EIAR Volume 4**). The report includes a calculation of the expected carbon savings over the lifetime of the Proposed Development and is presented using the latest version of the Scottish Government's Carbon Calculator Tool[3]. This remains the suitable standardised tool for use in relation to net carbon saving calculations for wind farm developments across the UK.

1.7.20 The assessment has been undertaken in accordance with the Scottish Government's recommended methodology[4] and presents the carbon emissions associated with ground conditions, access preparations, foundation excavations, materials used on-site (including carbon associated with the manufacturing of turbine components), the transportation of materials and components to Site, and any other carbon loss (e.g. through the degradation of peat / peaty soils).

1.7.21 The vulnerability of the Proposed Development to climate change has been considered as part of the detailed design process, which considered the potential consequences of climate change

[3] Available at https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/ [Accessed June 2026]

[4] Nayak et. al., (2010) Scottish '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/ [Accessed January 2026]

(e.g. increased flood risk potential and more extreme weather conditions). Embedded mitigation includes but is not limited to Sustainable Drainage System (SuDS), ultrasonic anemometers and remote operational control system (controller and SCADA systems) which is linked to an ice detection application and fire detection and warning systems. Therefore, no further assessment of the vulnerability of the Proposed Development to climate change, climate change resilience has been undertaken.

Population and Human health

1.7.22 The EIAR considers human health in terms of amenity through the assessment of potential likely significant effects associated with water supplies (**Chapter 8, EIAR Volume 2**), noise (**Chapter 10, EIAR Volume 2**), traffic (**Chapter 9, EIAR Volume 2**), visual amenity (**Chapter 4, EIAR Volume 2**) and shadow flicker (**Technical Appendix 1.7, EIAR Volume 4**). The potential for impacts associated with any contamination that may be present due to past mining activity is considered in **Chapter 8 (EIAR Volume 2).** No other sources or pathways for effects on human health have been identified.

1.7.23 The potential for likely significant effects on "population" is considered through the socio-economics, recreation and tourism assessment presented in the separate Maximising Socio-**Economic Benefits Report**, submitted with the consent application. In addition, an Outdoor Access Management Plan has been prepared and is included in **Technical Appendix 9.2 (EIAR Volume 4)**.

1.7.24 Appropriate control measures to ensure potential effects on air and water quality are managed appropriately in the construction phase are addressed through an outline CEMP included in **Technical Appendix 2.1 (EIAR Volume 4)**.

As such a separate, human health impact assessment chapter is therefore not presented in the EIAR.

Risk of Major Accidents and/or Disasters

1.7.25 The construction, operation and decommissioning of the Proposed Development would be undertaken under relevant health and safety regulations including the requirements of the *Construction (Design and Management) Regulations 2015*[5]. A risk assessment process will be followed by the Principal Designer during the design stage, which will ensure that all potential risks are identified at an early stage and appropriate mitigation is implemented.

1.7.26 The risk of a major accident or disaster occurring as a result of the Proposed Development is therefore considered to be low. During the operation, routine maintenance inspections would be completed in order to ensure compliance.

1.7.27 Accordingly, assessment of major accidents and disasters has been scoped out from the EIAR. It should however be noted that a peat landslide risk assessment has been undertaken and included as **Technical Appendix 8.3: Peat Landslide Hazard and Risk Assessment (EIAR Volume 4)**.

[5] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents [Accessed June 2026].

Ice Throw and Ice Fall

1.7.28 When temperatures drop below freezing, it is possible for ice to accumulate on a turbine's blades. Subsequently, the ice can be thrown from the blade when the turbine is in operation, and it can also fall from the blade to the immediate area below the turbine (ice fall).

1.7.29 Modern wind turbines are designed to operate such that either ice does not accumulate on blades (through heating of blades during periods of weather where ice accumulation is possible), or if there is ice accumulation the turbine will automatically shut down (sensors on the blades detect ice accumulation and trigger shutdown) and so potential for ice throw from blades is avoided by design..

1.7.30 Standard mitigation for the risk of ice throw comprises off-site monitoring to enable the deactivation of turbines on sensing ice accumulation (if this is not fully automated), 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 and ice fall under certain weather conditions.

1.7.31 Considering the above, no potential significant effects as a result of ice throw or ice fall from the Proposed Development are anticipated and ice throw and ice fall are scoped out of the EIAR.

Forestry

1.7.32 According to the Scottish Government's National Scale Land Capability for Forestry Map[6], much of the Site is located on areas classified as Forestry Land F6: *Land with very limited flexibility for the growth and management of tree crops,* with smaller sections located on areas classified as Forestry Land F5: *Land with limited flexibility for the growth and management of tree crops*. There is a small area of commercial forestry located in the northwest of the Site.

1.7.33 It is anticipated that no areas of sensitive woodland or commercial forestry plantation would be affected by the Proposed Development. Therefore, there will be no requirement for the development of forestry felling and re-stocking proposals in accordance with The Scottish Government's Control of Woodland Removal Policy[7]. Any woodland re-planting on-site would be subject to future management control options (e.g. felling, coppicing, etc.) to prevent such woodland from affecting the performance of the Proposed Development.

Eskdalemuir Seismic Array

1.7.34 The Site lies within the 50 km MoD Safeguarding zone of the Eskdalemuir Seismic Array (EKA) and as such operation of the wind farm is anticipated to be subject to a Seismic Impact Limit (SIL) under proposed changes to the methodology for calculating impact on the EKA that are being consulted upon at the time of application.

1.7.35 The Applicant contracted subject matter experts Xi Engineering Consultants to determine the impact of the Proposed Development on the EKA. **Technical Appendix 1.5** (**EIAR Volume 4**) considers the current MoD and emerging DESNZ position relating to safeguarding Eskdalemuir, and calculates the required Seismic Ground Vibration (SGV) budget for the

[6] Available at https://map.environment.gov.scot/Soil_maps [accessed January 2026]

[7] Available at https://www.forestry.gov.scot/publications/285-the-scottish-government-s-policy-on-control-of-woodland-removal (Accessed January 2026).

Proposed Development and the level of Seismic Impact Limit (SIL) the Proposed Development is expected to be able to meet. Technical Appendix 1.5 demonstrates that the Proposed Development would be able to be accommodated under the proposed safeguarding approach currently being consulted upon by DESNZ[8], depending on the adopted SIL and available headroom levels.

1.7.36 There are credible scenarios under which the Proposed Development could be built without adversely affecting the EKA, remaining within the MOD's agreed 0.336 nm cumulative vibration budget, based on the adoption of the industry-recommended Seismic Impact Limit (SIL) approach as detailed in the DESNZ consultation.

Telecommunications

1.7.37 Five fixed telecommunications links cross the Site; three of these are microwave links, two operated by MBNL and one operated by SPEN, and the remaining two are UHF links operated by JRC and by Arqiva, as detailed below:

- MBNL Link 1 runs between Mast 1557893 in Eastertown and Mast 1204144 at Green Lowther;
- MBNL Link 2 runs between Mast 1497190 in Castle Hill and Mast 1204144 at Green Lowther;
- SPEN Link 1 runs between Coalburn Substation and Green Lowther Radar Station;
- JRC Link 1 exclusion zone runs as two lines between Strancleuch Hill and Lowthers;
- Arqiva Link 1 runs between Black Hill Mast and Leadhills Mast.

1.7.38 A Telecommunications Impact Assessment has been undertaken to identify potential infringements of the links by turbines and is presented in **Technical Appendix 1.6 (EIAR Volume 4)**. The assessment has identified potential interference issues with the JRC and Arqiva links, associated with Turbine 1, Turbine 2 and Turbine 5. Therefore, a technical mitigation solution is likely to be required between the Applicant and the service operator following consent of the Proposed Development, if granted. The technical mitigation solutions which would be considered include:

- Micrositing of turbines;
- Use of an alternative scanner; and
- Replacement of the UHF telemetry link with a microwave link.

1.7.39 Consultation with Arqiva and with the JRC is currently ongoing to understand the mitigation options available for the potential interference issues with their links.

1.7.40 Considering the above, no significant effects are anticipated on telecommunications as a result of the Proposed Development.

Shadow Flicker

1.7.41 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

[8] Eskdalemuir seismic array: revised approach to managing onshore wind turbine interference. DESNZ Consultation. https://www.gov.uk/government/consultations/eskdalemuir-seismic-array-revised-approach-to-managing-onshore-wind-turbine-interference accessed 3rd June 2026.

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'[9].

1.7.42 A desk-based analysis confirmed that there are five dwellings located within 10 rotor diameters and 130 degrees either side of north of the Proposed Development.

1.7.43 While there are currently no UK guidelines which quantify what exposure levels of shadow flicker are acceptable, Predac[10], 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 Guidance[11].

1.7.44 Shadow flicker modelling has been undertaken to provide details on the predicted frequency of occurrence of shadow flicker at each window location at each of the residential properties identified within the study area. Two receptor locations would potentially be affected by shadow flicker as a result of the Proposed Development; Waterhead Toll Cottage and New Glendorch. However, mitigation is proposed in the form of a Wind Farm Shadow Flicker Mitigation protocol and it is considered that potential impacts can be reduced to an acceptable level. A technical report is included as a **Technical Appendix 1.7 (EIAR Volume 4)**, which sets out details of the predicted shadow flicker effects and appropriate mitigation.

Baseline Characterisation

1.7.45 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 survey and empirical study and projection.

1.7.46 The environmental baseline adopted for the purposes of the EIA is stated in each of the technical assessment chapters provided in the EIAR. The baseline is normally taken as the current character and condition of the Site and surrounds, and the likely significant environmental effects of the Proposed Development are then assessed in the context of the current conditions. No change to the current baseline, comprising potential future baseline scenarios, is anticipated.

Mitigation by Design and Consideration of Alternatives

1.7.47 Following the baseline characterisation, the information collected on environmental constraints was used to inform the consideration of design alternatives. An iterative process was followed, whereby the Applicant considered a range of turbine layout, height and access proposals. The aim of the design element of the EIA process was to develop an optimal solution which seeks to maximise potential renewable energy generation, within technical and environmental constraints. The main aim has been to avoid likely significant environmental effects through the design. Further details on the design process adopted for the Proposed Development are set out within **Chapter 3: Design Evolution and Alternatives (EIAR Volume 2)**.

[9] 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 [accessed December 2025]

[10] Predac - European Actions for Renewable Energies (2004). Spatial Planning of Wind Turbines

[11] Northern Irish Government, Best Practice Guidance to PPS 18 'Renewable Energy' (2019) Available online from Best Practice Guidance to PPS 18 'Renewable Energy' | Department for Infrastructure [accessed June 2026]

Impact Assessment

1.7.48 The next stage in the EIA process was to complete an impact assessment to determine the likely significant effects remaining following the implementation of mitigation by design. An assessment chapter has been provided for each issue where it is considered that there are likely significant effects associated with the construction, operation, decommissioning or restoration phases of the Proposed Development. Each assessment chapter considers primary, secondary, direct, indirect and cumulative effects and defines the assessment methodology used and the criteria by which a significant effect is defined. Each chapter provides a summary of the likely significant effects, the relevant embedded mitigation, and specifies if additional mitigation is required.

Additional Mitigation

1.7.49 The impact assessment is used to identify where additional 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. Mitigation has been considered following a hierarchy of first seeking to avoid effects, followed by seeking a reduction in effects to level not considered significant, and finally where necessary and possible, offsetting or compensatory measures are considered.

1.7.50 **Chapter 11: Schedule of Mitigation (EIAR Volume 2)** provides a summary of the mitigation measures provided in each of the technical chapters to avoid, reduce or offset impacts which could give rise to significant residual effects. In addition, some 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.

EIA Project Team and Statement of Competence

1.7.51 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'. The EIAR has been compiled and approved by professional EIAR practitioners at Ramboll, holding relevant undergraduate and post-graduate degrees, membership of the Institute of Sustainability and Environmental Professionals ((ISEP) formerly known as Institute of Environmental Management and Assessment (IEMA)) and Chartered Environmentalist status with the Society for the Environment. The EIAR meets the requirements of the ISEP EIA Quality Mark Scheme. This is a voluntary scheme operated by ISEP that allows organisations to make a commitment to excellence in EIA and to have this commitment independently reviewed on an annual basis.

1.7.52 The project team comprises the companies presented in **Table 1.1** below. Professional qualifications of the lead author of technical reports are included in **Technical Appendix 1.2 (EIAR Volume 4)** and each of the impact assessment chapters provides details of the relevant professional memberships of the author, code or practice followed and assessment methodology used.

Table 1.1: Project Team	
Discipline Organisation	**Role and Responsibility**
Ramboll UK Limited	EIA Project Management Shadow Flicker
MVGLA Ltd	Landscape and Visual Amenity
CFA Archaeology Ltd	Cultural Heritage
SLR Consulting Limited	Ecology and Ornithology
Ramboll UK Limited	Hydrology, Hydrogeology and Geology
Pell Frischmann	Traffic and Transport
Hoare Lea	Noise and Vibration
Mackenzie Renewables Ltd	Aviation

1.8 Copies of the EIAR

1.8.1 The full EIAR and supporting application documents will be made available for viewing and downloading via the Scottish Government Energy Consents Unit portal at https://www.energyconsents.scot, and the South Lanarkshire Council planning portal.

1.8.2 Paper copies of the full EIAR will be made available to view at the following publicly accessible locations:

- Crawfordjohn Village Hall, Manse Road, Crawfordjohn, Biggar, ML12 6SR;
- Crawford Hall, 100 Carlisle Road, Crawford, Biggar, ML12 6TW; and
- Leadhills Hall, 35 Ramsay Street, Leadhills, Bigar, ML12 6YA.

1.8.3 Paper copies of the Non-Technical Summary (EIAR Volume 1) along with USB sticks containing the full EIAR will be available at the above locations to take away, while stocks last.

1.8.4 The EIAR and accompanying documents will also be made available for viewing and download on the project website: https://www.renewcopower.com/portfolio/united-kingdom/uk-projects/ravengill-energy-park/.

1.8.5 The Applicant will work closely with the ECU to ensure all statutory consultees who wish to receive a physical copy of this EIAR will do so.

1.8.6 In the interests of sustainability, reference to the paperless (project website/ECU/ SLC planning portal/USB) version is strongly recommended.

1.8.7 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: ravengill@renewcopower.com
- Telephone: 0141 3196144
- Post: Ravengill Energy Park, Renewco Power, 12 Alva Street, Edinburgh EH2 4QG

1.8.8 Hard copies of the EIAR can be printed for purchase on request from the Project Team (details above) at a charge of £2,000 for a hard copy and £15 on USB storage device. Copies of a short Non-Technical Summary are available free of charge.

1.9 Commenting on the Application

1.9.1 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 Carluke & Lanark Gazette for two successive weeks;
- the Carluke and Lanark Advertiser for two successive weeks; and
- on the Project website[12].

1.9.2 The advertisement will provide details of the date by which 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.

1.9.3 Any representations in relation to the application should be made to the Energy Consents Unit via their website at www.energyconsents.scot or by post to The 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 or emailed representations should be dated, clearly stating the name (in block capitals), full return email and postal address of those making representations.

[12] https://www.renewcopower.com/portfolio/united-kingdom/uk-projects/ravengill-energy-park/

2 Development Description

2.1 Introduction

2.1.1 This chapter 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;
- the physical characteristics of the Proposed Development, including the land-use requirements during the construction and operational phases;
- the main characteristics of the construction and operational phase of the Proposed 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:

- Volume 3a: Figures
  - 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 Layout;
  - Figure 2.6: Typical Cable Trench Section;
  - Figure 2.7: Typical Temporary Construction Compound Layout;
  - Figure 2.8: Battery Storage Layout; and
  - Figure 2.9: Typical Battery Storage Container Elevations; and
  - Figure 2.10: Typical PCS Elevations.
- Volume 4: Technical Appendices
  - Technical Appendix 2.1: Outline Construction Environmental Management Plan (OCEMP);
  - Technical Appendix 2.2: Borrow Pit Assessment;
  - Technical Appendix 2.3: Aviation Assessment; and
  - Technical Appendix 2.4: Carbon Balance Assessment.

2.1.3 Figures and technical appendices are referenced in the text where relevant.

2.2 Site Context

2.2.1 The Site, covering an area of approximately 2,555 hectares (ha), is located approximately 530 m from Leadhills village (at its closest point) and 1 km south of Abington village, with the A74(M) motorway located to the east, as shown in **Figure 1.1 (EIAR Volume 3a).**

2.2.2 The Site predominantly comprises open moorland, much of which is managed for grouse and sheep grazing, improved grassland and semi-improved grassland, with areas of forestry located in the valleys, predominantly to the east of the B797.

2.2.3 The Site terrain is undulating with multiple hills within the boundary such as Ravengill Dod (499 m AOD), Coom Dod (553 m AOD), Hunt Law (523 m AOD) and Brown Dod (489 m AOD). This landscape is typical of the wider location within the Southern Uplands.

2.2.4 The Site lies within the Clyde catchment, with multiple watercourses and waterbodies located within the Site, including tributaries of the River Clyde such as Glengonnar Water through the centre of the Site and Snar Water in the west. Elvan Water runs along the southern Site boundary and the River Clyde lies approximately 1 km to east of the Site boundary at its closest point.

2.2.5 The immediate vicinity of the Site is sparsely populated, with settlement largely confined to the valleys. Key settlements within the vicinity of the Site include the villages of Abington, Crawford, Crawfordjohn, Elvanfoot, Leadhills and Wanlockhead. Other residential properties are located sporadically in the vicinity of the Site, with three residential properties located within the Site boundary (North Shortcleugh Farm, Lettershaws Farm Cottage and Glencaple Farm Cottage).

2.2.6 There is one statutory site designated for nature conservation within the Site boundary; the Raven Gill Site of Special Scientific Interest (SSSI) which is designated for geological stratigraphy features: Arenig-Llanvirn[1]. No development is proposed within the SSSI.

2.2.7 There is one designated heritage asset (a scheduled monument) present within the Site boundary (Waterhead, platform settlement (SM 4714)) as shown on **Figure 5.1 (EIAR Volume 3a)**, as well as three sites recorded in the Historic Environment Record (HER) that are classed as being of potential national importance. There are also a number of scheduled monuments immediately outside the Site boundary, mainly associated with historic mining activity and prehistoric settlement in the area, and there are a number of listed buildings concentrated in the villages of Leadhills and Wanlockhead, as shown on **Figure 5.2 (EIAR Volume 3a)**.

2.2.8 Historically, areas of the Site were subject to lead and gold mining activity from the 16th-20th century, and evidence of disused mines and mining-related assets are visible, with the principal areas of mining related activity being located outwith the Site boundary.

2.2.9 There is extensive wind energy development within this part of southern Scotland and there are several wind farms at various stages in the consenting process and operational wind farms within the surrounding landscape. These include the consented and under construction Priestgill Wind Farm to the northeast; the operational Clyde Wind Farm to the east; the consented Lion Hill Wind Farm to the southeast; the operational Andershaw Wind Farm to the northwest; and the Middle Muir Wind Farm to the northwest. Additionally, proposed developments in the area include the M74 West Wind Farm to the north; the Grayside Wind Farm to the northeast; the Clyde South Energy Park to the southeast; the Watchman Energy Park to the southeast; the Glensalloch Wind Farm to the southwest; and the West Andershaw Wind Farm to the northwest.

2.3 Project Description

2.3.1 The Proposed Development would comprise up to 21 wind turbines and battery energy storage system (BESS) 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 21 wind turbines with a maximum tip height of 220 m;

[1] NatureScot (2008). Raven Gill Site of Special Scientific Interest. Available at: https://www.nature.scot/sites/default/files/site-special-scientific-interest/1333/sssi-citation.pdf

- permanent foundations supporting each wind turbine, and associated crane hardstanding at each wind turbine base;
- a temporary construction site entrance from the A74(M) motorway, to allow delivery of only abnormal indivisible loads (AIL) required for turbine component delivery. Empty AIL vehicles would return to the road network via the B797 road, rejoining the M74 at Junction 14;
- two new junctions on the B797 road for site traffic and two new junctions on the C class road between the B797 and Crawfordjohn, one to the west and one to the east;
- a series of new on-site access tracks with associated watercourse crossings (where the final layout dictates), which may include upgrade and/or relocation of existing access tracks across the Site;
- underground power cables, generally laid in trenches alongside access tracks;
- on-site substation and control building;
- temporary construction compounds and laydown areas; and
- a BESS, with approximately 50 MW capacity, co-located with the on-site substation; and
- four temporary construction compounds and laydown areas, the main one located adjacent to the substation and BESS sites and three satellite compounds: two located in the western area of the Site and the other located in the northern area.

2.3.3 In addition, the following ancillary works would be necessary:

- extraction of rock from borrow pits. Four borrow pit search areas have been located within the Site;
- temporary on-site concrete batching plant. This would be located within the temporary compound areas and/or one of the borrow pit search areas; and
- where necessary, works on land outside the main development area and immediately adjacent to the A74(M) to facilitate the delivery of AIL (e.g. construction of over-run areas and temporary modifications to street furniture etc).

2.3.4 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 immediately 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 not encroach into environmentally constrained areas and would be carried out under the supervision of an ecological clerk of works and an appropriately experienced and qualified engineer.

2.3.5 The proposed locations for all infrastructure including wind turbines, BESS, tracks, construction compounds, the substation and borrow pits, are shown on **Figure 2.1 (EIAR Volume 3a)**.

2.3.6 An overview of the Proposed Development infrastructure layout is set out in Table 2.1 below.

Table 2.1: Overview of Proposed Development Infrastructure	
Element	**Proposed Development**[2]
No. of Turbines	Up to 21 total
Turbine Locations	Refer to **Table 2.2** below.
Turbine Tip Height	Up to 220 m. Refer to **Figure 2.2** (**EIAR Volume 3a**)
Operational Lifetime	40 years from date of commissioning
Turbine Foundations and Hardstanding	Foundation dimensions: 25-32 m diameter, and an approximate depth of 3-5 m Total hardstanding (per Turbine): approx. 6,430 m^2 Refer to **Figure 2.3** (**EIAR Volume 3a**)
Access Track (new permanent)	Approximately 30.5 km of new tracks, comprising: ▪ 4.68 km of upgraded track; ▪ 25.3 km of new standard track; and ▪ 0.57 km of new floating track Typical running width 6 m with a 0.5 m shoulder on each side Refer to **Figure 2.4** (**EIAR Volume 3a**)
Substation Compound	Dimensions: 80 m x 120 m Footprint 9,600 m^2 Refer to **Figure 2.5** (**EIAR Volume 3a**)
Cable trench	**Dimension/width:** 1.25-2 m wide and approximately 1 m deep Refer to **Figure 2.6** (**EIAR Volume 3a**)
Temporary Construction Compounds	Dimensions Footprint: Compound 1: 80 m x 125 m (10,000 m^2); Compound 2: 50 m x 100 m (5,000 m^2); Compound 3:40 m x 100 m (4,000 m^2); and Compound 4: 70 m x 150 m (10,500 m^2). Refer to **Figure 2.7 (EIAR Volume 3a)**
Battery Energy Storage System	Dimensions 60 m x 175 m Footprint: 10,500 m^2 Refer to **Figure 2.8 and Figure 2.9** (**EIAR Volume 3a**)
Micrositing allowance	100 m

Wind Turbines and Turbine Layout

2.3.7 The Proposed Development will comprise up to 21 turbines, as set out in **Figure 2.1** (**EIAR Volume 3a**), with a maximum tip height of 220 m. The turbine coordinates of the proposed turbines are set out in **Table 2.2** below.

Table 2.2: Turbine Coordinates		
Turbine No.	**Easting**	**Northing**
1	287971	618974
2	288264	618355
3	286849	618133
4	287226	617738

[2] Dimensions and footprint areas shown within the table are approximate and subject to detailed design

Table 2.2: Turbine Coordinates		
Turbine No.	**Easting**	**Northing**
5	287709	617214
6	286364	617049
7	286646	616715
8	286963	616303
9	291850	619544
10	292680	619542
11	293040	619047
12	292389	618783
13	291144	619062
14	291257	618660
15	291738	618565
16	292036	617853
17	290720	618062
18	291330	617871
19	291316	617317
20	290077	618173
21	290485	617374

2.3.8 These locations would be subject to micrositing during the construction phase. The Construction Environmental Management Plan (CEMP) would include detailed guidance on the application of the micrositing tolerance which would be set by the consent condition. An Outline Construction Environmental Management Plan (OCEMP) is included in **Technical Appendix 2.1 (EIAR Volume 4)**.

2.3.9 The exact model of wind turbine to be installed at the Proposed Development would be selected through a competitive procurement process. In each assessment in the EIA, a worst-case scenario of the turbine dimensions/characteristics relevant to that topic has been used. An indicative turbine for the Proposed Development is shown on **Figure 2.2 (EIAR Volume 3a)**.

2.3.10 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 colour of the turbines would be agreed in consultation with South Lanarkshire Council (SLC).

2.3.11 Based on current (2026) wind turbine generator technology the typical generation capacity for a turbine of the size and design proposed would be up to 7.5 MW.

Turbine Foundations

2.3.12 Turbines are typically fixed to steel reinforced concrete foundations, approximately 25 m in diameter. The foundations would be formed in excavations approximately 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**).

2.3.13 Prior to excavation, topsoil and existing vegetation would be lifted and stored. After completion the foundation would be backfilled with suitable excavated or imported material and the original vegetation would be reinstated around the hardstanding areas where possible.

2.3.14 Concrete for site construction, including turbine foundations, would likely be batched on-site.

Turbine Hardstanding

2.3.15 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. **Figure 2.3 (EIAR Volume 3a)** provides an illustration of a typical crane hardstanding arrangement (dimensions may vary).

2.3.16 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.

2.3.17 Typical permanent hardstand areas per turbine are approximately 2,016 m^2, with the temporary hardstand area at each turbine location approximately 4,414 m^2. These dimensions are dependent on the site ground conditions.

Turbine Lighting

2.3.18 The Proposed Development would require visible aviation lighting under the current Civil Aviation Authority (CAA) policy statement[3]. In order to mitigate the night time visual impact of the Proposed Development on non-aviation receptors a reduced lighting scheme has been designed and will be submitted to the CAA for approval. The reduced lighting scheme proposes 2000 candela steady red lights on ten of the 21 turbines (T1, T3, T5, T6, T8, T9, T11, T16, T20 and T21), and no mid-tower lighting.

2.3.19 Infrared lighting as required by the Ministry of Defence (MOD) (not visible to the naked eye) is proposed to be installed on four turbines (T2, T10, T13 and T19).

2.3.20 Further detail is provided in Technical Appendix 4.6 (EIAR Volume 4).

2.3.21 In addition to lighting on the turbines themselves, low-level security lighting at the substation and BESS would also be required.

Electrical Cabling

2.3.22 Electrical connections from the wind turbines to the onsite electrical substation and control building will be made via underground cables. These underground cables would be laid in trenches approximately 1.25-2 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.

2.3.23 Typical cable trench detail is illustrated in **Figure 2.6 (EIAR Volume 3a)**.

[3] CAA Policy and Guidelines on Wind Turbines, CAP 764 (Draft June 2020)

On-Site Substation Compound

2.3.24 The electrical cables would terminate at the substation; the substation compound would measure approximately 9,600 m^2 (80 x 120 m) and would be located adjacent to the BESS compound (refer to **Figure 2.1 (EIAR Volume 3a).** It would comprise a substation and control building, of approximately 360 m^2 in size with a maximum height of 8.5 m, and would contain switchgear, control equipment and basic welfare facilities including a toilet and a parking area. The building would accommodate all the equipment necessary for automatic remote control and monitoring of the Proposed Development in addition to the electrical switchgear, fault protection and metering equipment required to connect the Proposed Development to the electricity network.

2.3.25 A typical substation and control building is shown in **Figure 2.5 (EIAR Volume 3a)**, the final design would be decided at the detailed design stage.

2.3.26 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

2.3.27 A BESS compound, measuring approximately 60 m x 175 m (approximately 10,500 m^2), is proposed adjacent to the substation and would contain 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 (**EIAR Volume 3a: Figure 2.8**).

2.3.28 The MV switch and control room would require an approximate area of 185 m^2 at a maximum height of approximately 3.2 m.

2.3.29 Each battery container would be approximately 15 m^2 with a maximum height of 3 m (refer to **Figure 2.9 (EIAR Volume 3a)**). Each PCS unit would be approximately 30 m^2 with a maximum height of approximately 3 m (refer to **Figure 2.10 (EIAR Volume 3)**).

2.3.30 The BESS area 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 operations.

Temporary Construction Compounds

2.3.31 Four temporary construction compounds would be required to enable construction of the Proposed Development. The compounds would be located as shown on **Figure 2.1 (EIAR Volume 3a)**. Each compound area 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;
- temporary office accommodation and welfare buildings (toilets, kitchen/canteen, drying rooms);
- equipment storage;
- concrete batching plant area;
- a receiving area for incoming vehicles;

- maintenance and refuelling facilities;
- waste, recycling and materials management facilities;
- general laydown areas; and
- parking.

2.3.32 Four temporary construction compounds are proposed and the approximate dimensions are set out in **Table 2.3.**

Table 2.3: Temporary Construction Compounds		
Compound	**Location**	**Dimensions**
1	290412, 619757	80 m x 125 m
2	290690, 620790	50 m x 100 m
3	289021, 620013	40 m x 100 m
4	288258, 617770	70 m x 150 m

2.3.33 An indicative layout of a typical temporary construction compound is shown in **Figure 2.7 (EIAR Volume 3a)**.

Access and Site Tracks

2.3.34 Access to Site would be taken from the following roads:

- Access to the turbine area for turbine component delivery (AIL) would be taken directly from the A74(M), with unloaded vehicles leaving the Site the via B797 road, rejoining the M74 at Junction 14; and
- Access to the Site for general site traffic would be via two new junctions on the B797 road and a crossing point on the C class road between the B797 and Crawfordjohn.

2.3.35 For more information on the delivery route to the site see **Chapter 9: Transport, Traffic and Access (EIAR Volume 2)**.

2.3.36 Approximately 30.58 km of new onsite access tracks, including approximately 4.7 km of upgraded track would be required to provide access to the wind turbines, substation compound, borrow pit search areas and construction compounds (**EIAR Volume 3a: Figure 2.1**). Typical access track designs are shown in **Figure 2.4 (EIAR Volume 3a)**. This figure shows the use of typical cut and fill access tracks.

2.3.37 Tracks would have a typical 6 m running width, with an additional 0.5 m either side for track shoulders, and with appropriate widening on bends, at junctions and passing places as required.

2.3.38 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.

2.3.39 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 of 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)**.

2.3.40 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 constructed. Floating tracks are constructed by creating a "floating" track bed that sits directly on top of a peat body. The mass of the track displaces the underlying peat, with an equilibrium reached between the downward force of the mass of the track on the one hand, and the combination of tensile strength of the acrotelm and upwards force of the displaced catotelm and groundwater beneath.

2.3.41 It is anticipated that there would be a maximum of 0.57 km of floating track required in the southern part of the Site between Turbines 16 and 18 and between Turbines 20 and 21. 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.

2.3.42 The on-site track layout has been designed to minimise environmental disturbance and land take by avoiding areas of deeper peat and steep slopes in excess of 12 degrees as well as, wherever possible, avoiding or minimising impact on other areas of identified environmental constraints.

2.3.43 The track layout has been carefully designed to minimise the number of watercourse crossings where possible. It is anticipated that 16 watercourse crossings would be required (see **Technical Appendix 8.3, EIAR Volume 4**). It is proposed that each watercourse crossing would have sufficient capacity for the climate change adjusted 1:200-year flood event and would include an allowance for potential partial blockage. For most crossings, a culvert design would be implemented. Where closed culverts are employed, they shall be oversized such that the base of culvert may be below the natural bed level of the watercourse allowing the naturalisation of the culvert bed substrate. Culverts shall follow the natural flow path and gradient of watercourses to which they are installed and shall be designed such that they do not represent a barrier to fish and other fauna. Culverts shall not include screening. For crossing Glengonnar water (crossing location WC4), a bridge would span a width of approximately 8 m. The track would be raised as it leads into the crossing (both to the north and south of the watercourse) and it is anticipated that the bridge would comprise a single-span structure that would not necessitate works within the watercourse. In line with SEPA guidance, the bridge would be designed to accommodate the 1 in 200 year + climate change flood event. 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.

Footpath Diversions

2.3.44 Temporary and permanent diversions are proposed to short sections of a number of core paths that occur within the Site, as follows:

- Core Path CL/5701/1;
- Core Path CL/3529/1 (Hunt Law Leadhills-Snarhead).
- Wider Network CL/5073/1;
- Wider Network CL/5069/1;
- Wider Network CL/5074/1;

- Wider Network On Road CL/5034/1; and
- Wider Network CL/5023/1.

2.3.45 During construction, potential impacts on recreational users at the Site would be temporary relating to potential safety risks, disruptions, and decreased recreational enjoyment due to machinery, noise, and visual intrusion. During operation, minimal impacts are expected and, where these might occur, due to the requirement for more significant maintenance works, impacts would be more localised and shorter in duration that those experienced during construction.

2.3.46 A series of measures are proposed to mitigate and offset potential impacts on recreational users of the Site, including provision of information on the construction working area, provision of crossing points, appropriate signage and on-site training.

Borrow Pits and Aggregate Material Requirements

2.3.47 Four borrow pit search areas have been identified covering a total area of approximately 81,500 m^2 (8.15 ha) to supply material to construct the Proposed Development.

2.3.48 It is estimated that these borrow pit areas could provide 192,100 m^3 (approximately 97% 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 a greater certainty to the suitability and quantity of material available for use in construction from this source.

2.3.49 Table 2.4 summaries the borrow pit search areas with further details provided in the Borrow Pit Assessment (Technical Appendix 2.2 (EIAR Volume 4)).

Table 2.4: Borrow Pit Areas

Borrow Pit Search Area No.	NGR Reference (Centre)		Approximate Excavation Dimensions (m)	Area of Land Impacted (m^2)[4]
BP1	288241	618637	150 x 80	10,000
BP2	289501	620267	120 x 60	6,600
BP3	290243	618760	150 x 95	13,800
BP4	291622	618437	130 x 100	10,500

2.3.50 Site won aggregate materials would also be available from the excavation required for the construction of the BESS and substation compounds. 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.

2.3.51 The volume of material won from borrow pits and through the construction of the BESS and substation compounds assumes a 25% reduction in quantity to account for unsuitable material or bulking of materials on excavation.

2.3.52 The construction of the Proposed Development would require approximately 197,960 m^3 of aggregate. Site won aggregate from a combination of the borrow pits and construction of the BESS and substation compounds (203,360 m^3), is expected to meet these requirements.

[4] This equates to the total footprint including tie-in, as defined in **Technical 2.2 (EIAR Volume 4)**

Connection to Electricity Grid – Current Position

2.3.53 At time of Application (June 2026) the Proposed Development has a signed grid connection agreement (GCA) for 2036 to connect to the Elvanfoot Substation, which is located approximately 4.5 km southeast of the proposed on-site substation. Under ongoing grid reforms the Proposed Development has been confirmed as a Gate 1 project, which means there is no confirmed location or date for the grid connection and the existing GCA will be cancelled and replaced with a Gate 1 offer in due course. There is no longer any certainty that the Proposed Development would connect at Elvanfoot Substation or of the timing of any connection to the national grid.

2.3.54 On receipt of a section 36 consent the Proposed Development would be in a position to apply for a Gate 2 offer which would indicate a grid connection date and location. Any grid connection date and location in a Gate 2 offer would remain subject to change as the Proposed Development moves forward in the grid connection queue, with the Proposed Development potentially changing connection location and date depending on availability of capacity that it could fill on the network.

2.3.55 Whilst a Gate 2 offer is progressing towards being delivered, it would be the responsibility of Scottish Power Energy Networks (SPEN) to provide the grid connection, including identification of the most suitable route, technology, and any necessary consents.

2.3.56 The identification of any potential significant effects associated with the grid connection necessitates knowledge of the location on the grid that the Proposed Development would connect to and, as described above, there is no certainty as to the likely grid connection location, route or means of connection at this time. On this basis the grid connection is not considered in this EIA Report.

2.3.57 On 17 February 2026, the Court of Session issued its judgment in *Raeshaw Farms Limited v Scottish Ministers and Energiekontor [2026] CSIH 10*. The Court confirmed that decision-makers must evaluate, on a fact-specific basis, whether a wind farm and its grid connection form a single project for EIA purposes. This is a decision for decision-makers to arrive at, and details to support this decision making process are set out in **Technical Appendix 2.5 (EIAR Volume 4)**.

Site Reinstatement and Restoration

2.3.58 Following commissioning of the Proposed Development, the areas of the Site temporarily disturbed to allow construction would be reinstated. Reinstatement would form part of the contractual obligations for the Principal Contractor and would include all temporary works, such as crane pads, borrow pits, temporary compounds and laydown areas.

2.3.59 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 2,555 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 28.5 ha, which equates to approximately 1.11% of the total area within the Site.

2.4.2 Temporary land take, which would include 16.31 ha, accounts for 0.64% of the total area within the Site.

2.4.3 Table 2.5 details the permanent and temporary land take required for the Proposed Development.

<table>
<tr><th colspan="4">Table 2.5: Summary of Temporary and Permanent Land Take</th></tr>
<tr><th colspan="2">Energy Project Element</th><th>Temporary (m²)</th><th>Permanent (m²)</th></tr>
<tr><td colspan="2">Turbines, Crane Pads and Laydown Areas</td><td>92,694</td><td>42,336</td></tr>
<tr><td colspan="2">On-site Access Tracks (New)</td><td>-</td><td>213,500</td></tr>
<tr><td colspan="2">Substation Compound</td><td>-</td><td>9,600</td></tr>
<tr><td colspan="2">BESS Compound</td><td>-</td><td>10,500</td></tr>
<tr><td rowspan="4">Temporary Construction Compounds</td><td>A</td><td>10,500</td><td>-</td></tr>
<tr><td>B</td><td>4,000</td><td>-</td></tr>
<tr><td>C</td><td>10,000</td><td>-</td></tr>
<tr><td>D</td><td>5,000</td><td>-</td></tr>
<tr><td rowspan="4">Borrow Pits</td><td>1</td><td>10,000</td><td>-</td></tr>
<tr><td>2</td><td>6,600</td><td>-</td></tr>
<tr><td>3</td><td>13,800</td><td>-</td></tr>
<tr><td>4</td><td>10,500</td><td>-</td></tr>
<tr><td colspan="2">Total Land Take</td><td>163,094</td><td>275,936</td></tr>
</table>

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 main contractor will begin following agreement of the detailed design and approval of any pre-commencement conditions with the appropriate consenting authority. Key construction activities will involve:

- public road improvement and junction creation;
- construction of main site access track;
- construction of the main construction compound and laydown area;
- installation of concrete batching plant;
- construction of all access tracks having established all required borrow pits;
- construction of the satellite construction compounds and laydown areas;
- 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;
- 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 in accordance with peat management plan; 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 will be undertaken concurrently to minimise the overall construction programme. Site restoration will 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 will be undertaken prior to the main construction works beginning onsite to determine the specific quality of rock and the rock head depth underlying the locations for site infrastructure. Initial site investigations have informed the design of the layout of the Proposed Development (i.e. Phase 1 and Phase 2 Peat probing) including positioning and anticipated construction characteristics of site access roads. 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 will be left in place following construction to provide permanent access for maintenance, repairs and eventual decommissioning of the Proposed Development. The construction works will 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 for the Proposed Development is illustrated in **Table 2.5** below.

Table 2.5: Indicative 18-Month Construction Programme

	Month																	
Task *	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1																		

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**
2		■	■	■	■	■	■	■	■	■	■	■	■					
3							■	■	■	■	■							
4								■	■	■	■	■						
5								■	■	■	■	■						
6										■	■	■	■					
7												■	■	■	■	■	■	
8													■	■	■	■	■	■
9																■	■	■
10	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

*Task:

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

Hours of Work

2.5.9 The normal working hours will be as follows:

- Monday to Friday 0700-1900;
- Saturday 0700-1300; 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 and commissioning or emergency work, will take place outside these hours, and any such out-of-hours works will be subject to prior agreement with SLC. The requirement for out-of-hours work could arise, for example, from delivery and unloading of abnormal loads or health and safety requirements, orto 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;
- Heavy goods vehicles (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; and

- Mobile road going cranes, used for the erection of the turbines; and
- Standard HGVs for transporting electric cable, BESS containers, steel reinforcement for foundations, construction plant fuel and other items and equipment.

2.5.12 A Construction Traffic Management Plan would be submitted to SLC for approval in consultation with 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 (**EIAR Volume 4: Technical Appendix 9.1: Transport Assessment**).

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 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)**. A detailed CEMP would be submitted to SLC for approval in consultation with relevant statutory consultees prior to construction commencing. The CEMP would, as a minimum, include details of:

- construction methodologies;
- pollution prevention measures;
- public liaison provision;
- peat slide, erosion and compaction management;
- control of contamination/pollution prevention;
- drainage management and SuDS;
- water quality monitoring;
- management of construction traffic;
- control of noise and vibration; and
- control of dust and other emissions to air.

2.5.14 **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

2.5.15 **Technical Appendix 8.4: Watercourse Crossings Assessment (EIAR Volume 4)** contains details of the watercourse crossings required as part of the Proposed Development and the proposed crossing type together with the relevant requirements in relation to the *Environmental Authorisations (Scotland) Regulations 2018.*

2.5.16 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 **(EIAR Volume 4: Technical Appendix 8.6)**. The assessment identified five Private Water Supply abstractions either within the Site or within

250 m of the Site boundary. 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.

2.5.18 Mitigation to prevent pollution impacts on any downstream PWS would be set out in a Water Management Plan which would form part of the CEMP, to ensure that the Proposed Development would not lead to significant impact to water abstraction and other hydrological receptors. SEPA would be consulted on the contents of the CEMP and the Water Management Plan prior to commencement of works as part of the discharge of relevant conditions attached to any consent.

Peat Management

2.5.19 An outline Peat Management Plan (OPMP) has been prepared (refer to **Technical Appendix 8.6, EIAR Volume 4**) and 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 consulted on with SEPA prior to construction and would be included in the final version of the CEMP.

2.5.20 The detailed peat surveys across the site have identified that approximately 130,287 m^3 of peat would be excavated as part of the construction activities associated with the Proposed Development. The Outline PMP outlines how that peat would be recovered, managed and reused within the site.

Peat Slide Risk

2.5.21 **Technical Appendix 8.7: Peat Landslide Hazard and Risk Assessment (PLHRA)** 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 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-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 shut-downs (e.g. generator over temperature) would require investigation and manual restart.

Construction and Operational Residues and Emissions

2.6.4 The EIA Regulations 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** provides 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 and Geology (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 Site. 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 CO_2 emissions. **Technical Appendix 2.4: Carbon Balance Assessment (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 decommissioning in a 0.2-1.5 year period, with an expected value of 1.1 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 8.6 (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>

Table 2.6: Residues and Emissions	
Topic	**Potential Residue/Emission**
	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)**. Operation 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 acceptable limits. The BESS would also generate noise during operation. The location of residential receptors in relation to the Proposed Development was a consideration in the design development process and the predicted noise levels are within acceptable limits. Full details of the noise impact assessment are present in **Chapter 10: Noise (EIAR Volume 2)**.
Light	Construction **Technical Appendix 2.1: OCEMP (EIAR Volume 4)** notes that temporary lighting would be required at the temporary construction compounds 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. Operation The turbines would require visible aviation lighting in line with CAA requirements. A reduced lighting scheme is proposed with 10 of the 21 turbines lit with 2000cd nacelle lights. This would be submitted to the CAA for approval. Infrared lighting, not visible to the naked eye, would also be provide on five of the 21 turbines as required by the MOD. Further details of the aviation lighting assessment is provided in **Technical Appendix 4.6 (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.
Waste	Construction **Technical Appendix 2.1: OCEMP (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. Operation 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 and BESS.

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 1.2 m below ground level (bgl) to avoid environmental effects from full removal. A Decommissioning Plan would set out environmental protection measures and restoration principles which would be submitted to and approved by SLC and then implemented by the Contractor appointed to undertake the decommissioning works. An outline Decommissioning Plan 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 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 Regulations[1].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 This chapter is supported by the following figures, which are referred to 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 a review of the planning history of the Site, and the Site feasibility assessment;
- An overview of the design objectives for this 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 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 UK

[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/

levels; the quantification of this contribution is described in **Chapter 2: Development Description (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 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

[3] Available at: https://www.southlanarkshire.gov.uk/developmentplan2

incompatibilities exist between the LDP and NPF4, or where the LDP is silent, the policies of NPF4 prevail.

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 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).

3.2.12 Whilst the requirement to produce a spatial framework has been superseded by NPF4, it is noted that the Proposed Development is located mainly[4] 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".*

3.2.13 Other South Lanarkshire Council supplementary guidance 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 Guidance[6] (2019).

Other Guidance

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

3.2.14 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.

3.2.15 The guidance note focuses on wind turbine design and layout, wind farm siting and design and designing in landscapes with multiple wind farms. It includes design principles in Section 2 which covers 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 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. Available at: https://www.southlanarkshire.gov.uk/downloads/file/10363/part_7_sl_landscape_capacity_study_for_wind_turbines_february_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

3.2.16 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*".

3.2.17 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.

3.2.18 This EIAR does not make any judgements regarding the 'acceptability' of the Proposed Development. A separate Planning Statement and a separate Design Statement accompany the application; the Planning Statement present an appraisal of the Proposed Development with reference to the energy and planning policy framework and other relevant planning considerations, while the Design Statement sets out the approach taken to the initial landscape-led design of the Proposed Development in light of relevant policy and guidance.

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 wind farm development.

3.3.2 The Site location and current land uses on the Site are described in **Chapter 2 (EIAR Volume 2)**.

Site Selection and Feasibility

3.3.3 In 2022, the Applicant identified the Site, and the wider area which encompasses the nearby sites of the M74 West, Watchman, and Clyde South projects, as suitable for renewable energy development.

3.3.4 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, and 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.

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

3.3.5 The Site for the Proposed Development benefits from a number of strategic advantages for renewable energy development, including:

- the Site is situated amidst a cluster of operational, proposed and consented wind farm developments, including the operational Clyde Wind Farm to the east, located in the Southern Uplands Character type (or in one of its sub-types) and which share 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 heritage;
- there is scope to deliver suitable access to the Site for both construction traffic and abnormal invisible loads (AIL) whilst reducing the potential for impacts on local road users;
- the Site has consistently high anticipated wind speeds, which will deliver excellent wind energy yields;
- the Site has good access to the electricity transmission network and it is anticipated that a grid connection can be achieved in a reasonable timeframe.

Overall, the Site has potential to accommodate a renewable energy project 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 agreed with the team that included the parameters set out in the following paragraphs.

3.4.3 The approach to 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 Landscape (Version 3a)[9];
- Planning policy documents (e.g. NPF4, South Lanarkshire Local Development Plan 2[10]); 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:

[9] NatureScot (2017) Siting and Design of Wind Farms in the Landscape (Version 3a). Available at: https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a
[10] South Lanarkshire Council (2021) Local Development Plan 2. Available at: https://www.southlanarkshire.gov.uk/developmentplan2

- 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.

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 the surrounding landscape.
- Objective 2: To follow the broad topography of the Site and respond to the different landscape character types.
- Objective 3: To limit visibility of the Proposed Development from surrounding areas.

3.4.6 Subsequent to this, the Design Brief was updated to set the scope for constraint mapping by the specialist consultant team, 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 should be a distance equivalent to a minimum of 2.5 rotor diameters;
- All watercourses should have a 50 m exclusion area placed around them, in order to ensure protection of water quality, in line with SEPA guidance;
- 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;
- No development, aside from access track upgrades, should take place within 100 m of the gas pipelines and the North West Ethylene Pipeline, which are present in the north of the Site;
- 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 Mapping

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, or where a technical limitation to delivery of the Proposed Development was identified. 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.

Design Workshops

3.4.9 The constraints and recommended design guidance to address these 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.

3.4.10 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 Issues and Design Constraints

3.5.1 Following the baseline characterisation of the Site, the key environmental issues for consideration in the design process were identified. Recommendations for how environmental constraints should be addressed in the design process were then made in relation to each technical topic. A summary of the key design considerations and recommendations is provided in **Table 3.1**.

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 and peat probing 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 aimed to 'design out' potential for significant effects. Where it was not considered possible to mitigate by design, the environmental constraints have been considered further as part of the EIA.

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
Landscape and Visual: Landscape Fabric	The Site is approximately 2,555 hectares (ha) of predominantly open managed moorland, improved grassland and semi-improved grassland, with a strip of forestry east of the B797 road within the valley containing the Glengonnar Water. This comprises a mixture of acid dry dwarf shrub heath, marshy grassland, unimproved acid grassland, blanket bog, wet dwarf shrub heath and wet modified bog. Other habitat types distributed across the Site include bracken, recently felled coniferous plantation, semi-improved grassland and acid/neutral flushes. Much of the landscape has been subject to mineral prospecting since the 12th centurygrouse. The general topography of the Site is one of undulating, interlocking rounded hills and small upland glens, characteristic of the wider Southern Uplands. The Site covers a range of elevations including the higher summits of Ravengill Dod (538 m Above Ordnance Datum (AOD)), Harryburn Brae (499 m AOD), Wellgrain Dod (555 m AOD), Brown Dod (489 m AOD), Snarhead Hill (511 m AOD), and Sowen Dod (546 m AOD). One steep-sided glen splits the Site in two and contains the B797 road and Glengonnar Water. To the south, the Site abuts a glen containing the B7040 road and Elvan Water.	The design strategy is based on specific 'principles' developed and tested in a hierarchical manner. The principles focus on: • The relationship between size and scale of the wind farm site, proposed turbines and the receiving landscape, (both in terms of physical dimensions as well as in terms of landscape character); • The pure geometry of underlying 2-dimensional (2D) landform pattern and turbine pattern; • The relationship between the 3-dimensional (3D) form of topography and the 3D composition of the turbines; • The deliberate or accidental contrast between the proposal with existing character; • The importance or desirability of limiting visibility from surrounding landscape; and • The interaction with immediately adjacent wind farm sites or with sites in relatively close proximity. For this Site specifically, these principles 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 LCT 217 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; • Turbines have been set back as far back as possible from settlements and the sides of glens to reduce turbine visibility and potential contrast with small-scale characteristics within those settlements/glens; and • 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 effects should therefore be placed in the context of all operational and under-construction or proposed developments in the area.

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
Landscape and Visual: Landscape Character and Designations	The Site lies entirely within LCT 217 Southern Uplands – Glasgow & Clyde Valley (NatureScot, 2019)[11], the most recent landscape character assessment undertaken covering the Site. LCTs relevant to the Proposed Development due to their proximity are: • 177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit; • 207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit; • 209. Upland Glen - Glasgow & Clyde Valley; and • 217 Southern Uplands – Glasgow & Clyde Valley. National and local landscape designations to be considered for landscape and visual effects include: • National - Scot's Mining Company House Garden and Designed Landscape (GDL) – 2.1 km to the south; • Local - Leadhills and Lowther Hills Special Landscape Area (SLA) (South Lanarkshire) - within; and • Thornhill Uplands Regional Scenic Area (RSA) (Dumfries and Galloway) – abuts the Site to the southwest.	Refer to Design Principles set out above.
Landscape and Visual: Visual Amenity	Effects on views and visual amenity occur when the Proposed Development changes or influences the view or visual amenity as experienced by people. Visual amenity may be described as the overall visual experience from a given location, whilst a 'view' reflects a specific direction. People may invariably be engaged in different activities or have different perspectives, and, in recognition of these differences, it is common practice to refer to 'visual receptors'. These include: • residents within settlements and of individual properties; • people who travel through the area with potential views of the Proposed Development on route receptors such as roads, railway lines and cycling routes; and	Refer to Design Principles set out above.

[11] NatureScot. (2019) SNH National Landscape Character Assessment Landscape Character Type 217 SOUTHERN UPLANDS – GLASGOW & CLYDE VALLEY. Available from: https://www.nature.scot/sites/default/files/LCA/LCT%20217%20-%20Southern%20Uplands%20-%20Glasgow%20&%20Clyde%20Valley%20-%20Final%20pdf.pdf [Accessed: 19th of February 2026]

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
	• people engaged in recreational activities including walkers on long distance footpaths, Scottish Hill Tracks (SHTs), Core Paths, hills, and visitors to tourist destinations where the visual experience is likely to include a focus on the surrounding landscape. The LVIA concentrated on the effect on views from settlements within 10 km of the Site, where there is potential for significant effects to occur. Settlements that are not within the ZTV, and those beyond 10 km, have been scoped out of the LVIA. Residential properties within approximately 2.5 km of the Site have been assessed separately in the Residential Visual Amenity Assessment (RVAA – **Technical Appendix 4.8, (EIAR Volume 4**). Route receptors within 25 km including roads, railway lines, cycling routes, and walking routes have been assessed. All distances taken from the outermost turbines.	
Cultural Heritage	Designated assets (and non-designated assets of national importance) within the Site: One Scheduled Monument (a designated asset of national importance) within the Site boundary: Waterhead, platform settlement 900m N of (SM 4714). In addition, the Historic Environment Record (HER) records three non-statutory register (NSR) sites within the Site boundary that are classed as being of potential national importance: • North Shortcleuch unenclosed platform settlement (WoSAS 10408), • Scapcleuch Burn unenclosed platform settlement (WoSAS 12014), and • Scapcleuch Burn unenclosed platform settlement (WoSAS 12015)	• Where possible, turbines are to be sited to minimise impacts on the setting of the Scheduled Monument within the Site Boundary. • A recommended minimum buffer of 100 m should be applied to Scheduled Monuments within the Site a adjacent to the Site boundary to reduce direct and indirect impacts. • No groundbreaking works can 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) There are 31 non-designated heritage assets recorded in the HER within the Site, these include: • Prehistoric features such as platform settlements and burnt mounds;	• 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.

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
	• Medieval features include a possible chapel and burial ground and possible field clearance; and • Post medieval assets, largely relating to mining activity associated with the lead mines and agrarian activity, including farmsteads, enclosures and field systems.	• 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 (non-avian)	Designated Sites: No Local Nature Conservation Sites (LNCS) are within 5 km of the Site. North Lowther Uplands Site of Special Scientific Interest (SSSI) is 3.2 km from the application boundary. There are several stands of ancient woodland within 5 km of the Site; most lie to the north of the Site. 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) or Other (on Roy map). There is one area of ancient woodland within the application boundary; a small strip in the far north of the Site. This is categorised as Long-Established (of plantation origin).	The Site is considered to be sufficiently spatially separated from any statutory or non-statutory designated site with ecological qualifying features to preclude the potential for likely effects. Avoid woodland removal or fragmentation of the ancient woodland.
	Bats One Potential Roost Feature (PRF) with low suitability was recorded within the Site. No features with PRF-M, moderate or high potential for roosting bats were recorded within the Site. Static bat activity surveys recorded five bat species and two bat genus (soprano and common pipistrelle, *Nyctalus* spp., Daubenton's, *Myotis* spp., Natterer's and Brown long-eared). No medium or high risk median or maximum percentile assessment scores were recorded across the Site in any month for high collision risk species (i.e., soprano and common pipistrelle and *Nyctalus* spp.).	Positioning of turbines to ensure potential bat roosts (PRF-M, moderate or high potential) lie outwith the 285 m protection buffer (i.e., 200 m + rotor radius). Establishing a minimum 50 m buffer from turbine blade tips to important edge habitats for bats across the Site to reduce collision risk.
	Internationally or nationally important habitats (Annex 1 habitats, Scottish Biodiversity List)	• 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. Where unavoidable, mitigate, compensate and enhance.

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
	• 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.	• Wet modified bog (including mosaics) is also considered a sensitive habitat - avoid where feasible. Where unavoidable, mitigate, compensate and enhance. • Minimise the loss of higher conservation value habitats. Where habitat loss cannot be avoided, then management, compensation and enhancement to be considered through the Biodiversity Enhancement and Management Plan (BEMP).
	Protected mammals: Otter spraints, potential reptile hibernacula and water vole (i.e., burrows, feeding signs, latrines and droppings) were recorded within the Site. The only protected features recorded related to water vole burrows. No other protected species recorded within the respective survey area.	Water vole burrows require a 5-10 m protection buffer zone around the protected feature, dependant on burrow location and bank profile. Due to the more limited nature of reptile protection and their ability to avoid machinery etc. during their active phase, no specified disturbance zone for reptiles is given; however, avoidance of the potential feature recommended.
	Fish: The Site is not accessible to migratory salmonids due to natural and impassable barriers to migration much further downstream in the Clyde catchment. Electrofishing surveys were undertaken by the Clyde River Foundation (CRF) and recorded brown trout, minnow, brook lamprey and three-spined stickleback. North America signal crayfish, an Invasive Non-Native Species (INNS) were recorded on Glengeith Burn, Elvan Water and Glenochar Burn.	Apply a minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where a minimum number of watercourse crossings are required. Biosecurity protocols would be in place (if applicable) to ensure there is no spread of signal crayfish within the Site.
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 buffer (500 m from nest location). Access routes through the buffer (500 m) can still be proposed but works to the existing road/tracks should be kept to a minimum within this area. 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 but recorded in the wider area	No turbines or new infrastructure to be located within the relevant buffer (500 m) for black grouse leks.

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park

Topic	Analysis	Design Recommendations
Hydrology and Hydrogeology	The Site is located within the River Clyde catchment and the following larger tributaries are located within the Site: • Glengonnar Water, which flows south to north through the centre of the Site, adjacent to the B797; • Kirk Gill, Laggan Gill and Glencaple Burn which flow to the north into Glengonnar Water and lie in the central and eastern parts of the Site; • Glenkip Burn and Glendorch Burn, which flow westwards into Snar Water and lie in the western section of the Site; and • Elvan Water and Shortcleugh Water, which flow to the east into the River Clyde and lie immediately south of the Site.	▪ 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. ▪ SEPA guidance is that 250 m/ 100 m buffers are needed for high and moderate GWDTEs respectively. ▪ Tracks should be perpendicular to watercourses at crossing points.
	Flood Risk (SEPA Flood Risk mapping)[12] Land in close proximity to Glengonnar Water and Glencaple Burn are shown to have an elevated risk of flooding. Immediately south of the southern site boundary, areas in the immediate vicinity of both the Elvan Water and Shortcleuch Water watercourses, are shown to have an elevated risk of flooding. Areas near Glencaple (north of the Site), South Shortcleugh (centrally located on the Site), Glenochar (located along the eastern boundary of the Site), and Peden Burn (south-east of the Site) are marginal areas in connection to tributaries of the watercourses identified above also within SEPA high risk flood areas. Generally, the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability). Surface water flood risk associated with the aforementioned watercourses, appears to be confined to the main channel and immediate surrounding area.	▪ 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 change[13].
	Groundwater Dependent Terrestrial Ecosystems (GWDTE) Habitat surveys confirmed that areas of the Site are classified as 'potentially GWDTE'.	▪ The design should assume a 250 m buffer to turbines and crane pads/borrow pits and a 100 m to excavated tracks pending any relaxation of buffers agreed with SEPA.

[12] Scottish Environment Protection Agency (2025) Flood maps. Available at: https://beta.sepa.scot/flooding/flood-maps/
[13] Scottish Environment Protection Agency (2025) Climate change allowances for flood risk assessment in land use planning [Version 6], Scottish Environment Protection Agency. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed: September 2025).

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park

Topic	Analysis	Design Recommendations
	Further hydrological assessment has confirmed that while potentially groundwater dependent vegetation communities are present, these areas are not supported by groundwater.	▪ Where proposed 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): PWS registers held by South Lanarkshire Council (SLC) indicate that a total of fifteen (15) PWS end users are recorded within a 2 km radius of the Site boundary, of which four (4) are located on site, and the buffer of five (5) PWS' intersect the Site boundary.	▪ A 250 m buffer for PWS is recommended. ▪ If possible, avoid development near source watercourses and preferably avoid development in their catchments.
Peat	A review of the NatureScot Carbon and Peatland 2016 map[14], shows the Site is predominantly overlain by 'Class 0' and 'Class 4' soils, which are defined as 'mineral soils' or 'mineral soils with some peat present' and do not typically support peatland habitats. Large areas of 'Class 3' soils are found across the Site, which typically are carbon-rich soils, with some areas of deep peat. Multiple discreet areas of 'Class 1' peatland are also identified on the Site with some smaller areas of 'Class 5' also shown. The Stage 1 and Stage 2 peat depth survey results indicate that peat is present across the Site but is generally shallow. The mean depth of peat recorded during the surveys was 0.37 m, with the maximum peat depth recorded at 5.4 m in the eastern part of the Site. The maximum peat depth recorded during the Stage 2 surveys was 3.7 m and the average (mean) was 0.36 m.	▪ The peat hierarchy, as set out in NPF4 Policy 5, should be used to avoid areas of deep peat in the first instance, where possible. ▪ Peat depth > 1.0 m should be avoided by turbines and infrastructure. ▪ Where avoidance of peat > 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 would be delivered on extendable trailers which would then be retracted to the size of a standard HGV for the return journey.	▪ Heavy-Goods Vehicles (HGVs) for the transport of AIL would access the Site from the A74(M) via a temporary construction site entrance. ▪ All other construction traffic would access the Site via the B797 road and/or the C class road between the B797 and Crawfordjohn; ▪ 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 Site is located in an area of low population density. The noise environment in the surrounding area is expected to be characterised in many cases by 'natural' sources, such as wind	▪ Consideration should be given to the location of the turbines in relation their distance from Noise Sensitive Receptors (NSRs); the greater the

[14] NatureScot (2016) Carbon and Peatland Map 2016. Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/

Table 3.1 Preliminary Site and Design Guidance for Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
	disturbed vegetation, birds and farm animals. In addition, road traffic noise will have a strong influence in some areas, in particular next to the A74(M) motorway to the east of the Site, and to a lesser extent the local roads such as the B7040 and the B797, although this will tend to reduce at night. 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. In line with the recommendations contained within PAN1/2011[15], operational wind farm noise from the Proposed Development would be assessed in line with ETSU-R-97[16] and the IOA GPG[17]. 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 *'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'*.	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.
Aviation	The Proposed Development has the potential for impact on the aviation assets and activities listed below. ▪ National Air Traffic Services (NATS) En Route (NERL) at Cumbernauld Primary Surveillance Radars (PSRs), 58 km north of the Site ▪ NERL's safeguarding consultation zone for the Lowther Hill secondary surveillance radars (SSRs) and NERL's air-ground-air (AGA) communications infrastructure, within 20 km of Site. ▪ Glasgow Prestwick Airport PSR, as the Site is within the area where the effects of tall constructions on instrument flight procedures (IFPs) are required to be assessed. Impacts may occur in the construction, operation and decommissioning phases.	▪ 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. ▪ Consideration of a reduced lighting scheme to be approved by the Civil Aviation Authority (CAA) – reduction of nighttime LVIA effects as well as potential impact on the Low Flying Area. ▪ Likely commission of formal IFP assessment for Prestwick Airport IFPs.

[15] Scottish Government (2011) Planning Advice Note 1/2011: Planning and Noise. Available at: https://www.gov.scot/collections/planning-advice-notes-pans/ (accessed December 2025)
[16] 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
[17] 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 Ravengill Energy Park		
Topic	**Analysis**	**Design Recommendations**
	▪ Military low flying area known as Low Flying Area 20(T), where daytime operational low flying at less than 250 feet above ground level (agl) is permitted. ▪ Aviation Lighting will also be required. All turbines 150 m or more agl are required to be lit by UK air law.	
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 within the nacelle of the turbine and can affect communication equipment in proximity to the turbines. ▪ There are two fixed microwave telecommunications links crossing the Site, both operated by Mobile Broadband Network Ltd (MBNL) between Green Lowther and Castle Hill and between Green Lowther and Mountherrick Hill. There is a further link operated by Arqiva, running north from Leadhills to Black Hill. Further links across the Site have been identified by Joint Radio Company (JRC).	▪ 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 should be agreed with the system operators (if required).

3.6 Design Evolution and Alternative Layouts

3.6.1 **Figure 3.1** (**EIAR Volume 3a**) summarises the Proposed Development design evolution from initial landscape-led design to the design freeze layout. During the design evolution process six main design iterations and revisions were produced. The following paragraphs explain the changes made through the design iterations. The key environmental constraints which influenced the design are shown on **Figure 3.2 (EIAR Volume 3a)**.

Turbine Layout

Turbine Numbering

3.6.2 Throughout the design evolution process, the removal/addition of turbines resulted in the need to re-number turbines. There were two main iterations of the initial layout prior to EIA Scoping, turbines were then re-numbered for the purposes of the Scoping consultation, and a final turbine numbering system was established for the design freeze. The layout iterations are shown on **Figure 3.1 (EIAR Volume 3a)**. A summary of turbine numbering is shown in **Tables 3.2 and 3.3**.

Table 3.2 Turbine Numbering (Layouts 1 and 2)

Layout 1: Initial Landscape Design Layout	**Layout 2: Amended Layout with Further Landscape and Cultural Heritage Input**
1	Removed
2	2
3	3
4	4
5	Removed
6	6
7	7
8	8
9	9
10	10
11	11
12	Removed
13	Removed
14	Removed
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	Removed
23	23
24	24
25	25

Table 3.2 Turbine Numbering (Layouts 1 and 2)	
Layout 1: Initial Landscape Design Layout	**Layout 2: Amended Layout with Further Landscape and Cultural Heritage Input**
26	26
27	27
28	28
29	Removed
30	30
31	31
32	32
33	Removed
34	34
35	35
36	36
37	37

Table 3.3 Turbine Numbering (Layouts 3, 4, 5 and 6)			
Layout 3: Scoping Layout	**Layout 4: Further Baseline Constraints Consideration Layout**	**Layout 5: Design Chill Layout**	**Layout 6: Design Freeze Layout**
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	Removed		
14	14	14	13
15	15	15	14
16	16	16	15
17	17	17	16
18	18	18	17
19	19	19	18
20	20	20	19
21	21	21	20
22	22	22	21

Table 3.3 Turbine Numbering (Layouts 3, 4, 5 and 6)			
Layout 3: Scoping Layout	**Layout 4: Further Baseline Constraints Consideration Layout**	**Layout 5: Design Chill Layout**	**Layout 6: Design Freeze Layout**
23	Removed		
24	Removed		
25	Removed		
26	Removed		
27	Removed		
28	28	Removed	
29	29	Removed	
30	30	Removed	
31	31	Removed	
32	32	Removed	
	33	Removed	
	34	Removed	

LAYOUT 1: INITIAL LANDSCAPE DESIGN LAYOUT (37 TURBINES)

3.6.3 The initial landscape design layout represented the original turbine layout proposed by the Applicant, based on consideration of landscape capacity only in conjunction with landownership constraints.

3.6.4 This initial layout considered landscape design and spacing of turbines in line with expected prevailing wind direction as derived from published wind atlas data.

3.6.5 At this stage in the Site's design, it was considered that the Site could theoretically accommodate up to 37 turbines up to a 220 m maximum tip height.

LAYOUT 2: AMENDED LAYOUT WITH FURTHER LANDSCAPE AND HERITAGE INPUT (29 TURBINES)

3.6.6 The first layout iteration was made in response to the following:

- An initial cultural heritage feasibility study of the Site; and
- Further analysis of landscape and visual amenity constraints.

3.6.7 As a result of the above, the following changes were made:

- Turbines 1, 5 and 22 were removed in order to reduce potential impacts on visual amenity;
- Turbines 12, 13 and 14 were removed due to their proximity to scheduled monument SM4516 (North Shortcleugh, platform settlement) and potential for impact on the setting of this designated heritage asset, in conjunction with the potential visual prominence of turbines in these locations;
- Turbine 29 was removed due to the presence of numerous non-designated heritage assets in this area and the potential for both direct and indirect impacts on these assets; and

- Turbine 33 was removed in order to provide opportunity for further set-back of the remaining turbines from scheduled monument SM5817 (Leads mines and associated remains, Leadhills) and to create a more even spread of turbines in the landscape.

LAYOUT 3: SCOPING LAYOUT (32 TURBINES)

3.6.8 The Scoping layout represented the layout that was developed following the addition of further land area to the red line boundary, to the southeast. This provided the opportunity to introduce further turbine locations in this southeastern area.

3.6.9 The Scoping layout was also based on further desk-based constraints review, taking account of additional site-based information as follows:

- further analysis of the landscape and key views from locations within the surrounding area;
- peat depth survey data gathered from Stage 1 peat probing survey; and
- mapping of additional environmental constraints including residential properties, sensitive ecological habitats and watercourses.

3.6.10 For the purposes of EIA Scoping, it was considered that the Site could theoretically accommodate up to 32 turbines up to a 220 m maximum tip height. Turbines were re-numbered for the Scoping consultation, as presented in Table 3.3 above.

LAYOUT 4: FURTHER BASELINE CONSTRAINTS CONSIDERATION LAYOUT (28 TURBINES)

3.6.11 Following the Scoping stage, further environmental constraint information was gathered and led to the development of an amended layout, which was identified in response to the following:

- initial noise modelling of Scoping Layout;
- community feedback following the initial public consultation period in May 2025;
- review of visual amenity from key viewpoints within the local area;
- the findings of the ornithology surveys; and
- the findings of habitat surveys.

3.6.12 As a result of a review of the constraints outlined above, the following turbine movements were made:

- Turbines within the central/northern turbine group (Turbines numbered 9-23) were generally moved in towards the centre of the area and re-positioned to reduce their elevation in the landscape, which also reduced their prominence from viewpoints on the B797 and B7040 roads. In addition:
  - Turbine 13 was removed in order to avoid potential impacts over a large blanket bog area;
  - Turbine 23 was removed due to its potential prominence in views from the B7040;
- Turbines within the southern turbine group (Turbines numbered 24-32) were reviewed and the following changes were made:
  - Turbines 24-27 were identified as being highly prominent in views from the B7040 road and from Leadhills village, with little opportunity to reposition these due to the steep topography. In addition, Turbine 26 was constrained by proximity to a Schedule 1 species nesting location. Therefore, these turbines were removed.

– Turbines 33 and 34 were added for further consideration.

3.6.13 Overall, six turbines were removed and two were added, resulting in a 28-turbine layout.

LAYOUT 5: DESIGN CHILL LAYOUT (21 TURBINES)

3.6.14 The design chill layout incorporated the following:

- further review of cultural heritage, aviation and telecommunications link constraints; and
- preparation by the civil engineering team of an initial site infrastructure layout, including internal site tracks, construction compounds, substation, BESS and borrow pit search areas.

3.6.15 During this process, the layout was refined through micrositing of turbines to optimise internal track and infrastructure alignment, whilst taking into consideration known environmental and engineering constraints and maintaining turbine spacing to maximise wind resource potential.

3.6.16 In particular, the following design changes were made:

- Turbine 1 was moved north onto an area of suitable gradient for the turbine hardstanding;
- Turbine 2 was moved south to ensure the hardstanding would avoid an area of blanket bog;
- Turbine 17 was moved west to a suitable gradient for the turbine hardstanding;
- Turbine 21 was moved north-west to ensure location on a suitable gradient for the track; and
- Turbines 28-34 were removed as a group in order to avoid potential setting impacts on designated heritage assets within Glenochar valley to the east and to reduce potential impacts on aviation and on a telecommunications link path.

3.6.17 Overall, seven turbines were removed, resulting in a 21-turbine layout.

LAYOUT 6: DESIGN FREEZE LAYOUT (21 TURBINES)

3.6.18 The design freeze layout represents the final layout which was amended in response to the following:

- Further review of the track and infrastructure layout against environmental constraints information, including Stage 2 peat data, cultural heritage assets, sensitive ecological habitats and watercourses; and
- Output from the telecommunications impact assessment and identification of further telecommunications link paths.

3.6.19 The following final design changes were made:

- The access track into the western turbine area from the B797 was amended in order to avoid potential impacts on the scheduled monument SM 4714 (Waterhead, platform settlement). This involved moving the proposed junction with the B797 road to a location further north at Lettershaws, north of the minor road to Crawfordjohn, and designing a new track alignment;

- The access track between Turbines 5, 6, 7 and 8 was amended in order to avoid a historical mining area and associated risks of ground instability, as well as to avoid areas of deeper peat;
- The access track between T17 and T10, T11 and T12 was amended to ensure reduced potential impacts on blanket bog habitat on Harryburn Brae, which included minor modifications to the associated turbine hardstanding locations;
- Turbine 1 was moved east in order to avoid a telecommunications link path;
- Turbine 8 was moved north-west to reduce overall track length and increase the distance of infrastructure to a mining risk area; and
- Turbine 10 and Turbine 12 were both moved north to avoid a telecommunications link path buffer.

3.6.20 The amendments described above have resulted in a proposed 21-turbine layout, and turbines were re-numbered as presented in **Table 3.3** above.

3.6.21 In addition, a review of existing estate tracks in proximity to proposed tracks was undertaken. This identified approximately 2.94 km of track that could be replaced by new proposed tracks. The Proposed Development includes a commitment to the restoration of habitat in the area of these existing tracks as identified on **Figure 2.1 (EIAR Volume 3a)**.

3.7 Summary of Preferred Option

3.7.1 The option taken forward for assessment is the Design Freeze Layout as presented in **Chapter 2 (EIAR Volume 2)** and shown in **Figure 2.1 (EIAR Volume 3a)**.

3.7.2 By following the design guidance described in **Table 3.1**, the turbines were sited to reduce potential impacts to landscape, views, heritage features, sensitive ecological habitat, ornithology constraints and existing telecommunications infrastructure, while the infrastructure footprint has been optimised to minimise overall track length, potential impacts to peatland and the number of watercourse crossings. Likely significant effects have been avoided or minimised as far as reasonably practicable through the design process.

3.7.3 It is acknowledged that the proposed access track between T20 and T21 and between T16 and T18 would cross deep peat; however, the proposed alignment of the access track in these locations represents the shortest practicable route and takes account of the engineering specifications for turbine component delivery, including track geometry requirements arising from the area’s topography. Rerouting the track to avoid the sections of deeper peat on the Site would necessitate a substantially longer alignment. A floating track solution is proposed in these locations (as described in **Chapter 2, EIAR Volume 2**), with the intention of reducing peat disturbance as far as practicable.

4 Landscape and Visual Amenity

4.1 Introduction

4.1.1 This chapter of the 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 Landscape and Visual Impact Assessment (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, and 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, Tom Finnie Photography and Natural Power visualisation specialists.

4.1.6 This chapter is supported by the following Technical Appendices and Figures:

- EIAR Volume 3a: Figures (Figures 4.1 to 4.17);
- EIAR Volume 3b: Visualisations (Figures 4.18.1 to 4.36.6); and
- EIAR Volume 4: Technical Appendices:
  - Technical Appendix 4.1: Landscape and Visual Impact Assessment Methodology;
  - Technical Appendix 4.2: Operational and Under-Construction Sites within 25 km;
  - Technical Appendix 4.3: Landscape Assessment;
  - Technical Appendix 4.3: Visual Assessment;
  - Technical Appendix 4.5: Cumulative Assessment;
  - Technical Appendix 4.6: Aviation Lighting Assessment;
  - Technical Appendix 4.7: Implications for Designated Landscapes; and
  - Technical Appendix 4.8: Residential Visual Amenity Assessment.

4.1.7 Figures and technical appendices are referenced in the text where relevant.

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

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 Edition (GLVIA3) (Landscape Institute, Institute of Environmental Management and Assessment, 2013)[2].

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 The scope of this chapter is set out in **Table 4.1**. The scope of the assessment has been informed by initial fieldwork, Zone of Theoretical Visibility (ZTV) coverage, Scoping Report and Opinion (**Technical Appendices 1.4 and 1.5, EIAR Volume 4**), consultation responses (**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)[3];
- Landscape Character Assessment: Guidance for England and Scotland (Countryside Commission and Scottish Natural Heritage (SNH, 2002)[4];
- Siting and Designing Windfarms in the Landscape (SNH, 2017)[5];
- Visual Representation of Wind Farms, Guidance (SNH, 2017)[6];
- Technical Guidance Note 06/19 Visual Representation of Development Proposals (LI, 2019)[7];

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

[3] 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: Notes and Clarifications on aspects of the 3rd Edition Guidelines on Landscape and Visual Impact Assessment (GLVIA3) LITGN-2024-01 – The Landscape Institute [Accessed: 19th June 2026]

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

[5] 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 [Accessed: 19th June 2026]

[6] 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 [Accessed: 19th June 2026]

[7] 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 [Accessed: 7th of April 2026

- Assessing the Cumulative Landscape and Visual Impact of Onshore Developments (NatureScot, 2021)[8];
- Guidance on Aviation Lighting Impact Assessment (NatureScot, 2024)[9];
- Special Landscape Qualities - Guidance on assessing effects (NatureScot, 2025)[10];
- Talla-Hart Fells Wild Land Area (NatureScot, 2014)[11]; and
- Residential Visual Amenity Assessment (RVAA), Technical Guidance Note 2/19 (LI, 2019)[12].

4.2.5 Distances noted within **Table 4.1** are from the nearest proposed turbine and based on the Study Areas stated in **Technical Appendix 4.1 (EIAR Volume 4)**. All Study Areas are calculated from the outermost turbines.

Table 4.1: Impacts Considered within the Assessment

Impact	**Phase***		
	C	***O/M***	***D***
Effects on the Site	*X*	*X*	*X*
Effects on landscape character within approximately 15 km.		*X*	
Effects on views from routes within approximately 25 km.		*X*	
Effects on views from local paths and locally promoted paths within approximately 5 km.		*X*	
Effects on views from settlements within approximately 10 km.		*X*	
Cumulative effects within approximately 25 km.		*X*	
Effects on landscape and visual receptors from aviation lights within 25 km.		*x*	
Effects on designated landscapes within approximately 25 km.		*x*	

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

4.2.6 This 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.

[8] 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 [Accessed: 7th of April 2026]

[9] NatureScot (2024) Guidance on Aviation Lighting Impact Assessment. Available online from: https://www.nature.scot/doc/guidance-aviation-lighting-impact-assessment [Accessed: 7th of April 2026]

[10] NatureScot. (2025) Special Landscape Qualities – Guidance on assessing effects. Available online from: https://www.nature.scot/doc/special-landscape-qualities-guidance-assessing-effects [Accessed: 7th of April 2026]

[11] NatureScot. (2014) Talla-Hart Fells Wild Land Area. Available online from: https://www.nature.scot/doc/assessing-impacts-wild-land-areas-technical-guidance [Accessed: 7th of April 2026]

[12] Landscape Institute (2019) Residential Visual Amenity Assessment (RVAA), Technical Guidance Note 2/19. Available online from: https://web.archive.org/web/20220202133918/https://www.nature.scot/sites/default/files/2021-06/Wild%20land%20Description%20Talla-Hart-fell-July-2016-02.pdf [Accessed: 7th of April 2026]

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

Potential Effects Scoped Out

4.2.8 Where receptors are unlikely to be affected by the Proposed Development, either through having little or no theoretical visibility, or being distant from the Site, they have been scoped out of the assessment. In addition to this, the scope of reporting in the LVIA has further focussed on those effects that are found to be significant or contribute to the meaningful discussion of landscape and visual effects of the Proposed Development.

4.2.9 The following effects have been scoped out of the LVIA, on the basis of initial fieldwork and ZTV coverage (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 settlements beyond approximately 10 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;
- Cumulative effects from turbines of less than 50 m to blade tip;
- Cumulative effects from developments 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 on landscape and visual receptors beyond the Site.

4.2.10 Viewpoint selection was also a form of containing the scope of the assessment, via the selection of viewpoints that are representative of sensitive landscape and visual receptors identified by ZTV mapping of having theoretical visibility of the Proposed Development, rather than exhaustive inclusion of all locations within the ZTV. The rationale behind the selection of viewpoints is set out in **Technical Appendix 4.4: Visual Assessment, (EIAR Volume 4).**

Method of Baseline Characterisation

Extent of the Study Area

4.2.11 NatureScot guidance (SNH, 2017) suggests that, for turbines 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.

4.2.12 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)**. Study Areas are calculated from the outermost turbines and have been refined to allow the assessment 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 Study Areas have therefore been used for the assessment:

- Operational and developments currently under-construction within 25 km of the Proposed Development, see **Technical Appendix 4.2 (EIAR Volume 4)**;
- Landscape effects were considered for landscape character within 15 km of the outer turbines, see **Technical Appendix 4.3 (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 4.4 (EIAR Volume 4)**;
- Cumulative effects on landscape character and visual amenity within 25 km, see **Technical Appendix 4.5 (EIAR Volume 4)**;
- Visual effects from aviation lighting within 25 km, see **Technical Appendix 4.6 (EIAR Volume 4)**;
- Effects on the special qualities of designated landscapes within 25 km, see **Technical Appendix 4.7 (EIAR Volume 4)**; and
- Visual effects on residential amenity has focussed on properties within 2.5 km of the outer turbines, see **Technical Appendix 4.8 (EIAR Volume 4)**.

Desk Study

4.2.13 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)[13];
- SiteLink (NatureScot, 2025)[14];
- Scottish Landscape Character Types Map and Descriptions (NatureScot, 2019)[15];
- Landscape Character Assessment: Glasgow and the Clyde Valley – Landscape Evolution and Influences (NatureScot, 2019)[16];
- South Lanarkshire Landscape Character Assessment (Ironside Farrar, 2010)[17];
- Wild Land Areas (SNH, 2017)[18]; and
- South Lanarkshire Validating Local Landscape Designations (Ironside Farrar, 2010)[19].

4.2.14 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)[20].

[13] South Lanarkshire Council. (2021) South Lanarkshire Local Development Plan 2. Available online from: https://www.southlanarkshire.gov.uk/developmentplan2 [Accessed: 7th of April 2026]

[14] NatureScot. (2025) SiteLink. Available online from: https://sitelink.nature.scot/home [Accessed: 7th of April 2026]

[15] 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 [Accessed: 24th June 2026]

[16] 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-characterassessment-glasgow-and-clyde-valley-landscape-evolution-and-influences [Accessed: 7th of April 2026]

[17] Ironside Farrar (2010) South Lanarkshire Landscape Character Assessment. South Lanarkshire Council.

[18] Scottish Natural Heritage. (2017) Wild Land Areas. Available online at: https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/wild-land/wild-land-area-descriptions-and-assessment-guidance [Accessed: 24th June 2026]

[19] Ironside Farrar (2010) South Lanarkshire Validating Local Landscape Designations South Lanarkshire Council.

[20] Ironside Farrar (2016) South Lanarkshire Landscape Capacity Study for Wind Energy. South Lanarkshire Council

Field Survey

4.2.15 Field survey work was carried out during several visits under differing weather conditions, between September 2023 and May 2026. 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 25 km from the outermost turbines to consider potential effects on landscape character and on experiences of views seen from routes and the summits of hills.

Method of Assessment

Overview

4.2.16 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

4.2.17 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.

4.2.18 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.

4.2.19 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.

4.2.20 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.

4.2.21 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 May 2026.

4.2.22 It should also 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.

4.2.23 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 micrositing. A **cumulative cut-off date of 6th March 2026** was applied to allow sufficient time to undertake the assessment and production of supporting figures and visualisations.

4.2.24 Wirelines have been produced for cumulative developments out to 25 km from the outermost turbines. Therefore, photographs may include operational or under construction wind farms that are not shown on wirelines.

4.2.25 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 Site is located entirely within the administrative boundaries of SLC on elevated upland ground within the Southern Uplands, forming part of a wider upland hills and plateau extending across the south of Scotland. Covering approximately 2,555 hectares (ha), the Site occupies an area of land between the B797 road to the north, the B7040 road to the south, extending west of the M74 Motorway / A74 (M) road to the Snar Water. The Site boundary is approximately 530 m from Leadhills village at its closest point.

4.3.2 **Figure 4.1 (EIAR Volume 3a)** shows the initial 45 km Study Area extends between Whitburn in the north, to the southern outskirts of Dumfries in the south, Ettrickbridge in the east, and Coylton in the west. Within the 45 km Study Area, the landscape varies and includes open moorland, improved grassland and semi-improved grassland, with areas of forestry plantation. The Southern Uplands are orientated in an east and west direction across the middle of the 45 km Study Area, separating plateau farmland and moorland surrounding the outskirts of Glasgow to the north, and the lower lying areas of Annandale and Nithsdale to the south which are contained by a series of foothills and farmland leading to the lower lying land surrounding the Solway Coast.

4.3.3 This complex landscape includes a key transport corridor between Scotland and England which passes through the Southern Uplands through a series of steep glens. This includes the M74 Motorway which changes to the A74 (M) road south of Abington, the West Coast Railway Line and key services such as an overhead line and high-pressure gas pipeline.

4.3.4 A total of 45 operational wind farms and five wind farm developments currently under-construction are located within the 25 km Study Area as of 6th March 2026. These are shown on **Figure 4.6 (EIAR Volume 3a)** and listed in **Technical Appendix 4.2 (EIAR Volume 4)**.

Landscape Character

4.3.5 There is a total of 20 LCTs within the 20 km Study Area, covering the Southern Uplands, moorland, farmland and river valley landscapes of varying scales. A review of potential visibility of the Proposed Development was undertaken using the ZTV shown on **Figure 4.8 (EIAR Volume 3a)** as , and visualisations within **EIAR Volume 3b**, This established which LCTs have the potential for significant effects from the Proposed Development and were therefore assessed in more detail in **Technical Appendix 4.3 (EIAR Volume 4)**; the following LCTs were assessed in greater detail:

- 177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit;
- 207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit;
- 209. Upland Glen - Glasgow & Clyde Valley; and
- 217 Southern Uplands – Glasgow & Clyde Valley.

Visual Amenity

4.3.6 Visual receptors are people, who would be affected by the changes in views and visual amenity within the Study Area. This includes local residents, road users, walkers, and visitors.

4.3.7 **Technical Appendix 4.4 (EIAR Volume 4)** discusses potential visual effects of the Proposed Development on visual receptors within the following Study Areas from the outermost turbines:

- Routes and long distance footpaths – 25 km;
- Settlements – 10 km; and
- Core Paths and Rights of Way – 5 km.

4.3.8 A review of the ZTV established the following receptors as potentially receiving significant effects:

SETTLEMENTS

- Abington;
- Crawford;
- Crawfordjohn;
- Elvanfoot;
- Leadhills; and
- Wanlockhead.

ROADS / RAILWAY LINE

- M74 Motorway / A74 (M) road;
- A73 road;
- A702 road;
- B797 road;
- B7040 road;
- B7078 Road / NCR 74; and
- West Coast Mainline.

LONG DISTANCE FOOTPATHS

- Southern Upland Way.

SCOTTISH HILL TRACKS

- 56: Coulter to Crawford;
- 57: Roberton to Douglas;
- 58. Douglas to Wanlockhead;
- 59: Muirkirk to Wanlockhead;
- 61/61a: Wanlockhead to Sanquhar; and
- 62: Wanlockhead to Enterkinfoot by the Enterkin Pass.

CORE PATHS

- 19 Core Paths.

HILL TOPS

- Hill tops to the north;
- Hill tops to the northeast, east and southeast;
- Hill and hill tops to the south; and
- Hill tops to the west.

Future Baseline

4.3.9 Within the 20 km Study Area, the development of renewable energy would continue without the Proposed Development due to a combination of the Scottish Government's onshore targets to achieve net-zero by 2045, and the high wind speeds available. This could also potentially include developments which are currently within the planning system shown on **Figure 4.12 (EIAR Volume 3a)** and new renewable energy proposals yet to be developed.

4.3.10 Climate change would bring subtle changes to the landscape from higher temperatures, increased rainfall and stronger winds, including storms. This may result in changes to soils and vegetation and different approaches to agriculture, including grazing and crops. Some of these changes vary in duration; for example, strong winds may result in damage or felling of trees, which would be instantly visible, to a more gradual change in vegetation through plant diseases and changes in habitat.

4.3.11 The Site is expected to stay similar to the current landscape baseline and continue to be moorland managed for grouse, rough pasture and forestry.

Summary of Sensitive Receptors

4.3.12 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 4.2**, together with their associated sensitivity.

Table 4.2: Summary of Sensitivity Landscape and Visual Receptors

Receptor	Sensitivity	Justification
Landscape Character		
The Site	Medium	Potential direct effects on the physical fabric of the Site
177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit	Medium	This LCT occurs in four large areas within the southern half of the 20 km Study Area, one of which covers the uplands surrounding Wanlockhead, abutting the Site within Dumfries and Galloway Council administrative area. Due to its proximity to the Proposed Development, close visibility of the turbines proposed would be received, potentially resulting in a change in character. The remaining three units located within the 20 km Study Area are approximately 13.2 km to the southeast (Annandale), 7.1 km to the south (Lowther Hills), and 12.6 km to the southwest (Nithsdale). Theoretical visibility is predicted in all three units although this would be confined to the upper slopes and summits. Within the three units, it is not considered that the character of the LCT would change from the addition of the Proposed Development to the baseline.
207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit	High	Three units of this LCT are located to the northwest of the Proposed Development covering the Duneaton Water, Douglas Water, and the Logan Water and River Nethan. The Duneaton Water unit of the LCT is situated approximately 450 m from the Site and is predicted to receive widespread theoretical visibility which could alter the character of the valley. The remaining two units would also receive theoretical visibility but would be reduced by intervening landform and be more distant 8.6 km (Douglas Water) and 16.9 km (Logan Water / River Nethan) and it is not

Table 4.2: Summary of Sensitivity Landscape and Visual Receptors		
Receptor	**Sensitivity**	**Justification**
		considered that the addition of the Proposed Development to this baseline would alter the character of both units.
209. Upland Glen – Glasgow & Clyde Valley	Medium	This LCT is partly found within the Site and is predicted to receive widespread theoretical visibility of the Proposed Development which could alter its character.
217 Southern Uplands – Glasgow & Clyde Valley	Medium	The Proposed Development would be located within this LCT and could potentially alter its character.
Settlements		
Abington	High	Situated approximately 3.5 km to the northeast of the nearest turbine, 1-21 turbines are predicted to be visible at a relatively close distance.
Crawford	High	Located approximately 2.2 km to the northeast of the nearest turbine, 1-15 turbines are predicted to be visible from the northern part of the village.
Crawfordjohn	High	Situated approximately 5.6 km to the northwest of the nearest turbine. The ZTV predicts that theoretical visibility would be widespread across the village of 1-15 turbines.
Elvanfoot	High	Located approximately 2.8 km to the southeast of the nearest turbine, the ZTV predicts widespread theoretical visibility of 1-21 turbines.
Leadhills	High	Situated 1.7 km to the northwest of the nearest turbine with the proposed turbines extending to the northeast, the ZTV shows widespread theoretical visibility of 1-21 turbines.
Wanlockhead	High	Situated approximately 3.1 km to the southeast of the nearest turbine, the ZTV shows theoretical visibility of 1-5 turbines in the east of the village, with the majority of properties not receiving a view.
Roads and Railway Line		
M74 Motorway / A74 (M) road	Low	This motorway is generally orientated in a northwest to southeast direction, and the northeast corner of the Site abuts the motorway near Abington. Theoretical visibility is predicted to be between 1-21 turbines from long sections to the north of the Proposed Development, reducing to shorter sections from the east and near Lockerbie where 1-5 turbines are predicted.
A73 road	Medium	Located approximately 7 km to the northeast of the nearest turbine, this road extends between Lanark in the north, and a roundabout northeast of Abington in the south. Generally following a north to south direction, the road meanders through a series of valleys within the 25 km Study Area constantly changing direction. The ZTV illustrates theoretical visibility of 1-21 turbines along two sections, approximately 3.7 km through Lanark, 23 km to the north of the nearest turbine. From here, intervening trees and buildings would reduce views of turbines to distant features beyond operational developments. A further section closer to the Site measuring 10.7 km between Broadlees and the southern roundabout is also predicted to receive theoretical visibility of the Proposed Development at 7.0 km at its closest point.
A702 road	Medium	This road extends between Biggarshiels in the northeast and close to Tynron in the southwest, approximately 50 m at its closest point to the Site.

Table 4.2: Summary of Sensitivity Landscape and Visual Receptors		
Receptor	**Sensitivity**	**Justification**
		Theoretical visibility is predicted to be widespread between Biggarshiels and Elvanfoot of 1-21 turbines up to 25 km away. Thereafter, not being visible to the south until Tynron where 1-5 turbines are predicted at a distance of approximately 24.2 km.
B797 road	High	This road passes through the centre of the Site orientated generally in a northeast to southwest direction. Extending between Abington in the north, and Mennock in the southwest, theoretical visibility is predicted of 1-21 turbines between Abington to the south of Wanlockhead for approximately 13.1 km.
B7040 road	High	This road passes the southern boundary of the Site between Elvanfoot in the east and Leadhills in the west. Widespread theoretical visibility is predicted from the route of 1-21 turbines.
B7078 Road / NCR 74	Medium	This road extends between Elvanfoot in the east, and Leadhills in the west along the Elvan Water valley and is adjacent to the southern boundary of the Site. Orientated generally in a northeast to southwest direction, the ZTV illustrates that the Proposed Development would theoretically be visible from the majority of this road between 1-15 turbines.
West Coast Mainline	Low	Located approximately 2 km at its closest point to the northeast of the Site, the railway line extends in a north to south direction between the south of Carstairs Junction, and Upper Murthat in the south, meandering through the Southern Uplands. Several long sections of the railway line would obtain close views of the proposed turbines.
Long Distance Footpaths		
Southern Upland Way (SUW)	High	This long-distance walking route passes through the southern half of the 25 km Study Area between Yardburgh Hill (474 m AOD) southeast of Moffat, and Back Hill southwest of Sanquhar. Located approximately 700 m at its closest point to the Site, the ZTV illustrates theoretical visibility would occur on sections of the SUW near Moffat, Daer Reservoir, Lowther Hill (725 m AOD) to a pass near Conrig Hill (485 m AOD), and the uplands on the western side of Nithsdale of 1-21 turbines varying from close to distant views.
Scottish Hill Tracks		
56: Coulter to Crawford	High	Located at 2.9 km at its closest point, this footpath extends through a series of interconnecting glens in the Southern Uplands and through Clyde Extension Wind Farm. The Proposed Development would be visible from short, elevated sections along the route and a long section west of Camps Reservoir.
57: Roberton to Douglas	High	This footpath extends across moorland between two glens at 9.3 km to the northeast of the nearest turbine. Theoretical visibility of 1-21 turbines for long sections with some screening by landform occurring southeast of Fallside and northwest of Nap Bridge.
58. Douglas to Wanlockhead	High	The footpath passes through the western side of the Site and is predicted to receive theoretical visibility of 1-21 turbines for long sections.
59: Muirkirk to Wanlockhead	High	This footpath crosses the Southern Uplands passing to the west of the Site, 2.2 km from the nearest turbine. On reaching Duntercleuch Rig (377 m AOD), the

Table 4.2: Summary of Sensitivity Landscape and Visual Receptors		
Receptor	**Sensitivity**	**Justification**
		footpath follows the SUW. Theoretical visibility is predicted from Duntercleuch to Shiel Hill (486 m AOD), thereafter limited to a highpoint at Meikle Knypes and Fingland.
61/61a: Wanlockhead to Sanquhar	High	This footpath takes two separate routes from Wanlockhead, the first heads northwest along the SUW and up over Glengaber Hill. The second route heads west from Wanlockhead over Black Hill (550 m AOD), and Green Hill (389 m AOD) following a ridgeline before both paths meet near Stitchen Cleuch. Theoretical visibility is predicted from elevated ground of 1-21 turbines at a distance of 2.6 km to the nearest turbine.
62: Wanlockhead to Enterkinfoot by the Enterkin Pass	High	The footpath extends to the southeast splitting near Rough Cleuch to the south and southwest to Enterkinfoot. Theoretical visibility is predicted from elevated ground facing the Site at a distance of 3.6 km to the nearest turbine.
Core Paths		
Core Paths within 5 km	High	19 out of 33 Core Paths have been assessed within 5 km due to theoretical visibility predicted along the majority of the route.
Hill Tops		
Hill tops to the north	High	Theoretical visibility of the Proposed Development predicted from summits and upper slopes, many of which are popular walking areas.
Hill tops to the northeast, east and southeast	High	
Hill and hill tops to the south	High	
Hill tops to the west	High	

4.4 Embedded 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 4.3**.

Table 4.3: Summary of Embedded Mitigation		
Phase	**Description**	**Purpose of Mitigation**
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 4.3: Summary of Embedded Mitigation		
Phase	**Description**	**Purpose of Mitigation**
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. 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 night-time 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, over time, would result in an increase in biodiversity on the Site which in itself would change the character of the landscape creating a mosaic of habitats (see **Chapter 6 EIAR Volume 2)**).

4.5 Assessment of Likely Effects

Potential Construction Effects

4.5.1 The description of the Proposed Development is se out in **Chapter 2, (EIAR Volume 2).**

Landscape

THE SITE

4.5.2 The following viewpoints are representative of views from within the Site:

- Viewpoint 6: B797 Road (**Figures 4.24.1-13, (EIAR Volume 3b)**); and
- Viewpoint 10: B7040 Shortcleugh (**Figures 4.28.1-8, (EIAR Volume 3b)**).

4.5.3 The Proposed Development would be in three distinct phases as follows:

- Construction Phase: short-term;
- Operational Phase: long-term covering approximately 40 year lifespan; and
- Decommissioning Phase: short-term.

4.5.4 The Site is considered to have the ability to accommodate a large typology wind development, which could make a significant contribution to renewable energy needs. Therefore, the susceptibility of the landscape within the Site is judged as **Low**.

4.5.5 The majority of the Site is designated at a local level as the Leadhills and Lowther Hills Special Landscape Area (SLA), the exception being the northeastern side which lies beyond the SLA, see **Figure 4.5 (EIAR Volume 3a)**. Other landscape features of higher sensitivity include several footpaths that are used by walkers accessing the various summits within the Site. Landscape value is considered to be **Medium**.

4.5.6 Overall, the sensitivity of the landscape of the Site is considered **Medium**.

4.5.7 During construction and decommissioning, the Site would become active with the presence of vehicles including flashing beacons and construction activities within the footprint of the Proposed Development. Activities would be associated the creation and operation of construction compounds, site clearance, the extraction of stone from borrow pits for the access roads and platforms, the construction of tracks, laydown areas, import of materials, crane works associated with erecting turbines, construction of the control building, substation, and BESS, and installation of electrical cables linking the turbines with the substation. This would be followed by reinstatement works at the end of the construction phase where areas around project components would be restored for revegetation.

4.5.8 During the decommissioning phase, project components would generally be removed from the Site and restoration undertaken.

4.5.9 The construction and decommissioning phases would be short-term in duration and reversible in that construction activities would cease, and operational effects would take over, followed by the decommissioning phase.

4.5.10 The extent of physical effects of the works within the Site would involve a relatively small geographical proportion of the Site as a whole, comprising approximately 36.92 ha which equates to 1.45 %. The larger part of which would be physically unaffected by either construction, operation or decommissioning phases and would continue to be managed as grouse moorland. The scale of the components, such as wind turbines and supporting infrastructure, would change the moorland characteristics of the Site. The magnitude of change during the construction and decommissioning phases would be **High**, temporary, and reversible. The decommissioning phase would be similar to the activities discussed during construction but would be undertaken over a shorter timeframe and involve less disturbance of the ground.

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

Potential Operational Effects

Landscape

THE SITE

4.5.12 During the operational and maintenance phase, the actual footprint of the Proposed Development would reduce in size and activity compared to the construction and decommissioning phases. This would be as a result of the construction compounds and borrow pits being restored and activities associated with operation and maintenance of the Proposed Development being limited to the operation and maintenance of the assets, i.e. turbines, substation, BESS and supporting infrastructure.

4.5.13 The magnitude associated with the change from grouse moorland to incorporate an operating renewable energy generating site with supporting ground-level infrastructure would be **High** and long-term. The management of grouse moorland within the Site would continue during the operational and maintenance phase. Following reinstatement after the decommissioning phases, landscape effects would generally be reversible.

4.5.14 Overall, the predicted effect on the Site is judged to be **significant (Major)** for the duration of the operation and maintenance phase.

Operational Effects on LCTs within 20 km

177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit

4.5.15 The Wanlockhead Unit of this LCT is characteristic of a larger area that extends across East Ayrshire, Dumfries and Galloway, South Lanarkshire and the Scottish Borders. Situated adjacent to the Site boundary to the southwest, this LCT is predominantly moorland with rounded summits and small glens interspersed with forestry plantations. In the northwest, the B740 road winds its way through a narrow valley containing the Crawick Water.

4.5.16 Relatively remote with a perception of tranquillity, the unit is criss-crossed with tracks used for both grouse management and walking, one of which, the SUW, circles Well Hill offering two separate routes between Wanlockhead and Sanquhar.

4.5.17 Viewpoint 18: Glengaber Hill (see **Figures 4.36.1-6, EIAR Volume 3b)**) is representative of the views from this LCT and the SUW.

4.5.18 The landscape is large in scale, open with an exposed character interspersed with smaller-scale incised glens in between rounded hills. Wind development is a characteristic in some units of this LCT with currently no operational or under-construction developments located within the Wanlockhead Unit. However, the unit does obtain visibility of operational developments in nearby neighbouring LCTs. Landscape susceptibility to the Proposed Development is judged as **Low**.

4.5.19 Part of this LCT is located within the Thornhill Uplands Regional Scenic Area (RSA), a regional designation set out in the Dumfries and Galloway Local Development Plan 2 - 2019. Other sensitive elements within this Unit of the LCT includes sections of the SUW and summits of Wedder Dodd (445 m AOD), Stood Hill (587 m AOD), Glengaber Hill (515 m AOD) and Conrig Hill (485 m AOD). Landscape value is considered to be **Medium**.

4.5.20 Overall, landscape sensitivity of the Wanlockhead Unit of LCT 177 Southern Uplands is considered to be **Medium**.

4.5.21 The ZTV shows that theoretical visibility of the Proposed Development would be from summits and upper slopes of northeast facing hills, gradually reducing in geographical coverage beyond 5 km due to screening by the intervening landform. From these locations, operational and under-construction developments can be observed at longer distances, and the addition of the Proposed Development would result in turbines being closer to the unit, visible from a large area within 5 km from the outermost turbines, and thereafter, limited.

4.5.22 The size and scale of the change in views looking beyond the unit would be high with the key characteristics largely remaining the same. Therefore, where visible it is judged that magnitude of change would be **Medium**, reducing to **Negligible** where screening occurs and in lower lying areas where no theoretical visibility of the proposed turbines is predicted during the duration of the operational phase, and would be long-term and reversible.

4.5.23 The Proposed Development would not be located within this unit of the LCT and effects would be indirect. The main effect upon the LCT would be from views of turbines from elevated areas looking beyond the LCT. The effect on the character of the Wanlockhead Unit of LCT 177 Southern Uplands – Dumfries & Galloway is judged to be **significant (Moderate)** for a localised area within 5 km to the southwest, thereafter, reducing to **not significant (Negligible)**.

207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit

4.5.24 Of the four units of this LCT located within the 45 km Study Area, the Duneaton Water Unit has been taken forward for assessment due to its proximity to the north of the Site.

4.5.25 The Duneaton Water Unit of this LCT marks where the lowlands surrounding Glasgow, in the north, meet the Southern Uplands to the south. Contrasting in scale, the unit is predominantly farmland with small areas of forestry and woodland and is of a smaller scale within the valley. At the top of the valley sides and in moorland areas to the west, the scale is larger. The pattern of the landscape is defined by the Duneaton Water and B740 road which travel along the valley and is linear, with fields being contained by post and wire fencing, hedgerows and trees. Settlement is limited to Crawfordjohn and smaller settlements and individual properties following the B740 road extending onto valley sides above waterbodies. The overall perception of the valley is of semi-remoteness as it extends westwards and the level of settlement reduces. In several places, there are the remnants of former mine workings.

4.5.26 The following viewpoints are representative of this unit of the LCT:

- Viewpoint 2: Crawfordjohn (see **Figures 4.22.1-6 (EIAR Volume 3b)**); and
- Viewpoint 16: Scottish Hill Track 58 (see **Figures 4.36.1-8 (EIAR Volume 3b)**).

4.5.27 The Duneaton Water Unit is considered to have a **Medium** susceptibility to the Proposed Development due to forming a narrow valley between upland and plateau landscapes and is susceptible to large-scale developments.

4.5.28 The eastern half of the Duneaton Water unit is within the Leadhills and Lowther Hills SLA. No other national or local landscape designations cover the three units within 15 km of the Site. Overall, landscape value is considered as **Medium**.

4.5.29 Overall, sensitivity of the Duneaton Unit of the LCT is assessed as **High**.

4.5.30 The ZTV indicates widespread theoretical visibility of the proposed turbines varying between 1-21 turbines. The northern side of the valley would obtain views of the proposed turbines in their entirety. Two small locations are predicted to receive no theoretical visibility due to screening by intervening landform, east of Gilkerscleuch Mains, and south and southwest of Netherhall. Visibility of the proposed turbines would reduce as a consequence of woodland and small forestry plantations within the unit; however, due to its proximity to the Proposed Development, visibility would cover a large geographical area within the unit.

4.5.31 The size and scale of the change to the character of the Duneaton Water would be high, covering a large geographical area including the valley floor and sides of the unit affecting the skyline of the valley in views to the to the south. These changes would be long-term during the operational phase and reversed following the completion of the decommissioning phase. This would occur within a localised area, extending to approximately 8 km from the outermost turbines. The Proposed Development would extend turbines westwards from Clyde Wind Farm and there would be a sufficient gap between the two developments that they would be read as two wind farms. Magnitude of change for the Duneaton Water Unit of the LCT is judged as **High**.

4.5.32 The effect on character for the Duneaton Water Unit of the LCT is judged as **significant (Major)**.

209. Upland Glen - Glasgow & Clyde Valley

4.5.33 This LCT occupies a section of the corridor containing the M74 Motorway where it changes to the A74 (M) road at Abington, the West Coast Railway Line, and a narrow glen extending westwards along the Glengonnar Water. Small to medium in scale, activity within the LCT is associated with movement, mainly traffic on the M74 Motorway, A74 (M) road, B797 road and trains on the high-speed West Coast Railway Line. The underlying character of the glens is of the Southern Uplands of rough pasture and historic features associated with the keeping of livestock such as dry stone walls and shielings. Over time, agriculture has remained as the main land use but with more modern techniques and there has been a substantial modification of features associated with travel, forestry and the expansion of settlements at Abington and Crawford. The addition of Clyde Wind Farm in the nearby Southern Uplands has led to the character of the LCT being altered.

4.5.34 The following viewpoints are representative of this LCT:

- Viewpoint 6: B797 Road (see **Figures 4.26.1-13, (EIAR Volume 3b)**);
- Viewpoint 8: Abington (see **Figures 4.28.1-6, (EIAR Volume 3b)**); and
- Viewpoint 14: B7040/A702 junction at Elvanfoot (see **Figures 4.34.1-6, (EIAR Volume 3b)**).

4.5.35 Landscape susceptibility for the LCT is assessed as **Medium** due to a combination of the small-scale features, low elevation, the M74 Motorway and West Coast Railway Line.

4.5.36 The Glengonnar Water is partially within the Leadhills and Lowther Hills SLA. The LCT also includes some cultural heritage artefacts and woodland resulting in a **Medium** value.

4.5.37 Landscape sensitivity is judged as **Medium** for the River Clyde unit of the LCT..

4.5.38 The ZTV indicates widespread theoretical visibility within the Glengonnar Water glen due to its location in the north of the Site, extending beyond the Site boundary. Within the main glen, theoretical visibility would mainly occur on the eastern side where west facing views can be experienced at Abington, Crawford and Elvanfoot. From these locations, Clyde Wind Farm is a prominent feature on adjacent hillsides. The addition of the Proposed Development to this baseline would result in further turbines appearing to the south and west and encroaching into an area currently unaffected, which would increase the intensification of wind development. A gap between the Proposed Development and Clyde Wind Farm by the LCT would be retained so they are read as two separate developments, and the key characteristics of the glen would remain as readable. Magnitude of change is judged as **Medium** up to approximately 6 km to the northeast, long-term and reversible.

4.5.39 Beyond Elvanfoot, the glen is orientated in a north to south direction and theoretical visibility would reduce due to screening from intervening landform and magnitude of change would be **Negligible**.

4.5.40 The effect on the character of LCT 209 Upland Glen – Glasgow and Clyde Valley is judged to be **significant (Moderate)** for a localised area within 5 km to the southwest, thereafter, reducing to **not significant (Negligible)**.

217 Southern Uplands – Glasgow & Clyde Valley

4.5.41 This LCT is located to the south of the Southern Upland Fault Line and encompasses the Lowther Hills; the Site is located entirely within this LCT. The general topography of the LCT is of interlocking rounded hills and small upland glens, characteristic of the wider Southern Uplands.

4.5.42 The LCT forms part of the skyline of the overall Southern Uplands observed from the north. Within the Site, there is a perception of remoteness and tranquillity, reducing in proximity to the various roads that criss-cross the landscape, distance from the M74 Motorway and West Coast Railway Line, and settlements.

4.5.43 The main landcover of the LCT comprises heather moorland generally managed for grouse shooting, interspersed with areas of bracken and forest plantation, and access tracks used to gain access to upland areas within the Site. On lower slopes, the hillsides are utilised for pasture comprising sheep farming with the remnants of former mining including spoil and features associated with the extraction and transportation of minerals.

4.5.44 The following viewpoints are representative of the views obtained from this LCT:

- Viewpoint 4: Hods Hill, Southern Upland Way (see **Figures 4.22.1-6 (EIAR Volume 3b)**);
- Viewpoint 6: B797 Road (see **Figures 4.24.1-13 (EIAR Volume 3b)**);
- Viewpoint 9: B797 South of Leadhills near Glengonnar Station (see **Figures 4.27.1-6 (EIAR Volume 3b)**);
- Viewpoint 10: B7040 Shortcleugh (see **Figures 4.28.1-8 (EIAR Volume 3b)**);
- Viewpoint 11: B7040 east of the Hass (see **Figures 4.29.1-6 (EIAR Volume 3b)**);
- Viewpoint 13: Green Lowther (see **Figures 4.31.1-8 (EIAR Volume 3b)**);
- Viewpoint 14: B7040/A702 junction at Elvanfoot (see **Figures 4.32.1-6 (EIAR Volume 3b)**);
- Viewpoint 15: Core Path SL135 (see **Figures 4.33.1-5 (EIAR Volume 3b)**);
- Viewpoint 16: Scottish Hill Track 58 (see **Figures 4.34.1-8 (EIAR Volume 3b)**); and
- Viewpoint 17: Leadhills Football Pitch (see **Figures 4.35.1-10 (EIAR Volume 3b)**).

4.5.45 This LCT is large in scale, open, and includes a variety of man-made features, including Middlemuir Wind Farm, Kennoxhead Phase 2 and Clyde Wind Farm, which lowers landscape susceptibility to wind turbine development to **Low**.

4.5.46 The majority of this LCT is designated as the Leadhills and Lowther Hills SLA as described in **Technical Appendix 4.7, (EIAR Volume 4)**, which also includes a section of the SUW, and several cultural heritage features. Landscape value is **Medium** overall, with parts of the periphery of the LCT displaying higher value.

4.5.47 Overall, sensitivity to landscape change in LCT 217 Southern Uplands – Glasgow and Clyde Valley is assessed as **Medium**.

4.5.48 The ZTV indicates widespread theoretical visibility of the Proposed Development to approximately 3 km to the east, 5 km to the south and west, thereafter, reducing on account of screening by intervening landform.

4.5.49 Potential effects on the character of the LCT would mainly be associated with views of the proposed turbines, which would have the greatest visibility within the LCT, whilst 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 operational wind farms both within the LCT (Clyde and its extension) and in neighbouring LCTs. Changes occurring would be limited in comparison to the overall size of the LCT and therefore localised, magnitude of change is judged as **Medium**, thereafter, **Negligible** due to distance and the limited extent of theoretical visibility predicted. Changes would be long-term in nature during the operational phase but would be reversible following the decommissioning phase.

4.5.50 Overall, the effect on the character of the landscape is judged as localised **significant (Major)** for an area of the LCT approximately within 3 - 5 km surrounding the proposed turbines, thereafter, levels of effect would reduce to **not significant (Negligible)** overall for the LCT.

Summary of Effects on Landscape Character

4.5.51 Of the four LCTs assessed in detail within 20 km, significant effects on landscape character were identified in all four in a localised area out to 8 km from the nearest turbine.

Visual Amenity

4.5.52 Visual receptors assessed in the LVIA are set out in detail in **Technical Appendix 4.4, (EIAR Volume 4)**.

SETTLEMENTS

4.5.53 All settlements are judged to be of **High** sensitivity as people at their home attach a **High** value to their existing view and visual amenity and are more susceptible to being affected by changes, resulting in a **High** susceptibility.

ABINGTON

4.5.54 The ZTV illustrates widespread theoretical visibility of the Proposed Development, with 1-15 turbines potentially being visible to the northwest and 1-21 turbines in the south. However, screening by buildings and trees within the village, as well as embankments associated with the M74 Motorway, reduces visibility of the proposed turbines for the majority of the village. **Figures 4.26.1-6 Viewpoint 8: Abington, (EIAR Volume 3b)** is representative of views when leaving the village via the B797 road where a more open elevated view is obtained. The nearest of the proposed turbines would be located 3.5 km to the northwest of the village.

4.5.55 The visual effect on the village is predicted to be widespread but would be reduced with screening from a combination of landform, buildings and vegetation. This would also reduce the size and scale of the change in view, which would be long-term and reversible. Magnitude of visual change is judged as **Medium** for parts of the village where views of the proposed turbines are visible, reducing to **Negligible** effect for the majority of properties within the village.

4.5.56 A **significant (Moderate)** effect is predicted for views from a limited number of properties on the periphery, mainly the north and those situated on the west. For the majority of the village, a **not significant (Negligible)** effect is predicted.

CRAWFORD

4.5.57 The ZTV illustrates that theoretical visibility of the Proposed Development is predicted to be widespread, with the main area of the village receiving potential views of 1-5 turbines and would be further reduced by screening, with 1-15 turbines being potentially visible in the north of the village including scattered properties and those located on Carlisle Road. A wireline projection from the northern part of the village is provided in **Technical Appendix 4.4: Visual Assessment, (EIAR Volume 4)**.

4.5.58 Clyde Wind Farm is partially visible to the north, and southeast from open areas within the village. The Proposed Development would be more prominent and seen in views to the west in succession with Clyde Wind Farm.

4.5.59 The geographical area where views are possible is predicted to be widespread; however, this would reduce with screening and would be limited to the northern part of the village including properties on the northern side of the West Coast Mainline and along Carlisle Road. The size and scale of the change would be reduced by intervening landform which would screen the lower proportions of the turbines. Changes in view would be long term and reversible. Magnitude of visual change is judged as **Medium** from a limited number of properties, reducing to **Low** and **Negligible** for the majority of the village due to screening.

4.5.60 A **significant (Moderate)** effect is predicted for views from a limited number of properties on the northern periphery and Carlisle Road. For the majority of the village, a **not significant (Minor)** and **(Negligible)** effect is predicted.

ELVANFOOT

4.5.61 The ZTV illustrates that there would be widespread theoretical visibility of the proposed turbines from Elvanfoot. However, for the majority of the village which faces to the northeast, the proposed Development would be to the northwest and screened by a combination of garden vegetation and landform.

4.5.62 To the north of the village where the junction between the A702 and B7040 roads meet, a few properties are predicted to receive views of 1-15 turbines. Due to the more open nature of the landscape, these properties would receive visibility of turbines on the western side of Harryburn Brae 499 m AOD.

4.5.63 **Figures 4.32.1-6 Viewpoint 14: B7040/A702 junction at Elvanfoot (EIAR Volume 3b)** represents the view when leaving the village from the north along the B7040 road.

4.5.64 The geographical coverage of theoretical visibility and the size and scale of the proportion of the turbines visible would be limited to properties on the northern side of the village in more elevated locations. Changes in views from these properties would be long term and reversible.

4.5.65 A **High** magnitude of visual change would occur to one property close to the junction with the B797 road owing to its elevated location, with the majority of the village receiving a **Low** and **Negligible** magnitude of visual change due to screening, this would be long-term and reversible.

4.5.66 A **significant (Major)** effect is predicted for views from one property at Elvanfoot on the northern periphery. For the majority of the village, a **not significant (Minor)** and **(Negligible)** effect is predicted.

LEADHILLS

4.5.67 The ZTV illustrates that theoretical visibility would be widespread across the village, ranging between 1-21 turbines, with turbines becoming more visible towards the south. The proposed turbines would be viewed to the northeast and northwest, with the nearest turbine being 1.7 km to the northwest. This would affect a few properties which are positioned apart from the main Leadhills settlement, specifically those on the northern end of Lowther View and some detached properties near Leadhills Station.

4.5.68 Figures 4.35.1-10 Viewpoint 17: Leadhills Football Pitch (EIAR Volume 3b) represents the view from the village.

4.5.69 Currently, Clyde Wind Farm is screened by landform limiting visibility to the eastern and southern fringes of the village.

4.5.70 Geographically, views of the proposed turbines would cover a large part of the village. The size and scale of the change would be reduced by intervening landform which screens a large part of the towers and limits views to turbine blades. Changes to the view would be long term and reversible. Magnitude of change is judged as **Medium** in the north of the village, and **High** in the south.

4.5.71 A **significant (Major)** effect is predicted for view from the south of the village, reducing to **significant (Moderate)** effect in the north.

WANLOCKHEAD

4.5.72 The ZTV illustrates that the majority of the village would receive no theoretical visibility owing to the containment by landform. The exception to this would be a few scattered properties on the eastern edge of the village including the Mountain Lodge which would obtain views to the north of 1-10 turbines.

4.5.73 Figures 4.23.1-7 Viewpoint 5: Upper Wanlockhead, (EIAR Volume 3b) represents the view from the eastern side of the village.

4.5.74 A very limited part of the village would be affected overall and the size and scale of the change in view would be small resulting in a **Low** magnitude of change.

4.5.75 A **not significant (Minor)** effect is predicted for views from a limited number of properties on the eastern periphery of the village. For the majority of the village, a **not significant (Negligible)** effect is predicted due to screening by landform.

Summary of Effects on Settlements within 10 km

4.5.76 Significant effects to views from Abington, Crawford, Elvanfoot and Leadhills were identified. For Abington and Elvanfoot significant effects would be limited to the western and north western edges affecting a limited number of properties in elevated areas. Crawford would receive significant effects to the northern part of the settlement, and significant effects are predicted across Leadhills. This would be in a localised area up to 5.6 km from the nearest turbine. Effects would be reduced within settlements by the surrounding built environment and vegetation. Both Roberton and Wanlockhead are not predicted to receive significant effects from the Proposed Development.

Roads and Railway Lines

M74 MOTORWAY / A74 (M) ROAD

4.5.77 The M74 Motorway / A74 (M) Road is a 70 miles per hour (mph) road comprising three lanes of traffic-oriented northwest to southeast of the Site and is a major transport route between Scotland and England. Passengers travelling in vehicles are likely to have some appreciation of views but would experience these at high speed resulting in a **Low** susceptibility. This route passes through the Mid Clyde Valley and Douglas Valley SLAs to the north of the Proposed

Development resulting in short sections of higher value; overall, the route is not covered by any national or local landscape designation and value is **Low**. Overall sensitivity is judged as **Low**.

4.5.78 The ZTV illustrates that theoretical visibility would occur along several long sections of the road, mainly occurring to the north and east of the Site.

4.5.79 This would include approximately 9.2 km section between Kirkmuirhill and Happendon in the northern part of the 25 km Study Area. From here, the proposed turbines would form distant features at approximately 15.1 – 25 km, seen beyond several operational wind farms. This would occur over a relatively long section of the road where the size and scale of the change in view would be very small. Magnitude of visual change for this section is judged as **Low** long-term and reversible.

4.5.80 To the south of Happendon Services, as far as Crawford, the Proposed Development would be visible infilling a gap between Clyde Wind Farm and the operational Andershaw and Middle Muir wind farms to the west. Mainly seen when travelling in a southbound direction, the Proposed Development would feature in the direction of travel then change to side-on views towards the west, south of Abington. This would occur along a relatively long section of the road comprising approximately 14.7 km with intermittent screening by adjacent embankments and vegetation. Due to intervening landform which partially screens the proposed turbines, the size and scale of the change would range between low and medium as the road gets nearer to the Site. Magnitude of change for this section of the road is judged to be **Low** up to approximately 7.6 km from the nearest turbine where the Proposed Development would start to feature more in the view when travelling southwards rising to **Medium** which would be long-term and reversible.

4.5.81 South of Crawford, intervening landform would reduce the number of turbines visible to between 1-15 rising to 1-21 from Wellshot Hill over approximately 7.3 km. This section of the road has forestry on each side; therefore, views of turbines would be reduced and limited to those visible along the valley.

4.5.82 Geographically, the section of the road affected would be reduced by screening, and the size and scale of the change would be low rising to medium as the road progresses away from the Site and the Proposed Development becomes more visible. Magnitude of change for this section is judged as **Medium** long-term and reversible.

4.5.83 A **significant (Moderate)** effect is predicted up to approximately 7.6 km to the northeast and seen when travelling southbound, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the motorway where the Proposed Development would be partially to fully screened by landform and forestry.

A73 ROAD

4.5.84 Susceptibility of viewers is judged as **Medium**, as road users are likely to have some appreciation of the view of the surrounding landscape. Sections of this road pass through the Upper Clyde Valley and Tinto SLAs resulting in sections of higher value; however, for the majority of the route no landscape designation applies, and value is judged as Medium. Overall sensitivity is judged as **Medium**.

4.5.85 The ZTV illustrates that theoretical visibility would be limited to approximately 10.8 km section of the road to the northeast of the Site when passing through a valley. This would be seen when travelling southbound where the Proposed Development would be visible on the ridgeline extending turbines west from Clyde Wind Farm.

4.5.86 The section of road predicted to be affected would cover a large geographical area, however, in realty views would be partially screened, with the Proposed Development becoming more noticeable at approximately 10 km. The size and scale of the change in view would be low on account of being limited to southbound views where many of the proposed turbines would be partially screened by intervening landform which would reduce their prominence. Magnitude of change for this section would be **Low** up to Roberton, rising to **Medium** for approximately 2.2 km to the roundabout with the A702 road, t and **Negligible** for the majority of the road due to a lack of visibility. Changes in view would be long-term and reversible.

4.5.87 A **significant (Moderate)** effect is predicted for an approximate 2.2 km section of this road up to 6.9 km, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road due to screening.

A702 ROAD

4.5.88 Susceptibility of viewers is judged as **Medium**, as road users are likely to have some appreciation of the view of the surrounding landscape. Sections of this road pass through the Upper Clyde Valley and Tinto, Leadhills and Lowther Hills SLAs, and the Thornhill Uplands Regional Scenic Area (RSA) resulting in sections of higher value; however, for the majority of the route no landscape designation applies, and value is judged as **Medium**. Overall sensitivity is judged as **Medium**.

4.5.89 The ZTV illustrates that theoretical visibility would occur from Bower of Mandel to Abington for approximately 4.9 km where the proposed turbines would be visible in southbound views occupying part of the ridgeline extending turbines westwards from Clyde Wind Farm.

4.5.90 From Abington, the Proposed Development would largely be screened by a combination of buildings and woodland within the settlement. **Figures 4.28.1-6 Viewpoint 8: Abington (EIAR Volume 3b)** represents the view from the road where the Proposed Development is visible. South of Abington, the proposed turbines would feature in side-on views to the west for approximately 8.1 km to Elvanfoot, gradually being screened by intervening landform. Short sections of the road are predicted to receive theoretical visibility of 1-5 turbines to the west of Thornhill. From here blades would be visible breaking the horizon of the Southern Uplands forming distant features.

4.5.91 A **significant (Moderate)** effect is predicted for a section of this road between Bower of Mandel to Abington, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road due to screening.

B797 ROAD

4.5.92 The susceptibility of viewers is **High** as they would comprise residents, cyclists and vehicle users travelling between South Lanarkshire and Dumfries and Galloway. The majority of this road is within the Leadhills and Lowther Hills SLA and Thornhill Uplands RSA, and value is considered **High**. Overall sensitivity is judged as **High**.

4.5.93 The ZTV illustrates that continuous theoretical visibility of the Proposed Development would occur in the northern section of the road extending southwards to Wanlockhead. The greatest visibility of the Proposed Development would occur to the north when travelling southbound up to Lettershaws, and from the south when travelling northbound between Wanlockhead and Leadhills. Between Lettershaws and Leadhills, the proposed turbines would be visible on either side of the road although this would be limited to the closer turbines with the tips of the further back turbines being visible intermittently.

4.5.94 The following viewpoints represent the view from different stages of the road:

- **Viewpoint 5: Upper Wanlockhead, Figures 4.23.1-7, (EIAR Volume 3b)**;
- **Viewpoint 6: B797 Road, Figures 4.24.1-6, (EIAR Volume 3b)**;
- **Viewpoint 9: B797 South of Leadhills near Glengonnar Station, Figures 4.27.1-6, (EIAR Volume 3b)**; and
- **Viewpoint 17: Leadhills Football Pitch, Figures 4.35.1-10, (EIAR Volume 3b)**.

4.5.95 Approximately 11.7 km and a few hundred metres of road south of Wanlockhead are predicted to receive theoretical visibility of the Proposed Development. The size and scale of the change would vary from different sections of the road where the proposed turbines would appear close, viewed in their entirety to the north and south, gradually becoming partially screened as the road passes through Glengonnar valley. Magnitude of change is judged as **High** up to Lettershaws in the north, and between Leadhills and Wanlockhead, reducing to **Medium** through the Glengonnar valley, and would be long-term and reversible.

4.5.96 A **significant (Major)** effect is predicted for sections of the road between Abington and Lettershaws, and between Wanlockhead and Leadhills, reducing to **significant (Moderate)** in between due to partial screening by landform. South of Wanlockhead where not visible, a **not significant (Negligible)** effect would occur on account of screening by landform.

B7040 ROAD

4.5.97 The susceptibility of viewers is **High** as they would comprise residents, cyclists and vehicle users travelling between South Lanarkshire and Dumfries and Galloway. The majority of the road is within the Leadhills and Lowther Hills SLA, and value is considered **High**. Overall sensitivity is judged as **High**.

4.5.98 The ZTV illustrates that the Proposed Development would theoretically be visible from the majority of this road between 1-15 turbines.

4.5.99 The following viewpoints represent the view from different stages of the road:

- **Viewpoint 10: B7040 Shortcleugh, Figures 4.28.1-8, (EIAR Volume 3b)**;
- **Viewpoint 11: B7040 east of the Hass, Figures 4.29.1-6, (EIAR Volume 3b)**; and
- **Viewpoint 14: B7040/A702 junction at Elvanfoot, Figures 4.32.1-6, (EIAR Volume 3b)**.

4.5.100 The proposed turbines would be viewed to the north and most noticeable when travelling westwards where they would be seen above the skyline varying in the proportion of the turbine visible from blades to full turbines intermittently. Views of the turbines would be close, and the size and scale of the change would be large, occurring over the majority of the road. Magnitude of visual change is judged as **High**, long-term and reversible.

4.5.101 A **significant (Major)** effect is predicted for this road.

B7978 ROAD / NATIONAL CYCLE ROUTE 74

4.5.102 Susceptibility of viewers is also considered to be **Medium** as road-users' attention is likely to be focused on the surrounding view. Footpaths assessed are promoted in literature, resulting in a **Medium** landscape value. Overall, sensitivity is judged as **Medium**.

4.5.103 Theoretical visibility is predicted to be similar to that described for the assessment of the M74 Motorway / A74 (M) road, albeit at a slower pace and often at a lower elevation than the adjacent motorway.

4.5.104 Magnitude of change is predicted to be **Medium** between Happendon Services and Beattock Summit, and **Low** to **Negligible** for the majority of the road and NCR owing to screening by rising landform and vegetation.

4.5.105 A **significant (Moderate)** effect is predicted south of Happendon Services to Beattock Summit, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road and NCR where the Proposed Development would be partially to fully screened by landform and forestry.

WEST COAST MAINLINE RAILWAY LINE

4.5.106 The railway line is a high speed transport route between Scotland and England. Passengers travelling in vehicles may have some appreciation of views, overall susceptibility is **Low**. The railway line passes through the Upper Clyde Valley and Tinto SLA to the northeast of the Proposed Development resulting in short sections of higher value, overall, the route is not covered by any national or local landscape designation and value is **Low**. Overall sensitivity is judged as **Low**.

4.5.107 The ZTV illustrates that theoretical visibility of the proposed turbines would occur as the railway line enters the valley containing the River Clyde and A702 road northeast of Symington. From here, the Proposed Development would be visible when travelling southbound in the direction of travel and therefore not visible to the passengers of the train. Magnitude of visual change for this section of the railway line is judged as **Negligible**.

4.5.108 On reaching Abington, the railway line changes orientation allowing passenger views of the proposed turbines to the west, when travelling both north and southbound for approximately 5.0 km to Crawford before intervening landform would reduce views to blades of 1-5 turbines. Visibility would be further reduced by embankments, infrastructure and woodland where the proposed turbines would be seen at a relatively fast speed. Magnitude of visual change for this section would be **Low**. Thereafter, screening by intervening landform would reduce the magnitude of visual change to **Negligible**. Changes in view would be long-term and reversible.

4.5.109 A **not significant (Minor)** effect is predicted for sections of the railway line between Abington and Crawford, and **not significant (Negligible)** elsewhere due to the direction of travel and screening by intervening landform.

Summary of Effects on Roads and Railway Line

4.5.110 Of the six roads and one railway line assessed, significant effects to views from sections of all six roads are predicted within a localised area up to 10 km from the nearest turbine. No significant effects are predicted for the West Coast Mainline railway line.

Footpaths

SOUTHERN UPLAND WAY

4.5.111 The SUW extends from Big Hill (432 m AOD) in the southeast, to Colt Hill (598 m AOD) in the southwest, generally following a northeast to southwest direction. This covers three sections of the SUW as follows:

- Section 5: Sanquhar to Wanlockhead;
- Section 6: Wanlockhead to Beattock; and
- Section 7: Beattock to St Mary's Loch.

4.5.112 Views from the SUW vary and include panoramic long-distance visibility when crossing elevated ground, to being more enclosed when passing through valleys and next to forestry.

4.5.113 At its closest point, the SUW would be approximately 2.7 km to the southwest of the nearest turbine, at Wanlockhead. The ZTV illustrates that several sections of the SUW would obtain visibility of the Proposed Development. For Section 5, this would be limited to approximately 750 m length west of Wanlockhead and approximately 960 m length at Glengaber Hill (515 m AOD). **Figures 4.36.1.6, Viewpoint 18: Glengaber Hill, (EIAR Volume 3b)** represent the view from this section of the SUW. From these two short sections of Section 5, the proposed turbines would extend turbines westwards from Clyde Wind Farm and be viewed across the upland landscape. Magnitude of visual change is predicted to be **High**.

4.5.114 Theoretical visibility of the Proposed Development from Section 6 would be screened by intervening landform and magnitude of visual change is judged as **Negligible**.

4.5.115 For Section 7, theoretical visibility of the Proposed Development would occur on the northwest facing slopes between Wanlockhead and Lowther Hill (725 m AOD) for approximately 2.5 km. Thereafter, theoretical visibility would be limited to 1-5 turbines on the summit of Laght Hill (507 m AOD). Further theoretical visibility is predicted from a section near Meikle Shag (501 m AOD) extending to Beld Knowe (507 m AOD) as the footpath passes around the north of Daer Reservoir. Views of the proposed turbines would vary from blade tips to full turbines the further the footpath progresses to the east. There would be some screening between Hitteril Hill (491 m AOD) and Meikle Shag on account of adjacent forestry and woodland. Magnitude of visual change is judged as **Low** from Meikle Shag to Daer Reservoir due to screening by adjacent forestry and woodland, and **High** east of Daer Reservoir due to the open nature of the landscape.

4.5.116 **Significant (Major)** effects are predicted for sections of the SUW at Glengaber Hill and between Hitteril Hill and Beld Knowe, and **not significant (Minor)** and **(Negligible)** elsewhere due to screening by landform and adjacent woodland and forestry.

Scottish Hill Tracks

4.5.117 A total of fourteen SHT were identified within 25 km Study Area as shown on **Figure 4.10 (EIAR Volume 3a)** and eight scoped out due to limited theoretical visibility predicted and distance from the Proposed Development. The following SHT included in the assessment include:

- 56: Coulter to Crawford;
- 57: Roberton to Douglas;
- 58. Douglas to Wanlockhead;
- 59: Muirkirk to Wanlockhead;
- 61/61a: Wanlockhead to Sanquhar; and
- 62: Wanlockhead to Enterkinfoot by the Enterkin Pass.

56: Coulter to Crawford

4.5.118 Located 2.9 km at its closest point, this footpath extends through a series of interconnecting glens in the Southern Uplands. Theoretical visibility of the proposed turbines is screened by landforms until the lower slopes of Craig Hill (497 m AOD) north of Camps Reservoir, except for the summit of Cowgill Rig (468 m AOD). West of Camps Reservoir, the path descends toward Crawford, the proposed turbines would extend further west from Clyde Wind Farm and its extension, which is the prominent feature within the views.

4.5.119 Visual magnitude of change would vary between **Low** where landform reduces views towards the Site, to **Medium** where the turbines would extend development further west, be long-term and reversible.

4.5.120 This would result in a **significant (Moderate)** effect west of Camps Reservoir, reducing to **not significant (Minor)** and **(Negligible)** effects elsewhere on the footpath due to screening by landform.

57: Roberton to Douglas

4.5.121 Theoretical visibility of 1-21 turbines for long sections with some screening by landform occurring southeast of Fallside and northwest of Nap Bridge, 9.3 km at its closest point.

4.5.122 From here the proposed turbines would be a distant feature and would be seen within the existing context of Clyde Wind Farms in the intervening area. Magnitude of visual change is predicted to be **Low** due to distance and the proposed turbines being beyond operational wind farms. Changes in views would be long-term and reversible. A **not significant (Minor)** effect is predicted for the views from this SHT.

58. Douglas to Wanlockhead

4.5.123 The footpath passes through the western side of the Site and is predicted to receive theoretical visibility of 1-21 turbines up to Crawfordjohn, thereafter, landform would reduce the number of turbines visible until the SHT passes through the Site and all 21 turbines would be visible as far as Hunt Law, landform would then provide screening reducing the number of turbines visible.

4.5.124 **Figures 4.34.1-8, (EIAR Volume 3b)** represents the view from the SHT.

4.5.125 Magnitude of visual change is judged as **Medium** up to Crawfordjohn, then **High** to Wanlockhead. **Significant (Major)** effects are predicted within the Site and **significant (Moderate)** effects overall for this SHT.

59: Muirkirk to Wanlockhead

4.5.126 Theoretical visibility is predicted from Duntercleuch to Shiel Hill (486 m AOD), thereafter limited to a highpoint at Meikle Knypes and Fingland with visibility of 1-21 turbines occurring over a long section of the SHT within 10 km.

4.5.127 Magnitude of change is judged as **High**, with smaller sections of **Negligible** where landform screens views. A **significant (Major)** effect is judged for the majority of this SHT, with short sections receiving a **not significant (Negligible)** effect.

61/61a: Wanlockhead to Sanquhar

4.5.128 Theoretical visibility is predicted from elevated ground of 1-21 turbines at a distance of 2.6 km to the nearest turbine. **Figures 4.36.1-6, (EIAR Volume 3b)** on Glengaber Hill represents views from this footpath.

4.5.129 From here the proposed turbines would be close with the majority of turbines being visible due to the higher elevation, resulting in a **High** magnitude of visual change. For the majority of the SHT, a **Negligible** magnitude of visual change is judged due to screening by landform. A **significant (Major)** effect is predicted from short sections of this route, reducing to **not significant (Negligible)** overall.

62: WANLOCKHEAD TO ENTERKINFOOT BY THE ENTERKIN PASS

4.5.130 Theoretical visibility is predicted from elevated ground facing the Site at a distance of 3.6 km to the nearest turbine. This would include Stake Hill (544 m AOD) and Threehope Height (551 m AOD) on a section shared with the SUW, and slopes of Whiteside (572 m AOD), and East Mount Lowther (631 m AOD) including the Auchenton Shank resulting in a **High** magnitude of visual change. Thereafter, a **Negligible** magnitude of visual change is judged for the majority of the SHT as a result of screening by landform. A **significant (Major)** effect is predicted between Wanlockhead and Threehope Hill, reducing to **not significant (Negligible)** thereafter due to screening.

Core Paths within 5 km

4.5.131 Approximately 102 sections of Core Paths are located within 5 km of the Proposed Development belonging to 35 different paths. There are some inconsistencies and some of these cover the same receptors as assessed, such as the SUW, and are mentioned under each visual receptor where appropriate in **Technical Appendix 4.4 (EIAR Volume 4)** to avoid duplication. The remaining Core Paths within the ZTV that are standalone footpaths total 19

4.5.132 Due to their proximity to the Site and combined with their open nature and extent of theoretical visibility predicted, magnitude of change is predicted to be **High** as a result of proximity to the Proposed Development. A **significant (Major)** effect is predicted for these Core Paths.

Hill Tops

4.5.133 The Study Area is predominantly an upland landscape that is popular as a hill walking area. Although 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. Given the number of hill tops for the purposes of this assessment, these have been grouped together for the purposes of the assessment and are represented by the photomontages and wirelines shown in **Figures 4.19.1 – 4.36-6, (EIAR Volume 3b)**. The following groups have been identified:

- Hill tops to the north;
- Hill tops to the northeast, east and southeast;
- Hill and hill tops to the south; and
- Hill tops to the west.

4.5.134 For all hill tops, susceptibility of viewers is considered to be **High** as walkers' attention would be focussed on the surrounding view. Hills and Mountains assessed are all considered to be of **High** landscape value due to being located in several local landscape designations and their promotion as walks. Overall, sensitivity is judged as **High**.

Summary of Effects on Views from Footpaths

4.5.135 Significant effects to views from paths are predicted from a localised area to the SUW and six SHTS within 10 km of the nearest turbine and Core Paths within 5 km.

HILL TOPS TO THE NORTH

4.5.136 **Viewpoint 1: Tinto, Figures 4.19.1-6, (EIAR Volume 3b)** represents the type of view that would be obtained from the group of hills. This shows that the Proposed Development would be viewed to the southeast occupying an area currently undeveloped between Clyde Wind Farm and its Extension, Middle Muir, Andershaw and developments west of Nithsdale at a distance of approximately 15 km. From this distance the proposed turbines would be viewed on hill tops but not dissimilar to the views currently experienced of other wind farms. Visual magnitude of change is judged to be **Low** due to distance and presence of other wind farms.

4.5.137 A **not significant (Minor)** effect is predicted for the northern group of hills as a result of distance and presence of other wind farms.

HILL TOPS TO THE NORTHEAST, EAST AND SOUTHEAST

4.5.138 From this group of hills, the Proposed Development would be viewed to the west at distances of approximately 3.6 to 25 km and the proposed turbines would be viewed beyond Clyde Wind Farm and its Extension, Harestanes and Minnygap Wind Farms, depending on location. The Proposed Development would intensify the cluster of turbines to the west and would appear more distant. Magnitude of visual change is judged as **High** and **Medium** within 10 km, reducing to **Low**.

4.5.139 A **significant (Major)** and **(Moderate)** effect would occur within 10 km, reducing to **not significant (Minor)** and **(Negligible)** thereafter.

HILL AND HILL TOPS TO THE SOUTH

4.5.140 Theoretical visibility is predicted to be limited to several summits to the south within 5 km and extending southeast. This would include summits of Dungrain Law 669 m AOD, Glen Ea's Hill 549 m AOD, Watchman Hill 454 m AOD, Leadburn Rig 400 m AOD and Green Lowther. 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 northeast. Magnitude of visual change is judged as **High**.

4.5.141 Beyond 6 km, theoretical visibility is more limited scattered up to Queensberry (697 m AOD) where the proposed turbines would be partially screened by landform and distance, the magnitude of visual change would reduce to **Medium** within 10 km, and **Low** thereafter.

4.5.142 **Significant (Major)** effects are predicted within 6 km, reducing to **significant (Moderate)** within 10 km and **not significant (Minor)** and **(Negligible)** thereafter.

HILL TOPS TO THE WEST

4.5.143 **Viewpoint 7: Cairn Table, Figures 4.21.1-6, (EIAR Volume 3b)** represents the view that would be obtained from the series of hills to the west. From here, the proposed turbines would occupy the mid-ground of the view, extending turbines further west from Clyde Wind Farm, and would be seen beyond the foreground Andershaw and Middle Muir Wind Farms, intensifying the cluster of turbines. Magnitude of visual change is judged as **High** within 10 km, thereafter, reducing to **Medium** and **Low** due to distance.

4.5.144 **Significant (Major)** effects are predicted within 10 km, reducing to **significant (Moderate)** within 15 km and **not significant (Minor)** and **(Negligible)** thereafter.

Summary of Effects to Views from Hill tops

4.5.145 Significant effects to views from hill tops have been predicted to occur from summits in a localised area up to 10 km from the nearest turbine.

Potential Cumulative Operational Effects

4.5.146 The assessment of cumulative effects is set out in **Technical Appendix 4.5 (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 the 25 km Study Area, as shown on **Figure 4.12 (EIAR Volume 3)**.

4.5.147 Scoping developments are shown on the figure for context but are not assessed due to their uncertainty both in design and progression through the planning process.

4.5.148 The cumulative assessment in **Technical Appendix 4.5 (EIAR Volume 4)** considered the potential additional effects of the Proposed Development with 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.

4.5.149 In the Consented Scenario, there would be a further concentration of turbines around existing wind farm developments. The exception to this would be Glenmuckloch (59) and Lethans Wind Farm (64), which occupy an area to the southwest between Kennoxhead and Sandy Knowe and contribute to an emerging larger concentration of turbines to the west and northwest than currently experienced with only one operational wind turbine, Glenmuckloch Energy Park (19) being present. The closest consented developments to the Site would be Lion Hill Wind Farm (65), and Kennoxhead (61) and Kennoxhead Phase 2 (Penbreck) (62) 11.5 km to the northwest appearing as part of Clyde Wind Farm (9) and Kennoxhead Wind Farm (28) respectively.

4.5.150 The In-Planning Scenario would lead to a further concentration of turbines. This would include smaller developments within the motorway corridor such as Broken Cross Energy Project, Muirhouse Farm and South Priorhill. The M74 West and Bodinglee developments would be located along the motorway corridor on either side to the northwest of Abington. Other in-planning developments would be located further to the east (Grayside) and west (Glenmuckloch Hill, Hagshaw Energy Cluster - Western Expansion Area A Phase 1, Hawkwood Hill), all located next to operational and under-construction developments. There would also be a further intensification of turbines on the western side of Nithsdale, infilling gaps between the operational and under-constructions sites. West of the A74 (M) road, Daer and Rivox would be located between Clyde and Harestanes and Minnygap Wind Farms.

4.5.151 In the Consented Scenario, Lion Hill and further away developments on the west side of Nithsdale 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 in the LVIA for operational and under-construction developments (i.e. no change in findings of effect). In the In-Planning Scenario, Daer and Rivox would result in a new cluster of turbines between Clyde and Harestanes Wind Farms occupying the southeast 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 the 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 east, Harestanes Wind Farm in the south, the M74 West and Bodinglee in the north. In addition, there would be sequential views on several of the roads and footpaths assessed. However, this is not deemed to result in additional cumulative effects due in part to the limited visibility of the Proposed Development and existing context where operational and under-construction developments are visible.

Combined Cumulative Effects

4.5.152 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.

4.5.153 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.

4.5.154 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'.

4.5.155 With consented wind farms present as well as existing wind farms, 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 operational and under-construction scenario. The southern fringe of the Southern Uplands range would remain 'with occasional wind farms' with the introduction of the Proposed Development.

4.5.156 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 to the west of A74 (M) road to a 'wind farm landscape.

Potential Aviation Lighting Effects

4.5.157 It is intended that the Proposed Development would be lit with ten turbines, Turbine 1, 3, 5, 6, 8, 9, 11, 16, 20 and 21, 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). An assessment of the effects from aviation lighting is provided in **Technical Appendix 4.6: Aviation Lighting Assessment, (EIAR Volume 4)**.

4.5.158 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 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.

4.5.159 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 and footpaths.

4.5.160 The assessment of aviation lights established that the following visual receptors judged as having **High** night-time sensitivity that would receive views of aviation lights considered to be significant:

- SUW;
- SHT: 56: Coulter to Crawford 58: Douglas to Wanlockhead, 59: Muirkirk to Wanlockhead, 61/61a: Wanlockhead to Sanquhar, 62: Wanlockhead to Enterkinfoot by the Enterkin Pass;
- Core Paths within 5 km;
- Hills to the north, northeast to southeast, south and west; and
- Residential properties within 2.5 km.

4.5.161 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.

4.5.162 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, 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

4.5.163 Designated landscapes are discussed in detail in Technical Appendix 4.7, (EIAR Volume 4) and shown on Figure 4.5 (EIAR Volume 3a).

4.5.164 Three designated landscapes were considered as follows:

- Scot's Mining Company Mining House Garden and Designed Landscape (GDL);
- Leadhills and Lowther Hills Special Landscape Area (SLA); and

- Thornhill Uplands Regional Scenic Area (RSA).

SCOT'S MINING COMPANY HOUSE GDL

4.5.165 The Proposed Development would be located approximately 2.1 km to the northwest of the GDL where the turbines would be visible above the surrounding hills to the northwest and northeast breaking the horizon. Views would be influenced by boundary vegetation and buildings, and the proposed turbines would be most visible during winter months when leaves are not on branches. This would be a visual effect from within and the boundary of the GDL and would not lead to a physical alteration of the artefacts that make the GDL distinctive. Therefore, no change to the interest of the GDL is judged as a result of the Proposed Development.

LEADHILLS AND LOWTHER HILLS SLA

4.5.166 To support the assessment, several viewpoints were considered within the SLA as follows:

- **Viewpoint 2: Crawfordjohn, (Figures 4.20.1-6, EIAR Volume 3b)**;
- **Viewpoint 6: B797 Road, (Figures 4.24.1-13, EIAR Volume 3b)**;
- **Viewpoint 9: B797 South of Leadhills near Glengonnar Station, (Figures 4.27.1-6, EIAR Volume 3b)**;
- **Viewpoint 10: B7040 Shortcleugh, (Figures 4.28.1-8, EIAR Volume 3b)**;
- **Viewpoint 11: B7040 east of the Hass, (Figures 4.29.1-6, EIAR Volume 3b)**;
- **Viewpoint 13: Green Lowther, (Figures 4.31.1-8, EIAR Volume 3b)**;
- **Viewpoint 15: Core Path SL135, (Figures 4.33.1-5, EIAR Volume 3b)**; and
- **Viewpoint 16: Scottish Hill Track 58, (Figures 4.34.1.X, EIAR Volume 3b)**.

4.5.167 In the description of this SLA a lack of extensive forestry or windfarm development is noted which engenders a sense of emptiness. The mining heritage associated with the small-scale mining industry readily visible around Leadhills, is one of the qualities attributed to the SLA.

4.5.168 The proposed turbines are theoretically visible from the northern part of the SLA, , thereafter reducing, due to intervening landform, between Louisie Wood and Lowther Hill, restricted to more distant views from around Daer Reservoir in the south, an area where Clyde Wind Farm can be seen.

4.5.169 As a result of this visibility, the Proposed Development would reduce the 'sense of emptiness' within the SLA, as identified in its description. However, it should be noted that views of wind farms are already a feature from the SLA and include Andershaw and MiddleMuir to the north, and Clyde Wind Farm to the east. 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/Andershaw Wind Farms have given rise to further amendments of the SLA.

4.5.170 No other special qualities, cultural artefacts, extensive moorland etc are impacted upon and whilst there is some loss of the sense of emptiness experienced in the southern half of the SLA, this does not substantively affect the integrity of the designation. The special qualities are not present in equal measure across all of the designated area.

4.5.171 Following a review of both landscape and visual receptors, it is not considered that the description or integrity of the SLA is compromised as a result of the introduction of the Proposed Development. Whilst it is acknowledged that there is some loss of the sense of emptiness, these effects would not result in a significant adverse effect on the integrity of the SLA.

THORNHILL UPLANDS RSA

4.5.172 To support the assessment, several viewpoints were considered within the SLA as follows:

- **Viewpoint 12: Southern Upland Way, Whing Head (Figures 4.30.1-6, EIAR Volume 3b)**; and
- **Viewpoint 18: Glengaber Hill, SUW (Figures 4.36.1-6, EIAR Volume 3b).**

4.5.173 The proposed turbines would be viewed partially above the ridgeline to the north and northeast beyond the designation introducing a new feature in views beyond the RSA. Theoretical visibility is predicted to be limited within the RSA owing to screening by intervening landform along a ridgeline between Glengaber Hill and Lowther Hill, thereafter, a limited number of summits to Threehope Height approximately 7.1 km from the nearest turbine where all 21 turbines would be visible. Thereafter, theoretical visibility would be limited to a few summits where partial visibility is experienced within the RSA.

4.5.174 As a result of the limited part of the RSA predicted to receive views, it is not judged that the addition of the Proposed Development to the baseline would alter the special qualities of which the landscape is designated for.

Residential Visual Amenity

4.5.175 An assessment of the effects on the visual aspects of residential amenity is set out in **Technical Appendix 4.8 (EIAR Volume 4)**. There are 19 groups within 2.5 km of the Proposed Development, as shown on **Figure 4.17 (EIAR Volume 3a)**. Grouped properties have similarity of location, setting, outlook and screening.

4.5.176 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' (RVAT). 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. However, this would be 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 (see also **Technical Appendix 4.5, EIAR Volume 4)**.

4.5.177 The assessment found that whilst there would be 15 properties judged to have a **High** magnitude of change, and two a **Medium** magnitude of change to views., No properties were judged to receive effects on visual aspects of residential amenity such that they would reach the RVAT. This is due to a combination of elements including distance from the proposed turbines, influence of screening by intervening landform, and orientation of views from the properties involved.

4.6 Specific Mitigation

4.6.1 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 4.4** below provides a summary the LVIA for the construction, operation and decommissioning phases as well as any cumulative considerations.

Table 4.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
Construction & Decommissioning			
Potential change to the physical landscape within the Site.	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).**
Operation			
Landscape Receptors			
Potential degradation to the Site.	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.	**Significant (Major).**
Potential degradation to 177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit**.**			**Significant (Moderate)** within 5 km to the southwest. **Not significant (Negligible)** where no theoretical visibility predicted.
Potential degradation to 207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit**.**			**Significant (Major).**
Potential degradation to 209. Upland Glen - Glasgow & Clyde Valley**.**			**Significant (Moderate)** within 5 km to the southwest., **Not significant (Negligible)** where no theoretical visibility predicted.
Potential degradation to 217 Southern Uplands – Glasgow & Clyde Valley**.**			**Significant (Major)** – approximately 3-5 km. **Not significant (Negligible)** where no theoretical visibility predicted.
Visual Receptors			
Potential change to views experienced from Abington.	The layout design has been informed by the large scale of the landscape and topographical features in order to reduce potential	Through the design process.	**Significant (Moderate)** effect is predicted to the view for a limited number of properties. For the majority of the village, a

Table 4.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
	landscape and visual effects whilst retaining turbine efficiency.		**not significant (Negligible)** effect is predicted.
Potential change to views experienced from Crawford.			**Significant (Moderate)** effect is predicted to the view for a limited number of properties. For the majority of the village, a **not significant (Minor)** and **(Negligible)** effect is predicted.
Potential change to views experienced from Crawfordjohn.			**Not significant (Minor)** effect is predicted to the view for a limited number of properties. For the majority of the village, a **not significant (Negligible)**. and is predicted.
Potential change to views experienced from Elvanfoot.	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.	**Significant (Major)** effect is predicted to the view for a limited number of properties. For the majority of the village, a **not significant (Minor)** and **(Negligible)** effect is predicted.
Potential change to views experienced from Leadhills.			SA significant (Major) effect is predicted to the view from the south of the village, reducing to significant (Moderate) effect in the north.
Potential change to views experienced from Wanlockhead.			**Not significant (Minor)** effect is predicted to the view for a limited number of properties on the eastern periphery of the village. For the majority of the village, a **not significant (Negligible)** and is predicted.
Potential change to views experienced from the M74 Motorway / A74 (M) road.			A **significant (Moderate)** effect is predicted up to approximately 7.6 km, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road**.**
Potential change to views experienced from the A73 road.			A **significant (Moderate)** effect is predicted for a 2.2 km section of this road between 6.9 to 9 km

Table 4.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
			from the nearest of the proposed turbines, reducing to not significant (Minor) and (Negligible) for the majority of the road.
Potential change to views experienced from the A702 road.			**Significant (Moderate)** effect is predicted between Bower of Mandel to Abington, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road.
Potential change to views experienced from the B797 road.			**Significant (Major)** effect is predicted for sections of the road between Abington and Lettershaws, and between Wanlockhead and Leadhills, reducing to **significant (Moderate)** passing through the Site due to screening by landform. South of Wanlockhead where not visible, a **not significant (Negligible)** effect would occur.
Potential change to views experienced from the B7040 road.			**Significant (Major)** effect is predicted for this road.
Potential change to views experienced from the B7078 Road / NCR 74.	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.	A **significant (Moderate)** effect is predicted for the B7078 Road and National Cycle Route 74 up to 7.6 km from the nearest turbine, reducing to **not significant (Minor)** and **(Negligible)** for the majority of the road and NCR.
Potential change to views experienced from the West Coast Mainline.			**Not significant (Minor)** effect is predicted for sections of the railway line between Abington and Crawford, then **not significant (Negligible)**.
Footpaths			
Potential change to views experienced from the Southern Upland Way**.**	The layout design has been informed by the large scale of the landscape and topographical features in	Through the design process.	**Significant (Major)** effects are predicted for sections of the SUW at Glengaber Hill up to 4.6 km from the nearest

Table 4.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
	order to reduce potential landscape and visual effects whilst retaining turbine efficiency.		turbine, and **not significant (Minor)** and **(Negligible)** elsewhere.
Potential change to views experienced from SHT 56: Coulter to Crawford**.**			A **significant (Moderate)** effect is predicted west of Camps Reservoir to approximately 4.5 km from the nearest turbine, reducing to **not significant (Minor)** and **(Negligible)** effects elsewhere in the 25 km Study Area.
Potential change to views experienced from SHT 57: Roberton to Douglas**.**			**Not significant (Minor)** effect is predicted.
Potential change to views experienced from SHT 58. Douglas to Wanlockhead.			A **significant (Major)** effect is judged up to 4.6 km from the nearest turbine, with short sections receiving a **not significant (Negligible)** effect.
Potential change to views experienced from SHT 59: Muirkirk to Wanlockhead.			A **significant (Major)** effect is predicted from short sections of this route up to 8.5 km from the nearest turbine, reducing to **not significant (Negligible)** overall.
Potential change to views experienced from SHT 61/61a: Wanlockhead to Sanquhar.			A **significant (Major)** effect is predicted from short sections of this route up to 5.9 km from the nearest turbine, reducing to **not significant (Negligible)** overall.
Potential change to views experienced from SHT 62: Wanlockhead to Enterkinfoot by the Enterkin Pass			A **significant (Major)** effect is predicted between Wanlockhead and Threehope Hill and up to 7.0 km from the nearest turbine, reducing to **not significant (Negligible)** thereafter.
Potential change to views experienced from Core Paths within 5 km.			A total of 19 Core Paths were identified as receiving a **significant (Major)** effect.
Hill tops			
Potential change to views experienced	The layout design has been informed by the		**Not significant (Minor)** effect is

Table 4.4: Summary of Potential Significant Effects

Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
from Hill tops to the north.	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.	predicted for the northern group of hills.
Potential change to views experienced from Hill tops to the northeast, east and southeast.			**Significant (Major)** and **(Moderate)** effect would occur within 10 km, reducing to **not significant (Minor)** and **(Negligible)** thereafter.
Potential change to views experienced from Hill and hill tops to the south.			**Significant (Major)** effects are predicted within 6 km, reducing to **significant (Moderate)** within 10 km and **not significant (Minor)** and **(Negligible)** levels thereafter.
Potential change to views experienced from Hill tops to the west.			**Significant (Major)** effects are predicted within 10 km, reducing to **significant (Moderate)** within 15 km and **not significant (Minor)** and **(Negligible)** levels thereafter.
Cumulative operation			
Consented Scenario			
Landscape: Potential cumulative degradation to key characteristics of: 177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit; 207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit 209. Upland Glen - Glasgow & Clyde Valley 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.
Visual Amenity: Potential change to views experienced from settlements, roads and railway lines,			

Table 4.4: Summary of Potential Significant Effects

Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
footpaths and hill tops.			
In-planning scenario			
Landscape: Potential cumulative degradation to key characteristics of: 177. Southern Uplands - Dumfries & Galloway: Wanlockhead Unit; 207. Upland River Valley - Glasgow & Clyde Valley: Duneaton Water Unit 209. Upland Glen - Glasgow & Clyde Valley 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.
Visual Amenity: Potential change to views experienced from settlements, roads and railway lines, footpaths and hill tops.			
Aviation Lighting			
Potential change to views experienced from: SUW SHT: 56: Coulter to Crawford 58: Douglas to Wanlockhead, 59: Muirkirk to Wanlockhead, 61/61a: Wanlockhead to Sanquhar, 62: Wanlockhead to Enterkinfoot by the Enterkin Pass; Core Paths within 5 km; Hills to the north, northeast to southeast, south and west; and 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.	**Significant (Moderate)** effect.
Potential degradation to Special qualities of Leadhills and Lowther Hills SLA			

Table 4.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Outcome/ Residual Effect**
Potential degradation to The special qualities of Thornhill Uplands RSA.			
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 reached due to a combination of distance from the proposed turbines and screening by landform and forestry.

5 Cultural Heritage

5.1 Introduction

5.1.1 This chapter considers the likely significant effects on the cultural heritage associated with the construction, operation and decommissioning of the Proposed Development.

5.1.2 The specific objectives of the chapter are to:

- describe the existing cultural heritage 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.

5.1.3 The assessment has been carried out by Linn Glancy MA, MA (Hons) ACIFA of CFA Archaeology Ltd (CFA), a Registered Organisation (RO) of the Chartered Institute for Archaeologists (CIfA), based in Musselburgh, East Lothian. Linn Glancy is a Consultant with over 25 years post-graduate experience as an Archaeologist, 19 years of which as a Consultant, and is an Associate of the Chartered Institute for Archaeologists (ACIfA).

5.1.4 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
  - Figure 5.1: Cultural Heritage Inner Study Area;
  - Figure 5.2: Cultural Heritage Outer Study Area;
  - Figure 5.3: Cultural Heritage Cumulative Developments and Viewpoints
- Volume 3b: Visualisations
  - Figure 5.4: Viewpoint 1, SM4798 Glengeith, settlement, bastle house and field system
  - Figure 5.5: Viewpoint 2, SM2605 Bodsberry Hill, fort
  - Figure 5.6: Viewpoint 3, SM2614 Kirkton, fort 860m NNE of
  - Figure 5.7: Viewpoint 4, SM2822 Kirkton, fort 1155m ENE of
  - Figure 5.8: Viewpoint 5, SM4238 Crooked Stone, standing stone 160m N of Crookedstane
  - Figure 5.9: Viewpoint 6, SM4254 Fagyad Hill, Cairn Figure
  - 5.10: Viewpoint 7, SM4256 Midlock, cairn 640m NE of
  - Figure 5.11: Viewpoint 8, SM4332 Lettershaws, platform settlement 1000m NE of
  - Figure 5.12: Viewpoint 9, SM4486 Stoneyburn, platform settlement and field system 700m WSW of
  - Figure 5.13: Viewpoint 10, SM4516 North Shortcleuch, platform settlement 1000m E of
  - Figure 5.14: Viewpoint 11, SM4714 Waterhead, platform settlement 900m N of
  - Figure 5.15: Viewpoint 12, SM5597 Wanlockhead, remains of lead mining and smelting
  - Figure 5.16a-d: Viewpoint 13a-d, SM5817 Lead mines and associated remains, Leadhills

- Volume 4: Technical Appendices
  - Technical Appendix 5.1: Cultural Heritage Assessment Methodology;
  - Technical Appendix 5.2: Gazetteer of Cultural Heritage Assets in the Inner Study Area;
  - Technical Appendix 5.3: Baseline Summary Cultural Heritage Assets in the inner Study Area;
  - Technical Appendix 5.4: Heritage Assets Tabulated Setting Assessment; and
  - Technical Appendix 5.5: Designated Assets in the Outer Study Area with no Visibility of the Proposed Development.

5.1.5 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)** and follows the principles set out in Scottish Natural Heritage (SNH) and Historic Environment Scotland's (HES's) 'Environmental Impact Assessment Handbook'[1] and HES's guidance document, 'Managing Change in the Historic Environment: Setting'[2]

5.2.2 The assessment is presented with reference to specific 'areas' of the Site within the application boundary. These areas comprise the western and eastern areas of the Site and associated access routes, as described in **Chapter 2: Description of the Development**.

5.2.3 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being 'Major' or 'Moderate'.

Scope of Assessment

Potential Impacts Scoped In

5.2.4 The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.1: Consultation Register (EIAR Volume 4)** and the following guidelines/policies:

LEGISLATION

5.2.5 The following legislation relevant to cultural heritage has been consulted as part of this assessment:

- The Ancient Monuments and Archaeological Areas Act 1979[3];
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[4]; and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[5].

[1] Scottish Natural Heritage and Historic Environment Scotland (2018) Environmental Impact Assessment Handbook, Edinburgh

[2] Historic Environment Scotland (2016, updated 2020) 'Managing Change in the Historic Environment – Setting', Edinburgh

[3] UK Government (1979) The Ancient Monuments and Archaeological Areas Act 1979, Available at https://www.legislation.gov.uk/ukpga/1979/46/contents {Accessed January 2026]

[4] Planning (Listed Buildings and Conservation Areas) (Scotland) Act (1997). Available at: https://www.legislation.gov.uk/ukpga/1997/9/contents [Accessed January 2026]

[5] The Electricity Works (Environmental Impact Assessment (Scotland) Regulations 2017. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents [Accessed January 2026].

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 for Scotland 4 (NPF4) (2023) [6]:
  - Policy 7 Historic Assets and Places;
- Historic Environment Policy for Scotland (HEPS) (HES 2019a) [7];
- South Lanarkshire Local Development Plan 2 (2021)[8]:
  - 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.

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'[9];
- Institute of Environmental Management and Assessment (IEMA, now ISEP) Principles of Cultural Heritage Impact Assessment in the UK[10];
- Planning Advice Note 1/2013 (PAN 1): Environmental Impact Assessment (revised 2017)[11];
- HES (2020a) 'Designation Policy and Selection Guidance'[12];
- HES (2020b) 'Managing Change in the Historic Environment: Setting'[13];
- Chartered Institute for Archaeologists (CIfA) (2014a) 'Code of Conduct: professional ethics in archaeology' (revised)[14];

[6] NPF4 (2023). Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed January 2026]

[7] HEPS (2019). Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7 [Accessed January 2026}

[8] SLLDP 2 (2021) Available at: https://www.southlanarkshire.gov.uk/info/200305/development_plans/2253/local_development_plan_2_ldp2 [Accessed January 2026]

[9] SNH/HES (2018) *EIA Handbook Version 5*. Available at: https://www.nature.scot/doc/archive/environmental-impact-assessment-handbook-version-5-2018 [Accessed January 2026]

[10] 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 [Accessed: 05 January 2026]

[11] PAN 1 (2013) Environmental Impact Assessment. Available at: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/ [Accessed January 2026]

[12] 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 [Accessed January 2026]

[13] HES (2020b) Managing Change in the Historic Environment: Setting. Available at: file:///C:/Users/jlitchfield/Downloads/managing-change-setting%20(5).PDF [Accessed January 2026]

[14] CIfA (2014a) Code of Conduct. Available at: https://www.archaeologists.net/sites/default/files/2023-11/CIfA-Code-of-Conduct-2022.pdf [Accessed: 05 January 2026]

- CIfA (2014b) 'Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment' (updated 2020)[15];
- CIfA (2014c) 'Standard and Guidance for Historic Environment Desk-Based Assessment' (updated 2020)[16]; and

5.2.8 This chapter has been written with due cognisance to the scoping opinion and post scoping consultation responses received from HES. The assets considered for assessment have been guided by these responses and the visualisations prepared have been agreed by means of this consultation.

5.2.9 The chapter assesses cumulative effects, defined as arising from the addition of the Proposed Development to other developments which are the subject of a valid planning application. Operational, under construction and consented developments are considered as part of the baseline. Developments close to the end of their operational life will be included as part of the baseline to present a reasonable 'worst case scenario'.

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

Potential Impacts Scoped Out

5.2.11 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 5.1**.

Table 5.1: Impacts Scoped Out of the Assessment

Impact	Reasoning
Assessment of the effect of the Proposed Development on the settings of World Heritage Sites and Inventory Historic Battlefields.	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.
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.	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.
Assessment of direct (physical) impacts on heritage assets during the operational and decommissioning phases of the Proposed Development.	Any maintenance, repair or replacement, and decommissioning work, would utilise the as-built infrastructure.
Assessment of the effect on the settings of heritage assets during the construction and decommissioning phases of the Proposed Development.	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.

[15] 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 [Accessed January 2026]

[16] 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 [Accessed January 2026]

Method of Baseline Characterisation

Extent of the Study Area

5.2.12 Two study areas have been used for the assessment:

- The Inner Study Area: The Site, defined by the application 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 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. **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 will be a theoretical view of the infrastructure. Details of these heritage assets with potential for operational effects are provided in **Technical Appendix 5.4 (EIAR Volume 4),** which also provides a tabulated summary assessment of the predicted effects on their settings on a case-by-case basis. Designated heritage assets in the Outer Study Area with no potential to be affected by operational effects are listed in **Technical Appendix 5.5 (EIAR Volume 4)**. 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

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

- HES Spatial Data Warehouse (HES 2026a[17]): 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 November 2025 for all assets within 5 km from the Proposed Development.
- The Dumfries and Galloway HER: a digital database extract was obtained directly from DGCAS in January 2026 for national important assets within 5 km of the Proposed Development.
- The National Record of the Historic Environment (NRHE) (Trove) (HES 2026b[18]): for any information additional to that contained in the HERs.
- Historic Land-Use Assessment Data for Scotland (HLAMap) (HES 2026c[19]): for information on the historic land use character of the Site and the surrounding area.

[17] HES (2026a) Historic Environment Scotland (HES) GIS downloader. Available at: https://portal.historicenvironment.scot/apex/f?p=PORTAL:downloads:::::DATASET:ALL [Accessed: February 2026]

[18] HES (2026b) Historic Environment Scotland's National Record of Historic Environment (NRHE) database. Available at https://www.trove.scot/ [Accessed: February 2026]

[19] HES (2026c) Historic Land-Use Assessment Data for Scotland (HLAmap). Available at: https://hlamap.org.uk/ [Accessed: February 2026]

- National Library of Scotland Map Library[20]: 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 2025 [21]): 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

5.2.14 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, BESS and substation locations, and turbines).

5.2.15 The field survey was undertaken between the 27th October and 7th November 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.

5.2.16 No intrusive archaeological interventions have been carried out as part of this assessment.

5.2.17 Site visits to selected heritage assets in the Outer Study Area were undertaken in February 2026 to assess the potential impact of the Proposed Development on their settings. Site visits included those assets specifically identified by consultees (HES) as requiring assessment and those identified through analysis of the blade tip height ZTV where it was considered, on the basis of professional judgement, that the impact on their settings could be significant.

Method of Assessment

Overview

5.2.18 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 5.1: Cultural Heritage Assessment Methodology (EIAR Volume 4)**.

[20] National Library of Scotland (2026) Available at https://maps.nls.uk/ [Accessed: February 2026]

[21] Scottish Government (2025). Scottish Remote Sensing Portal. Available at: https://remotesensingdata.gov.scot [Accessed: February 2026]

Limitations and Assumptions

5.2.19 The desk-based assessment draws on the records in the South Lanarkshire and Dumfries and Galloway Council HERs, provided in a digital Geographic Information System (GIS) dataset in November 2025 and January 2026 respectively. It is assumed that the data provided was accurate and up to date at the time it was acquired. It is unlikely that there have been significant changes to the dataset since it was acquired, and it is assumed to be a reliable and accurate reflection of the recorded cultural heritage baseline for the purpose of this assessment.

5.2.20 Designated heritage assets within the Outer Study Area (**Figure 5.2 and Figure 5.3, EIAR Volume 3a**) have been identified from the HES database and were downloaded from the HES website[22] in January 2026. This data is assumed to have been accurate and up to date at the time of its acquisition.

5.3 Baseline Conditions

Current Baseline

Heritage Assets within the Inner Study Area

5.3.1 Refer to **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, Waterhead, platform settlement 900 m N of (SM4714). The monument comprises a single, prehistoric house platform, 14.4 m in diameter scooped into the southeast facing slopes overlooking the valley of Glengonnar Water. As a Scheduled Monument, the asset is of heritage value at the national level and of high sensitivity.

5.3.3 There are no Listed Buildings within the Inner Study Area, and no part of the Inner Study Area falls within a Conservation Area, Inventory Garden and Designed Landscape, or Inventory Historic Battlefield.

NON-DESIGNATED HERITAGE ASSETS

5.3.4 Ninety non-designated heritage assets have been identified within the Inner Study Area, with the assets comprising both those recorded in the SLC HER as well as those identified through the desk-based assessment 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)**. **Technical Appendix 5.2 (EIAR Volume 4)** provides detailed gazetteer information on the character and baseline condition of the assets. **Technical Appendix 5.3 (EIAR Volume 4)** provides a detailed summary of the baseline character and summarises the heritage value and relative sensitivity of the assets.

5.3.5 Of the 90 non-designated heritage assets, four are included in the HER as non-statutory register (NSR) sites of schedulable quality. These assets are:

- North Shortcleuch Unenclosed platform settlement; small cairns; pen (WoSAS 10408)
- Scapcleuch Burn Unenclosed Platform Settlement; Small Cairns (WoSAS 12014)

[22] HES (2026) https://portal.historicenvironment.scot/apex/f?p=PORTAL:downloads:::::DATASET:ALL Accessed January 2025

- Scapcleuch Burn Unenclosed Platform Settlement; Small Cairns (WoSAS 12015)
- North Shortcleuch House Platform; Cairns (WoSAS 13326)

Archaeological Potential

5.3.6 The Site predominantly comprises open managed moorland, improved grassland and semi-improved grassland, with areas of forestry located in the valleys, predominantly to the east of the B797. The Site terrain is undulating with multiple hills within the boundary such as Ravengill Dod (499 m), Great Hill (523 m) and Mid Hill (404 m). Much of the landscape has been subject to mineral prospecting since the 12th century and today is largely used for sheep grazing and as a shooting estate. This landscape is typical of the wider location within the Southern Uplands.

5.3.7 The Historic Land-Use Assessment map (HLAmap) categorises the Site as largely 'Rough Grazing' which it describes as "*Hill ground or lower-lying land that shows no evidence of recent agricultural improvement can be used for rough grazing. Such areas are largely heather moorland or rough grassland*." Other land types recorded within the Site include a small area of 'Rectilinear Fields and Farms' in the areas of Glencaple Farmstead (WoSAS 86730) and North Shortcleuch Farmstead (WoSAS 18913), an area of 'Opencast / mining /quarry site' at Wellgrain Dod, a small parcel of 'Plantation' woodland to the east of the B797 at Black Hill.

5.3.8 The HLAmap also records areas of 'Medieval/ post medieval settlement and agriculture' "*The remains of settlements and field systems that pre-date the agricultural improvements of the 18th or 19th century survive in marginal areas, with ruinous buildings, small kilns, curvilinear boundaries, and rig cultivation*." These correspond with the area of Glendorch Bastle (WoSAS 10035) and farmstead (WoSAS 76804) and Kirk Gill (WoSAS 10505).

5.3.9 Roy's map of 1747-55[23] shows the Site as largely unenclosed hilly upland. Areas of cultivation are depicted near the valley bottoms of Glengonnar and Elvan Water and buildings are recorded at Glencaple Farmstead (WoSAS 86730), Glendorch Bastle (WoSAS 10035) and farmstead (WoSAS 76804) and at North Shortcleuch Farmstead (WoSAS 18913).

5.3.10 By the First Edition Ordnance Survey map (1864) the Site is little changed from Roy's map and largely consists of unenclosed hilly upland with areas of cultivation along the valley bottoms. The exception to this is the presence of a number of old lead mines scattered across the Site, evidence of the mineral prospection across the Site as discussed above. Subsequent Ordnance Survey Editions show very little change in the historic landscape with the exception of the addition of grouse butts as the area becomes partly utilised as a shooting estate in the 20th century.

5.3.11 Within the Inner Study Area, the greatest potential for previously unrecorded subsurface archaeological remains is in the lower slopes along the valleys of Glengonnar and Elvan Water and in the areas surrounding previously recorded assets. In particular in the area surrounding Glendorch Bastle (WoSAS 10035) and the platform settlements Waterhead, platform settlement (SM4714, WoSAS 10408, WoSAS 12014, WoSAS 12015 and WoSAS 13326). Across the Site there is potential for remains related to mineral prospection and mining, upland farming and the shooting estate.

5.3.12 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,

[23] Roy, W (1747-55) Military Survey of Scotland

the potential for hitherto undiscovered buried archaeological remains to survive within the Inner Study Area is assessed to be varied. With moderate potential on the lower valley slopes largely relating to prehistoric and medieval agrarian settlement remains or lead mining, and with a low potential on the upper slopes, the greatest potential is considered to be for structures associated with lead mining or the shooting estate.

*Designated Heritage assets within the Outer Study Area (**Figures 5.2 and 5.3 EIAR Volume 3a; Technical Appendices 5.4 and 5.5, EIAR Volume 4)***

5.3.13 Within 10 km of the application boundary, there are 64 scheduled monuments (including the one scheduled monument in the Inner Study Area) of heritage value at a national level and of high sensitivity. Fifty-three of these have predicted theoretical visibility of the Proposed Development (including the one scheduled monument in the Inner Study Area).

5.3.14 Within 10 km of the Site there are two category A listed buildings of heritage value at a national level and of high sensitivity. One of these Scots Mining Company House (LB732) has predicted theoretical visibility of the Proposed Development. The second category A listed building, Wanlockhead Village Library (LB17192) would not have predicted theoretical visibility of the Proposed Development, nor are there any views of cultural significance towards this asset which would be affected by the Proposed Development.

5.3.15 Within 10 km of the Proposed Development there is one Inventory Garden and Designed Landscape (GDL) of heritage value at a national level and of high sensitivity, the GDL has predicted theoretical visibility of the Proposed Development.

5.3.16 Within 10 km of the Proposed Development there are 15 category B listed buildings of heritage value at a regional level and of medium sensitivity. Nine have predicted theoretical visibility of the Proposed Development.

5.3.17 Within 10 km of the Proposed Development there are two conservation areas, Leadhills and Wanlockhead, of heritage value at a regional level and of medium sensitivity; both have some predicted theoretical visibility of the Proposed Development.

5.3.18 Within 5 km of the Proposed Development there are 12 category C listed buildings of heritage value at a local level and of low sensitivity. Three have predicted theoretical visibility of the Proposed Development.

5.3.19 Within 5 km of the Proposed Development there are 36 WoSAS NSR sites of schedulable quality (including the four in the Inner Study Area) of heritage value at a national level and of high sensitivity. Thirty-two have predicted theoretical visibility of the Proposed Development.

5.3.20 Within 5 km of the Proposed Development there are ten Dumfries and Galloway Nationally Important Sites of heritage value at a national level and of high sensitivity. Two have predicted theoretical visibility of the Proposed Development.

5.3.21 There are no Inventory Battlefields within the Outer Study Area.

5.3.22 No designated assets beyond the Outer Study Area have been identified as being potentially sensitive to impacts on their setting from the Proposed Development.

Future Baseline

5.3.23 If the Proposed Development were not to proceed, there would likely be no change to the baseline condition of the various heritage assets that presently exist within the Inner Study Area. Current land management regimes would most likely continue and there would be no change to the character of the heritage assets, other than the erosion of features through natural processes and agricultural activities. The current rough pasture and moorland land-use would also likely continue, limiting the potential for disturbance to heritage assets, and only natural decay (weathering and erosion) would affect the surviving upstanding remains.

5.3.24 Designated heritage assets in both the Inner and Outer Study Areas would be subject to normal statutory requirements and planning constraints.

Summary of Sensitive Receptors

5.3.25 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 5.2** together with their associated sensitivity.

Table 5.2: Summary of Sensitive Receptors

Receptor	Sensitivity	Justification
Scheduled Monuments up to 10 km from the outermost turbines.	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 a proposed development upon the setting of a Scheduled Monument are one of the considerations in determinations of applications for planning consent .
Inventory Gardens and Designed Landscapes (GDL) up to 10 km from the outermost turbines.	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.	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	High	NSR Sites which are considered by the local planning authority (WoSAS) to be potentially of schedulable quality (NSR Sites Codes V and C)

Table 5.2: Summary of Sensitive Receptors		
Receptor	**Sensitivity**	**Justification**
significant' up to 5 km from the outermost turbines.		or sites considered by Dumfries and Galloway Council to be a Site of National Importance.
Conservation areas up to 5 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 preserve or enhance. The (Listed Buildings and Conservation Areas) (Scotland) Act 1997 states the Planning authorities are required to give special attention to the desirability of preserving or enhancing the character or appearance of that area With regard to the setting of Conservation Areas NPF4 Policy 7d) states d) Development proposals in or affecting conservation areas will only be supported where the character and appearance of the conservation area and its setting is preserved or enhanced. Relevant considerations include the: i. architectural and historic character of the area; ii. existing density, built form and layout; and iii. context and siting, quality of design and suitable materials.
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 Embedded Mitigation

5.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2** and **Chapter 3 (EIAR Volume 2)**.

Design Stage Mitigation

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. In order to both avoid or minimise construction effects on heritage assets and to reduce the potential for significant impacts on the setting of designated heritage assets, the layout of the Proposed Development went through a number of iterations, including the positioning of proposed turbines, the BESS, and the siting of other infrastructure. The layout shown on **Figure 5.1 (EIAR Volume 3a)** therefore embeds design mitigation into the siting of the individual elements of the Proposed Development as far as possible with regard to potential direct construction impacts on heritage assets and with regard to potential direct operational effects on the setting of heritage assets.

Standard/ Best Practice Mitigation

5.4.3 Standard/best practice mitigation is considered to be an integral part of the Proposed Development with high level of certainty in relation to its effectiveness. The standard/best practice mitigation considered for the Cultural Heritage assessment are as follows:

- CH01- Pre-construction, the Proposed Development, including access elements, has been designed to avoid any direct impacts on the Scheduled Monuments. The Scheduled Monument within the Site (SM4714) would 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. The purpose of this mitigation is to avoid direct impacts on Scheduled Monuments, this would conform to NPF4 Policy 7 h).
- CH02- Construction stage works would proceed in accordance with the measures set out in the Outline Construction Environmental Management Plan (CEMP). The purpose of this mitigation is to avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains, this would conform to NPF4 Policy 7 o).
- CH03– during the construction stage 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 micrositing 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). The purpose of this mitigation is to avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains, this would conform to NPF4 Policy 7 o).
- CH04- during the construction stage, construction machinery would operate only within defined working areas and access corridors, limiting ground disturbance. The purpose of this mitigation is to avoid or minimise potential direct or indirect impacts to known heritage assets and below-ground archaeological remains, this would conform to NPF4 Policy 7 o).
- CH05- during the construction stage, 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, this would conform to NPF4 Policy 7 o).
- CH06- during construction, Archaeological monitoring (watching briefs) and set-piece excavation may be undertaken to record heritage assets (e.g. WoSAS 10505 and WoSAS 76804) 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). The purpose of this mitigation would be to preserve the archaeological remains 'by record' where preservation in situ is not practicable and would conform to NPF4 Policy 7 o).
- CH07- during construction, should previously unidentified archaeological remains be encountered they would be subject to a programme of archaeological works to be developed in consultation with WoSAS and detailed in a WSI. The purpose of this

mitigation would be to preserve the archaeological remains 'by record' where preservation in situ is not practicable and would conform to NPF4 Policy 7 o).

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 assessment of likely significant effects assumes that these mitigation measures are implemented.

5.5 Assessment of Likely Effects

Construction

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 a 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, EIAR Volume 2**); however, there are heritage assets that could be directly affected by construction works associated with the Proposed Development, and these impacts are discussed further below, with further information on the assets provided in **Technical Appendix 5.2** and **Technical Appendix 5.3 (EIAR Volume 4).**

Pyatshaw Brae House Platform (WoSAS 13299)

5.5.3 Pyatshaw Brae House Platform is the possible site of a house platform recorded in 1992[24] it could not be located in the field survey for this assessment. As either a prehistoric platform settlement now overgrown and unidentifiable or a wrongly located site that is not in this location, the sensitivity of this site is unknown and could be of no sensitivity to medium sensitivity. The asset would be removed by the excavation of a borrow pit search area.

5.5.4 It is assessed that, without mitigation, there is potential for up to a direct high magnitude impact, resulting in an effect of up to Moderate significance (significant in EIA terms).

5.5.5 With the standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation**, including the recording of below-ground remains where encountered (CH06/CH07), any predicted residual effects would be **Minor**, and the impacts are not considered further within the EIAR.

Kirk Gill (WoSAS 10505)

5.5.6 Kirk Gill is the possible remains of a medieval chapel (WoSAS 10505) which survive as a series of turf covered footings alongside the remains of a circular sheepfold. As a possible medieval ecclesiastical site this is an asset of medium sensitivity. The southernmost area of the asset, the sheepfold, is within 15 m of a proposed access track. Groundworks for the access track, likely to include removal of topsoil and minimal earthworks, may expose

[24] Ward T (1992) Upper Clydesdale through the Ages: The M74 Project: The Clydesdale Experience

peripheral remains associated with the chapel site. There is also potential for damage to the site from construction traffic accidentally traversing the site.

5.5.7 It is assessed that, without mitigation, there is potential for a direct medium magnitude impact, resulting in an effect of Moderate significance (significant in EIA terms).

5.5.8 With the standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation**, including the avoidance of upstanding remains (CH04/CH05) and recording of below-ground remains where encountered (CH06/CH07), any predicted residual effects would be **Minor**, and the impacts are not considered further within the EIAR.

Glendorch Farmstead (WoSAS 76804) and Glendorch Bastle (WoSAS 10035)

5.5.9 The remains of the drystone dyke and field surrounding Glendorch Farmstead (WoSAS 76804), an asset of low sensitivity, would be crossed by the proposed access track between T1 and T3. The construction of the access track would remove small sections of the drystone wall and groundworks for the access track, likely to include the removal of topsoil and earthworks through the field and may expose remains associated with the Farmstead and the associated Glendorch Bastle (WoSAS 10035).

5.5.10 It is assessed that, without mitigation, there is potential for a direct low magnitude impact, resulting in an effect of Minor significance (not significant in EIA terms).

5.5.11 With the standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation**, including the avoidance of upstanding remains (CH04/CH05) and recording of below-ground remains where encountered (CH06/CH07), any predicted residual effects would be **Minor**, and the impacts are not considered further within the EIAR.

Braehead Enclosures (WoSAS 96803)

5.5.12 The area of four circular sheepfold (WoSAS 96803), an asset of low sensitivity, would be crossed by the proposed access track between Lettershaws and the western turbine array. Direct effects arising from the construction impacts on the remains of a sheepfold or accidental movement of construction traffic and/or machinery have potential to result in a direct medium impact, resulting in an effect of negligible significance (not significant in EIA terms).

5.5.13 With the standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation**, including the avoidance of upstanding remains (CH04/CH05) any predicted residual effects would be **Negligible**, and the impacts are not considered further within the EIAR.

Sheepfolds (HA4 and HA5)

5.5.14 The Sheepfolds (HA4 and HA5) are assets of negligible sensitivity. The proposed indicative construction compound would be to the immediate west of these assets. Direct effects arising from the accidental movement of construction traffic and/or machinery have potential to result in a direct medium impact, resulting in an effect of minor significance (not significant in EIA terms).

5.5.15 The adoption of standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation** (e.g. 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. **No residual impact** is predicted and this is not considered further within the EIAR.

Sheepfolds (HA30)

5.5.16 The Sheepfolds (HA30) are an asset of negligible sensitivity. The proposed access track between T4 and T7 passes to the west of the sheepfold. Direct effects arising from the accidental movement of construction traffic and/or machinery have potential to result in a direct medium impact, resulting in an effect of minor significance (not significant in EIA terms).

5.5.17 The adoption of standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation** (e.g. 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. **No residual impact** is predicted and this is not considered further within the EIAR.

Grouse Butts

5.5.18 The access tracks and hardstanding cross through eleven of the lines of grouse butts (HA7, HA10, HA12, HA27, HA28, HA29, HA32, HA34, HA36, HA38 and HA52) and four single grouse butts (HA37, HA46, HA49 and HA51). These are all modern grousebutts of timber construction and in varying condition, and are considered to be, at most, negligible sensitivity. Ground-breaking works along the routes of the access tracks and for the hardstanding may result in the removal of a small number of these butts. No mitigation is proposed and this would be an effect of **Negligible** significance (not significant in EIA terms) therefore, these will not be considered further within the EIAR.

Field Walls

5.5.19 The access tracks cross three field walls HA42, HA45 and HA47. The construction of the access tracks would remove small sections of these drystone walls, assets of at most negligible cultural heritage sensitivity. No mitigation is proposed and this would be an effect of **Negligible** significance (not significant in EIA terms) therefore, these will not be considered further within the EIAR.

Archaeological Potential

5.5.20 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 low to moderate potential for such remains to be encountered within the Site.

5.5.21 Standard/best practice mitigation outlined in **Section 5.5 Embedded Mitigation** (CH07) makes provision for a programme of archaeological works to investigate and record any previously unidentified archaeological remains, mitigating potential impacts to a **Negligible** level of significance (not significant in EIA terms).

Operation

5.5.22 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.

5.5.23 In HES's scoping response of 17th July 2025, they requested that potential impacts on the setting of 27 scheduled monuments, a Category A Listed Building (LB732) and an Inventory

Designed Landscape and Garden (GDL00339) be assessed in the EIAR. Of these assets, one Fall Hill, enclosed cremation cemetery 650m NE of Midlock (SM4766), is no longer designated and was removed from the schedule on the 2 September 2025[25] . This asset therefore has not been included for assessment. Furthermore, given the reduction in the number of turbines of the Proposed Development between the Scoping stage and final Design Freeze layout, there is no longer predicted visibility in views from two of the scheduled monuments requested by HES; Air Cleuch, cairns 1300m S of Glengeith (SM4641) and Glenochar Burn, bastle house, post-medieval settlement & field system (SM5385). These assets have therefore not been included in the setting assessment. The remaining 26 designated assets raised by HES have been assessed for setting impacts.

5.5.24 The assessment of operational effects on the setting of designated heritage assets has been carried out with reference to the layout of the Proposed Development and location of such assets, considered alongside the theoretical visibility of the Proposed Development indicated by the blade-tip ZTV shown on **Figure 5.2 (EIAR Volume 3a**). The criteria detailed in **Technical Appendix 5.1 (EIAR Volume 4)** have been used to complete the assessment, in combination with professional judgement, and the nature and magnitude of effects.

5.5.25 **Technical Appendix 5.4 (EIAR Volume 4)** contains tabulated assessments of the predicted effects of the Proposed Development on the settings of designated heritage assets with cogitation of the degree of predicted theoretical visibility of the Proposed Development based on analysis of blade tip height and hub height ZTVs, without screening.

5.5.26 **Technical Appendix 5.5 (EIAR Volume 4**) provides details of the designated heritage assets recorded in the Outer Study Area that are predicted to have no visibility of the Proposed Development based on analysis of blade tip height and hub height ZTVs, without screening. In addition, no views of cultural significance to or across these assets have been identified with visibility of the Proposed Development.

5.5.27 There are no designated heritage assets beyond 10 km from the application boundary that have been identified, either through appraisal of the blade tip ZTV or notified through consultation with HES, as requiring consideration of potential impacts on their settings.

5.5.28 Baseline visualisations have been provided to inform the assessment of heritage assets identified with potential for operational effects. These are listed in **Table 5.3.** 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 in their letter of 05 December 2025.

Table 5.3: Cultural Heritage Visualisations

Asset No.	Asset Name and Type	Figure (EIAR Volume 3b) and Cultural Heritage Viewpoint
SM2605	Bodsberry Hill, fort	Figure 5.5: Viewpoint 2 SM2605 Bodsberry Hill, fort
SM2614	Kirkton, fort 860m NNE of	Figure 5.6: Viewpoint 3 SM2614 Kirkton, fort 860m NNE of
SM2822	Kirkton, fort 1155m ENE of	Figure 5.7: Viewpoint 4

25 HES (02/09/2025) Report on Handling, 300075865-RoH-PORTALFinal (Available at https://portal.historicenvironment.scot/apex/f?p=1505:300:::::VIEWTYPE,VIEWREF:decision,500004230, accessed February 2026)

Table 5.3: Cultural Heritage Visualisations		
Asset No.	**Asset Name and Type**	**Figure (EIAR Volume 3b) and Cultural Heritage Viewpoint**
		SM2822 Kirkton, fort 1155m ENE of
SM4238	Crooked Stone, standing stone 160m N of Crookedstane	Figure 5.8: Viewpoint 5 SM4238 Crooked Stone, standing stone 160m N of Crookedstane
SM4254	Fagyad Hill, Cairn	Figure 5.9: Viewpoint 6 SM4254 Fagyad Hill, Cairn
SM4256	Midlock, cairn 640m NE of	Figure 5.10: Viewpoint 7 SM4256 Midlock, cairn 640m NE of
SM4332	Lettershaws, platform settlement 1000m NE of	Figure 5.11: Viewpoint 8 SM4332 Lettershaws, platform settlement 1000m NE of
SM4486	SM4486 Stoneyburn, platform settlement and field system 700m WSW of	Figure 5.12: Viewpoint 9 SM4486 Stoneyburn, platform settlement and field system 700m WSW of
SM4516	North Shortcleuch, platform settlement 1000m E of	Figure 5.13: Viewpoint 10 SM4516 North Shortcleuch, platform settlement 1000m E of
SM4603	Boghead, platform settlement 500m SW of	Figure 5.19: Viewpoint 16 SM4603 Boghead, platform settlement 500m SW of
SM4714	Waterhead, platform settlement 900m N of	Figure 5.14: Viewpoint 11 SM4714 Waterhead, platform settlement 900m N of
SM4798	Glengeith, settlement, bastle house and field system	Figure 5.4: Viewpoint 1 SM4798 Glengeith, settlement, bastle house and field system
SM5817	Lead mines and associated remains, Leadhills VPa	Figure 5.16a-d: Viewpoint 13a-d SM5817 Lead mines and associated remains, Leadhills
SM5597	Wanlockhead, remains of lead mining and smelting	Figure 5.15: Viewpoint 12 SM5597 Wanlockhead, remains of lead mining and smelting

5.5.29 Of the designated assets with predicted theoretical visibility of the Proposed Development, five have been identified during the course of this assessment for further detailed consideration in addition to the tabulated assessment in **Technical Appendix 5.4 (EIAR Volume 4).** These five assets have been identified based on their proximity to the Proposed Development or based on their sensitivity to impacts on their setting. The assets included for detailed assessment in this chapter are:

- Waterhead, platform settlement 900m N of (SM4714)
- Lead mines and associated remains, Leadhills (SM5817)
- Historic Gold Workings, Leadhills, South Lanarkshire (SM13677)
- Scot's Mining Company House LB732 and GDL00339
- Leadhills Conservation Area

Inner Study Area

WATERHEAD, PLATFORM SETTLEMENT 900M N OF (SM4714)

5.5.30 The monument comprises the site of a prehistoric house consisting of a single platform, 14.4 m in diameter, scooped into the lower southeast facing slope of Glendowran. As a scheduled monument, the platform settlement is of heritage value at the national level and of high sensitivity.

5.5.31 The site is located within an area of rough grazing land on the lower slopes of Glendowran Hill, 220 m to the west of Glengonnar Water. As a prehistoric platform settlement this is a Bronze Age to Iron Age unenclosed settlement site whose distribution is largely restricted to the area of Clydesdale and upper Tweeddale. They are typically small platforms cut into hill slopes on which a round house was built, these unenclosed platform settlements are usually found in groups of multiple platforms with archaeological evidence suggesting they are farming settlements[26]. Waterhead platform settlement is unusual in that it only contains one house and it appears to have been built as an isolated dwelling rather than as part of a larger settlement or in relation to other contemporary buildings. There is no apparent evidence of contemporary settlement in this area of Glengonnar and it is possible that this structure was either deliberately sited for isolation or perhaps more likely provided temporal summer pastoral shelter.

5.5.32 The key characteristics of the platform settlement's setting that contribute to its cultural significance can be summarised as its isolation from contemporary settlements, and as an agricultural settlement its proximity to the better agricultural land of the lower slopes of Glengonnar and to the water source of Glengonnar Water.

5.5.33 Waterhead platform settlement (SM4714) lies 0.9 km to the east of the proposed turbine (T1), 0.9 km to the northeast of the proposed turbine T2, and 1.5 km to the west of the indicative substation and BESS. The wireline (**Figure 5.14 Viewpoint 11 SM4714 Waterhead, platform settlement 900m N of, EIAR Volume 3b**) shows that, from the platform settlement, eight turbines would be visible at hub height and a further two visible at tip height, while the BESS and the substation would not be visible.

5.5.34 The introduction of the Proposed Development would result in the proposed turbines being visible high on and behind the hilltops in the view to the west, south and east from the monument (**Figure 5.2, EIAR Volume 3b**). The key elements of Glengonnar which contribute to the setting of the platform settlement, its position on the lower slopes of the valley, close to the watercourse and the better agricultural land of the valley floor and in isolation from contemporary settlements would remain readily appreciable. It would remain possible to understand that this site was probably chosen as a temporary, remote, summer, pastoral shelter. While the turbines would be visible it would remain possible to understand,

[26] Scottish Archaeological Research Framework (SCARF): South East Scotland Research Framework Society of Antiquaries of Scotland https://scarf.scot/regional/sesarf/5-chalcolithic-and-bronze-age/5-1-introduction-and-overview/5-1-3-middle-bronze-age/ (Accessed May 2026)

appreciate and experience the key elements of this prehistoric agricultural settlement and its setting within Glengonnar.

5.5.35 Overall, as a result of the change to its wider surroundings, the Proposed Development would have an impact of low magnitude on the setting of Waterhead, platform settlement, an asset of high sensitivity. In the context of NPF4 Policy 7h ii), it is considered that the ability to understand, appreciate and experience the siting of this scheduled monument and the key aspects of the setting of relevance to the platform settlement would be adequately retained such that the integrity of its setting would not be significantly adversely affected. Overall, it is assessed that this would result in an effect of **Minor** adverse significance and not significant in EIA terms.

Outer Study Area

LEAD MINES AND ASSOCIATED REMAINS, LEADHILLS (SM5817)

5.5.36 This monument comprises an extensive area of lead mining and workings located in the Lowther Hills. The scheduled area is in three parts, comprising:

- the northern area is on the east facing slopes of Glengonnar and measures approximately 1 km from north to south and at its widest 450 m east to west,
- the western area which is largely located on the east facing slopes overlooking the village of Leadhills, and measures approximately 2.4 km north to south and 860 m east to west, and
- the southern area located on the north and east slopes of Mine Hill to the south of the village of Leadhills, and measures approximately 1.6 km north to south and at its widest 1.3 km east to west.

5.5.37 As a scheduled monument, Lead mines and associated remains are of heritage value at the national level and of high sensitivity.

5.5.38 The Lead mines and associated remains comprise an area of the Lowther Hills which was subject to extensive lead mining. While it is recorded that lead mining took place in the Lowther Hills from at least the 12th century most of the visible remains within the scheduled areas date from the period of intensive mining in the mid to late 18th century until the mines closure in 1929.

5.5.39 The national importance of this monument derives from it being an extensive and relatively well-preserved example of early pre-industrial and industrial revolution period lead mines and works containing upstanding remains of many contemporary mining functions. The monument also has further value as a representative of the economic and socio-economic importance of lead mining in 18th and 19th century Scotland. HES's Statement of National Importance for this asset states "*The monument makes a significant contribution to today's landscape and/or our understanding of the historic landscape by serving as a physical reminder of the importance of lead mining in 18th and 19th century Scotland and its role in society and the economy.*"[27]

5.5.40 Given the large size of the Lead mines and associated works scheduled area, the distance and visibility of the Proposed Development from the scheduled area varies across the monument. The closest turbine (T5) would be approximately 410 m to the west of the northern scheduled area, while turbine T8 would be 1 km from the northwest edge of the

[27] https://portal.historicenvironment.scot/apex/f?p=1505:300:::::VIEWTYPE,VIEWREF:designation,SM5817

western scheduled area. The bare earth ZTV (**Figure 5.2, EIAR Volume 3a**) suggests that visibility of the proposed turbines would range from 1-5 turbines visible on the lower slopes at the very south of the southern scheduled area near Glen Franka Rig and at the northwest edge of the western scheduled area. The number of turbines visible from the scheduled area increases with altitude, with the high slopes and summits having predicted visibility of between 16-21 turbines.

5.5.41 As a functional industrial monument, the location of the lead mines and associated workings would have been chosen for the presence of lead and the suitability of the site for mining and processing lead, including the proximity to water sources (Glengonnar Water). This was not a monument placed with consideration made to its wider setting beyond its functional requirements. Given the size of this scheduled area, the visibility of the contemporary lead mining remains, throughout the scheduled area, are a key characteristic of its setting as are the views from the monument to the village of Leadhills in which its miners would have lived.

5.5.42 Four wireline visualisations have been produced from within the scheduled area as representative views; the location of these viewpoints were agreed in consultation with HES (refer to **Technical Appendix 1.1: Consultation Register (EIAR Volume 4))**.

5.5.43 **Figure 5.16a CH Viewpoint 13a (EIAR Volume 3b)** is located in the north of the western scheduled area upslope from a pathway. This wireline shows that a total of 7 turbines would be visible to hub height with a further two visible to tip height. Three turbines of the western group would be visible to hub height to the north beyond the intervening hills, with turbine T8 being the closest turbine in this view direction at 1.6 km from the scheduled area. To the northeast, four turbines would be visible to hub height and two to tip height; the closest turbine in this view direction would be T21 at 3.1 km away.

5.5.44 **Figure 5.16b CH Viewpoint 13b (EIAR Volume 3b)** is located in the west of the western scheduled area high upslope on a pathway. This wireline shows that a total of 18 turbines would be visible to hub height and a further two visible to tip height, at a distance of 2.1 km to the nearest turbine (T8) in the western group and 4.13 km to the nearest turbine (T21) of the eastern group.

5.5.45 **Figure 5.16c CH Viewpoint 13c (EIAR Volume 3b)** is located on a high point on a track through the southern scheduled area. The wireline shows that a total of 19 turbines would be visible to hub height and a further two visible to tip height, at a distance of 3 km to the nearest turbine (T8) in the western group and 3.7 km to the nearest turbine (T21) of the eastern group.

5.5.46 **Figure 5.16d CH Viewpoint 13d (EIAR Volume 3b)** is located on a high point at the western edge of the northern scheduled area. The wireline shows that rising ground to the west largely blocks views to the proposed turbines of the western group, with two turbines (T2 and T5) visible above the slope at a distance of 0.8 km to the southwest and 0.78 km to the northwest respectively. To the east, looking across Glengonnar, eight turbines of the eastern group would be visible to hub height and a further two visible to tip height, at a distance of 1.7 km to the nearest turbine (T20).

5.5.47 The visualisations and ZTV show that introduction of the Proposed Development would result in the proposed turbines being visible up hill and beyond the areas of lead mines and workings to the northwest and northeast of the scheduled area. The Proposed Development would form part of the wider landscape; however, the key views of importance to the monument, those reciprocal views between the different elements of the lead mines, working and the village of Leadhills, would be retained. The ability to understand, appreciate and experience this monument as a physical reminder of the importance of lead mining in 18th and 19th century Scotland set within a remote upland landscape would be retained, albeit with the Proposed Development visible in views beyond the scheduled area to the northeast and northwest.

5.5.48 Overall, as a result of the change to its wider surroundings, the Proposed Development would have an impact of low magnitude on the setting of the Lead works and associated remains scheduled monument, an asset of high sensitivity. In the context of the NPF4 Policy 7h ii) test it is considered that the ability to understand, appreciate and experience the siting of this scheduled monument and the key aspects of the setting of relevance to the monument would be adequately retained such that the integrity of its setting would not be significantly adversely affected. Overall, it is assessed that this would result in an effect that is of **Minor** adverse significance and not significant in EIA terms.

HISTORIC GOLD WORKINGS, LEADHILLS, SOUTH LANARKSHIRE (SM13677)

5.5.49 This scheduled monument comprises the remains of gold workings dating to the 16th century, consisting of a group of deep gullies and gold scours, cut into the hillside to the north of Shortcleuch Water. Also included in the scheduled area are the remains of two buildings to the south of the B7040 road which may have been used for the processing of sediments.

5.5.50 As a scheduled monument, the gold workings are of heritage value at the national level and of high sensitivity.

5.5.51 As a functional industrial monument, the location of the gold workings and associated structures would have been chosen for the presence of gold ore and the suitability of the site to both create gold scours in the hillside and availability of water to flush the sediment down the scours. This was not a monument placed with consideration to its wider setting beyond its functional requirements. Although there are other monuments related to the contemporary mining industry within the wider landscape, these are not intervisible with the Historic Gold Workings and do not contribute to its setting.

5.5.52 The key characteristics of the scheduled monument's setting that contribute to its cultural significance can be summarised as the localised south facing setting of gold scours and the proximity to Shortcleuch Water.

5.5.53 The Historic Gold Workings lie 2 km to the south of the nearest proposed turbine (T21) and 2.9 km to the south of the proposed substation and BESS. The visualisations (**Figure 5.17 Viewpoint 14 SM13677 Historic gold workings, Leadhills, South Lanarkshire and Figure 4.29.1-6 LVIA Viewpoint 11 B7040 road (photomontage close to Historic gold workings, Leadhills, South Lanarkshire SM13677) EIAR Volume 3b**) show that, from the gold workings, three turbines would be visible at hub height and a further four visible at tip height, while the BESS and the substation would not be visible.

5.5.54 The introduction of the Proposed Development would result in the proposed turbines being visible in the view to the north from the monument (**Figure 5.2, EIAR Volume 3a**). However, the discrete local setting of this monument and its relationship with Shortcleuch Water would remain unaffected. This assessment reflects the findings of HES's Report on Handling[28] which was produced when the site was scheduled in 2017 while the formerly

[28] HES (2017) Report on Handling paragraph 3.3, (Available at https://portal.historicenvironment.scot/apex/f?p=1505:300:::::VIEWTYPE,VIEWREF:decision,500001709, Accessed February 2026)

proposed Harryburn Wind Farm was in planning. HES were aware of the Harryburn proposal at the time and in their report on the handling of the decision to schedule stated:

"*This monument is located close to a proposed windfarm development located in the hills above the site and we have considered the likely implications of proceeding to designate this site. We have assessed the setting of the proposed monument and have concluded that the monument has a discrete setting which is focussed on the Shortcleuch Water. We are content that the construction of a wind farm on the hills above (to the north) of the proposed monument would not diminish our understanding and appreciation of the monument*." [29]

5.5.55 Overall, as a result of the change to its wider surroundings, the Proposed Development would have an impact of negligible magnitude on the setting of the historic gold workings, an asset of high sensitivity. In the context of the NPF4 Policy 7h ii) test, it is considered that the ability to understand, appreciate and experience the siting of this scheduled monument and the key aspects of the setting of relevance to the historic gold workings would be adequately retained such that the integrity of its setting would not be significantly adversely affected. Overall, it is assessed that this would result in an effect of **Negligible** significance and not significant in EIA terms.

SCOT'S MINING COMPANY HOUSE AND GDL (LB732 AND GDL00339)

5.5.56 Scots Mining Company House (LB732) is a Category A Listed Building set within the grounds of its Inventory Garden and Designed Landscape (GDL00339) at the southern edge of Leadhills village. The Category A Listed Building and Inventory Garden and Designed Landscape are assets of heritage value at the national level and of high sensitivity.

5.5.57 The Scot's Mining Company House (LB732) is a purpose built, industrial manager's house built between 1734 and 1740 for James Stirling, the agent of the Scot's Mining Company in Leadhills. The house is a two storey, three bay square-plan pyramidal roofed classical villa with later single storey wings added also in the 18th century. The main front façade of the house faces west over the village of Leadhills to the rising hills of Snarehead Hill, on the lower slopes of which there are the remains of contemporary lead works (SM5817).

5.5.58 The house's garden (GDL00339) is largely enclosed by dense established planting; however, the various walks through the gardens and the elevated position of the house allow for views through the trees to the surrounding landscape. The surrounding landscape is now largely open moorland and sheep grazing, although when in use as the mine managers house this landscape would have been dominated by the lead workings. The garden, as well as providing the immediate setting of the managers house, is recognised as amongst the best examples of high-altitude garden cultivation in Scotland and today the trees and planting of the garden remain a noticeable feature in the surrounding landscape.

5.5.59 Scots Mining Company House was the administrative centre of the industrial mining estate. It was also built to be a dominant landmark within the village acting both as a site where the manager of the mine could overlook the village and mining operations but also as a prominent reminder to the villagers and miners that they were being overlooked. The formality of the house in comparison to the majority of the contemporary housing stock in the village further accentuates the difference between the manager and the mine workers/ villagers. The relationship between the House and GDL and the village of Leadhills and the associated Lead mines (SM5817) are therefore a key characteristic of the setting of these assets. The altitude of Leadhills and the resulting contrast between the planting of the GDL

[29] Ibid

and the wider surrounding managed moorland setting is a further key characteristic of their setting.

5.5.60 The Scot's Mining Company House and GDL lie 2.2 km to the southeast of the nearest visible proposed turbine (T8), 5 km from the BESS and the substation. The bare earth wireline (**Figure 5.18 Viewpoint 15: LB732 and GDL00339 Scot's Mining Company House and GDL, EIAR Volume 3b**) shows that, from the house, four turbines would be visible at hub height and a further six visible at tip height, while the BESS and substation would not be visible.

5.5.61 A photomontage has been produced from a location upslope to the east of the Scot's Mining Company House and GDL (**Figure 4.37.1-X LVIA Viewpoint 17 Leadhills Football pitch (photomontage near Scot's Mining Company House (LB732) and GDL and Leadhills CA, EIAR Volume 3b**) the higher elevation of this photomontage allows it slightly wider views than those that would be gained from the grounds of the GDL, but demonstrates that the proposed turbines would be visible on and beyond the hills to the northwest from the House and GDL and that there would be limited potential visibility of the eastern group of turbines beyond Broad Law to the east.

5.5.62 The introduction of the Proposed Development would result in the proposed turbines being visible on the hills in distant views to the northwest and northeast from the House and GDL. The main façade of the Scot's Mining Company House faces west and the tip of one of the proposed turbines would be within this view, which is today filtered through the dense deciduous planting of the GDL. However, the majority of the turbines would, where visible, be seen to the northwest beyond the village of Leadhills and that area of the associated Lead mines (SM5817) in views from the House and GDL. It would remain possible to understand, appreciate and experience the relationship between the House and GDL and the village and lead mines in these views, with the turbines sitting on and behind the hills beyond them. Furthermore, the Proposed Development would not detract from views from the village towards the House and GDL which are now largely screened by the woodland of the GDL.

5.5.63 It is assessed that, as a result of the change to its wider surroundings, the Proposed Development would have an impact of low magnitude on the setting of The Scot's Mining Company House and GDL, assets of high sensitivity. In the context of the NPF4 Policy 7c) test it is considered that the Proposed Development would preserve the character, and the special architectural and historic interest of The Scot's Mining Company House Listed Building, as the relationship between the House, Leadhills village and the associated historic mining areas would be adequately retained. In the context of NPF4 Policy 7i) test it is considered that the Proposed Development has been located so as to protect and preserve the cultural significance, character and integrity of Scot's Mining Company House GDL and would not significantly impact on important views to, from and within the site, or its setting. Overall, it is assessed that this would result in an effect that is of **Minor** adverse significance and not significant in EIA terms.

LEADHILLS CONSERVATION AREA (CA393)

5.5.64 Leadhills Conservation Area (CA), comprising the whole of the village of Leadhills, stretches 1.5 km north to south and approximately 600 m east to west. As a CA, this is an asset of heritage value at the regional level and of medium sensitivity.

5.5.65 Leadhills is the second highest village in Scotland at approximately 395 m AOD. A settlement at this altitude is unusual in Scotland as most are located at lower levels close to good agricultural land, river valleys or the coast. The village of Leadhills has developed around a natural valley in the Lowther Hills, perhaps in part chosen to provide relative shelter in the otherwise exposed landscape.

5.5.66 The settlement at Leadhills may have had origins in the early 1600s as a seasonal base for miners. However, the present architectural character of Leadhills village largely reflects the period from 1735 when the poor living conditions of the miners were recognised. It was during this period of improvement that the current street pattern of the village emerged, comprising a more formal north-south alignment along the main street with long rows of one to one and a half storey miners cottages built into the hillside and a number of grander municipal and institutional buildings including the library, school and the Scot's Mining Company House (LB732).

5.5.67 A key characteristic of the CA setting is its connection with the surrounding lead mining remains including the scheduled monument Lead mines and associated remains, Leadhills (SM5817) and the views to and from these remains. It is this association and the origins of the village as a mining village that is fundamental to the siting of the village in a remote upland landscape, and this isolated upland setting is also a characteristic of the setting of the CA.

5.5.68 Given the size and topography of the CA, the ZTV shows that there would be varied visibility of the proposed turbines across the CA with limited visibility in the north of the CA in the low ground surrounding the cemetery. The potential visibility increases further south and upslope in the CA, where the highest theoretical visibility would be in the area of Leadhills railway station where 16 to 21 turbines would theoretically be visible. The visualisations produced to inform this assessment aid the understanding of potential visibility from the CA and surrounding area.

- **Figure 5.18 CH Viewpoint 15 Scot's Mining Company House (LB732)** (**EIAR Volume 3b**) is taken from an area of the CA which has higher theoretical visibility of the Proposed Development than most of the CA to the north of it. This bare earth wireline photomontage shows that the nearest turbines to this area of the CA (T6, T7 and T8) would be largely hidden behind the summit of Hunt Law with only the tip of T8 visible; to the north northeast, turbines T1, T2, T4 and T5 would theoretically be visible to hub height. The bare earth wireline shows that the eastern group of turbines would be almost fully hidden behind the rising ground of Ben Law with only the tips of four turbines theoretically visible beyond the hill.
- Figure 4.35.1-10 LVIA Viewpoint 17 Leadhills Football pitch (photomontage near Scot's Mining Company House (LB732) and GDL and in Leadhills CA) (EIAR Volume 3b) is taken upslope from the eastern edge of the CA in an area of greater theoretical visibility than the majority of the CA. This photomontage also shows that the nearest turbines to the CA (T6, T7 and T8) would be largely hidden behind the summit of Hunt Law with only the tip of two turbines theoretically visible; to the north northeast, turbines T1, T2, T3, T4 and T5 would be theoretically visible to hub height. The photomontage shows that the eastern group of turbines would be almost fully hidden behind the rising ground of Ben Law with the hub of one turbine and the tips of six turbines theoretically visible beyond the hill.
- **Figure 4.27.1-6 LVIA Viewpoint 9 B797 South of Leadhills near Glengonnar Station (EIAR Volume 3b)** (photomontage) demonstrates that on approaching Leadhills from the south on the B797, the Proposed Development would be visible on and behind the hills to the east and northwest of the CA.

5.5.69 The visualisations and ZTV show that introduction of the Proposed Development would result in the proposed turbines being visible to varying degrees from within the conservation area with the greatest visibility being in views to the northwest. The Proposed Development would also be largely visible on the southern approach to the village along the B797 road. Approaching the village from the north, southbound on the B797, the proposed turbines will not be visible in combination with the village and on approach from the east on the B7040 there is some potential for the western group of turbines to be visible to the northwest beyond the Conservation Area. The Proposed Development would form part of the wider landscape; however, the key views of importance to the setting of this Conservation Area, those reciprocal views between the village of Leadhills and the surrounding remains of the lead mines, would be retained. The ability to understand, appreciate and experience this conservation area as a former mining village located in a remote upland landscape would be retained albeit with the proposed turbines visible to the northeast and northwest to varying degrees in views out from the village and in views towards the village on the approach from the south.

5.5.70 Overall, as a result of the change to its wider surroundings, the Proposed Development would have an impact of medium magnitude on the setting of Leadhills Conservation Area, an asset of medium sensitivity. In the context of NPF4 Policy 7d) test it is considered that the Proposed Development would preserve the architectural and historic character of the area, the existing density, built form and layout and would adequately preserve the context and siting of the Leadhills Conservation Area as it would remain readily appreciable that this is a former mining village set within a remote upland landscape. Overall, it is assessed that this would result in an effect that is of **Moderate** adverse significance and significant in EIA terms.

Decommissioning

5.5.71 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 would have the potential to cause direct, permanent, and irreversible effects on the heritage assets. The likelihood of direct decommissioning 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.

5.5.72 There are no previously recorded or newly identified assets likely to receive direct construction 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.

5.5.73 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.

Cumulative Effects

Construction

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

Operation

5.5.75 **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, together with the heritage assets recorded within the Outer Study Area.

5.5.76 Cumulative developments that are operational or under construction are considered to form part of the baseline setting of the Outer Study Area and are considered (where relevant) above (**Operational Effects**).

5.5.77 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.

5.5.78 Based on professional judgment, appraisal of the blade-tip ZTV, and use of cumulative wireline visualisations (**Figures 5.4 – 5.16**, **EIAR Volume 3b**), no cumulative schemes (consented or at the application stage) have been identified that in combination with the Proposed Development would result in a possible cumulative effect on heritage assets greater than that identified as an Operational Effect. This is due to the relative distance and limited theoretical visibility of the cumulative developments from the heritage assets assessed as part of this assessment.

5.6 Additional Mitigation and Enhancement Measures

5.6.1 Additional mitigation comprises site-specific mitigation which has been included to further reduce the magnitude of impact/significance of effect identified through the EIA.

Construction

5.6.2 No specific mitigation is required as the embedded and standard mitigation measures result in no residual significant effects as a result of the construction the Proposed Development.

Operation

5.6.3 No specific mitigation is available to further reduce the predicted 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.

Decommissioning

5.6.4 No specific mitigation is required as the embedded and standard mitigation measures result in no residual significant effects as a result of decommissioning the Proposed Development.

5.7 Assessment of Residual Effects

Construction

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 minor magnitude (**not significant** in EIA terms).

Operation

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 Leadhills Conservation 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 adequately preserve the context and siting of the Leadhills Conservation Area, as it would remain possible to experience, appreciate, and understand the setting of this historic mining village within a remote upland landscape, albeit in a landscape that contains 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).

Decommissioning

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.

Cumulative

Construction

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

Operational

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

5.8 Monitoring

Construction

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 construction.

Operation

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

Decommissioning

5.9 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.

5.10 Summary

5.10.1 The potential significant effects of the Proposed Development are set out in Table 5.4 below.

Table 5.4: Summary of Potential Significant Effects

Likely Significant Effect	Additional Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Potential adverse impact of up to moderate significance on Pyatshaw Brae House Platform (WoSAS 13299)	Implementation of CEMP Archaeological monitoring and excavation (where required).	To be agreed with WoSAS and set out in a WSI.	Up to Minor Adverse (Not Significant)
Potential accidental adverse impact of moderate significance on Kirk Gill (WoSAS 10505).	Implementation of CEMP Restriction of construction machinery to defined areas; avoidance of upstanding heritage remains	CEMP agreed with SLC in consultation with other statutory consultees. ACoW	No Impact
Potential adverse direct construction impact on previously undiscovered below-ground archaeological remains.	Implementation of CEMP Archaeological monitoring and excavation (where required).	To be agreed with WoSAS and set out in a WSI.	Negligible Adverse Not Significant
Operation			
Moderate adverse impact on the setting of Leadhills Conservation Area (CA393)	None proposed	N/A	Moderate Adverse (Significant) – h*owever, it is considered that the context and siting of the Leadhills Conservation Area would be adequately preserved such that it would remain readily appreciable that this is a former mining village set*

Table 5.4: Summary of Potential Significant Effects			
Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
			within a remote and upland landscape
Decommissioning			
N/A	N/A	N/A	N/A
Cumulative construction			
N/A	N/A	N/A	N/A
Cumulative operation			
N/A	N/A	N/A	N/A

6 Ecology

6.1 Introduction

6.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) considers the likely significant effects associated with the construction, operation and decommissioning of the Ravengill 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 specific objectives of the chapter are to:

- describe the existing ecological baseline context and cumulative context;
- describe the assessment methodology and significance criteria used in completing the ecological impact assessment (EcIA);
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects;
- assess the residual effects remaining following the implementation of mitigation;
- in the event of the remaining residual effects are assessed to be significant, considering appropriate proposals for compensation; and
- assess how the Proposed Development would contribute to the enhancement of biodiversity.

6.1.3 The assessment has been carried out by SLR Consulting Limited (formerly MacArthur Green[1]). All staff contributing to this chapter have professional experience in ecological impact assessment (EIA) and ecological survey, hold professional membership of and / or abide by the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct.

6.1.4 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
  - 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) Survey Area and Results;
  - Figure 6.5: Peatland Condition Assessment (PCA) Survey Area and Classification Results;
  - Figure 6.6: Woodland/Scrub Invasion of Peatland;
  - Figure 6.7: Sphagna Abundance and Distribution;
  - Figure 6.8: Protected Species Survey Area and Results;
  - Figure 6.9: Bat Anabat Locations and Daytime Bat Walkover Survey Area and Results;
  - Figure 6.10: Overall Risk Assessment 2025 (May to September) – Common pipistrelle;
  - Figure 6.11: Overall Risk Assessment 2025 (May to September) – Soprano pipistrelle;
  - Figure 6.12: Overall Risk Assessment 2025 (May to September) – *Nyctalus* species;

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

- Figure 6.13: Electrofishing: Trout Presence/Absence and Density Category
- Figure 6.14: Outline Biodiversity Enhancement Management Plan.

- Volume 4: Technical Appendices
  - Technical Appendix 6.1: Assessment Methodology;
  - Technical Appendix 6.2: National Vegetation Classification and Habitats Survey Report;
  - Technical Appendix 6.3: Protected Species Survey Report;
  - Technical Appendix 6.4: Bat Survey Report;
  - Technical Appendix 6.5: Fish Survey Report;
  - Technical Appendix 6.6: Outline Species Protection Plan; and
  - Technical Appendix 6.7: Outline Biodiversity Enhancement Management Plan.

6.1.5 Figures and technical appendices are referenced in the text where relevant.

6.2 Assessment Methodology

Overview

6.2.1 The EcIA methodology is detailed in **Technical Appendix 6.1 (EIAR Volume 4)** and follows the principles set out in CIEEM[2] guidance, which is in line with the EIA Regulations[3].

6.2.2 The assessment is presented with reference to specific 'areas' of the Site. These areas comprise western and eastern areas and associated access routes, as fully described in **Chapter 2: Proposed Development (EIAR Volume 2)**.

6.2.3 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being 'Major' or 'Moderate'.

Scope of Assessment

Potential Impacts Scoped In

6.2.4 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.

6.2.5 The scope of the assessment has been informed by consultation responses as detailed in the consultation register (see **Technical Appendix 1.1 (EIAR Volume 4)**) and relevant legislation, best practice guidance, and national and local policy, including the local South Lanarkshire Biodiversity Strategy 2024-2030[4].

6.2.6 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);

[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.
[4] South Lanarkshire Council (2024). South Lanarkshire Council Biodiversity Strategy. Available at: https://www.southlanarkshire.gov.uk/downloads/file/16574/biodiversity_strategy_2024_-_2030. [Accessed February 2026]

- 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);
- 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 and Geology (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).

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

Potential Impacts Scoped Out

6.2.8 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 Directive[5]
- 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 1981[8], the Habitats Regulations[9] or The Protection of Badgers Act 1992[10].

6.2.9 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).

6.2.10 Based on information provided by the Clyde River Foundation (CRF), freshwater pearl mussel (FWPM) (*Margaritifera margaritifera*) are scoped out of the assessment. CRF confirm that FWPM are unlikely to be present in watercourses 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 River Clyde[11].

[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/. [Accessed February 2026]
[7] NatureScot (2025). Scottish Biodiversity List. Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list. [Accessed February 2026]
[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).

6.2.11 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 6.7**) in nature and are likely to be of shorter duration.

6.2.12 Prior to decommissioning, a Decommissioning Plan would be prepared and submitted to the planning authority, 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.

6.2.13 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 scoped out and not assessed further.

6.2.14 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 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 6.6**.

Method of Baseline Characterisation

Extent of the Study Area

6.2.15 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.

6.2.16 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 (except for designated sites, where the study area is a 5 km distance band around the application boundary (see **Figure 6.1, EIAR Volume 3a**).

Desk Study

6.2.17 A desk study was undertaken to collate existing available ecological information in relation to the Site and surrounding environment.

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

- NatureScot Sitelink[12] for designated site information within 5 km of the application boundary;

[12] NatureScot (2025). Sitelink. Available at: https://sitelink.nature.scot/home. [Accessed February 2026]

- Local Nature Conservation Sites (LNCS)[13] within 5 km of the application boundary;
- Ancient Woodland Inventory (AWI) Scotland[14] for ancient woodland sites within 5 km of the application boundary;
- Carbon and Peatland Map[15] for predicted peatland classes within the Site;
- National Biodiversity Network (NBN) Atlas Scotland[16] for protected or notable species records within 5 km of the application boundary, 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 – 2030[4];
- Deer Distribution Survey (2023)[17];
- Saving Scotland's Red Squirrels[18] for recorded sightings of red squirrels within 5 km of the application boundary;
- Scottish Environment Protection Agency (SEPA) Water Environment Hub[19] for watercourse classification;
- SEPA Obstacles to Fish Passage[20] for barriers to fish migration;
- Scoping documents for nearby proposed developments for further records within 5 km of the application boundary (comprising Glensalloch Wind Farm[21]); and
- Relevant scientific literature on protected species' distribution, habitats distribution and conservation status etc.

Field Survey

6.2.19 The following field surveys were undertaken to further establish the baseline ecological conditions at the Site (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 September 2024, October 2024, November 2024 and July 2025);
- Peatland Condition Assessment (PCA) surveys, following completion of the NVC surveys and the identification of priority peatland communities on-site (January 2026);
- Protected species surveys (carried out 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*);
- Daytime Bat Walkover (DBW) and Ground Level Tree Assessment (GLTA) to identify bat potential roost features (PRFs) (June 2025 and July 2025);
- Bat activity surveys (May to September 2025); and
- Fisheries surveys, baseline surveys including electrofishing (July 2025).

[13] Scottish Government (2025). Local Nature Conservation Sites – Scotland. Available at: https://www.data.gov.uk/dataset/c3460656-74ab-435a-8f77-9a528e24beb1/local-nature-conservation-sites-scotland.
[14] Ancient Woodland Inventory (Scotland). Available at: https://www.spatialdata.gov.scot/geonetwork/srv/api/records/A091F945-F744-4C8F-95B3-A09E6EF6AE33. [Accessed February 2025]
[15] Scottish Natural Heritage (SNH) (2016). Carbon and peatland map 2016. Available at: https://opendata.nature.scot/datasets/snh::carbon-and-peatland-2016-map/explore. [Accessed February 2025]
[16] NBN Atlas Scotland (2025). Online. Available at: https://nbnatlas.org/. [Accessed February 2026]. Citations for individual records are noted in **Technical Appendices 6.3 and 6.4 (EIAR Volume 4).**
[17] The British Deer Society (2023). Deer Distribution Survey Results. Available at: https://bds.org.uk/science-research/deer-surveys/deer-distribution-survey/. [Accessed February 2026].
[18] Scottish Squirrels (2025). Saving Scotland's Red Squirrels. Available at: https://scottishsquirrels.org.uk/. [Accessed February 2026]
[19] SEPA (2026). Water Environment Hub. Available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/. [Accessed March 2026].
[20] https://marine.gov.scot/?q=maps/1746 [Accessed March 2026].
[21] Savills (2025). Glensalloch Wind Farm Scoping Report.

6.2.20 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 all ecology field surveys.

6.2.21 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 **6.13 (EIAR Volume 3a)**.

Method of Assessment

Overview

6.2.22 Detailed information on the assessment methodology, including criteria for assessing sensitivity of IEFs, magnitude of change and cumulative effects, as well as overall significance criteria, is provided in **Technical Appendix 6.1 (EIAR Volume 4)**.

Limitations

6.2.23 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.

6.2.24 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.

6.2.25 Static bat activity surveys experienced some minor limitations. Due to unforeseen errors with the detectors, microphones or batteries, the guidance[22] recommended 10 consecutive nights of recordings were not achieved at all detectors during deployments on a small number of occasions; however, overall, the resulting static bat data collected for the Site was well in exceedance of guidance[22] requirements 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 and amount of bat data collected.

6.2.26 No notable limitations were experienced with regards to habitats, protected species or fish field surveys (see **Technical Appendices 6.2**, **6.3** and **6.5 (EIAR Volume 4)**).

6.2.27 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

6.2.28 The following assumptions are included in the assessment of otherwise unmitigated effects on IEFs:

[22] 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. [Accessed February 2026].

- Construction of 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: 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 **Section 6.5** would be fully applied, e.g., the presence of an Ecological Clerk of Works (ECoW), 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

Current Baseline

Desk-Based Study

DESIGNATED SITES

6.3.1 North Lowther Uplands Site of Special Scientific Interest (SSSI), designated for its assemblage of upland vegetation communities representative of the Southern Uplands, lies 3.2 km to the west of the Site (refer to **Figure 6.1 (EIAR Volume 3a)**). The latest assessed condition of the SSSI was 'unfavourable recovering' as of 15 January 2019 due to negative pressures associated with burning and overgrazing. The most important habitats included within the upland assemblage are blanket bog, heather moorland and acid grassland[23].

6.3.2 There are no LNCS within 5 km of the application boundary.

ANCIENT WOODLAND

6.3.3 There are several stands of ancient woodland within 5 km of the application boundary; most lie to the north (refer to **Figure 6.1 (EIAR Volume 3a)**). The majority of these ancient woodland stands are categorised as Long-Established (of plantation origin), with a few small patches categorised as Ancient (of semi-natural origin) or Other (on Roy map). There is one area of ancient woodland within the Site: a very small riparian strip in the far north of the Site along Glengonnar Water and which is located approximately 35 m from the nearest section of proposed track associated with the Proposed Development, and which is an existing track to

[23] SNH (2010). North Lowther Uplands Site of Special Scientific Interest Site Management Statement. Available at: https://www.nature.scot/sites/default/files/site-special-scientific-interest/8161/site-management-statement.pdf. [Accessed February 2026]

be upgraded (see **Figure 6.1 (EIAR Volume 3a)**); this stand is categorised as Long-Established (of plantation origin).

Habitats

TERRESTRIAL HABITATS

6.3.4 The Carbon and Peatland Map 2016[15] 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 "n*ationally important carbon-rich soils, deep peat and priority peatland habitat*"[24] as Class 1[25] and Class 2[26] peatlands. Class 1 peatlands are also "*likely to be of high conservation value*" and Class 2 "o*f potentially high conservation value and restoration potential*".

6.3.5 The predictive tool and map indicate that there are several small areas of Class 1 peatland within the Site, predominantly located in the eastern and western extents. No Class 2 peatland is present within the Site. The remainder of the Site is composed of mainly Class 4[27], Class 3[28] and Class 0[29] (mineral) soils, with some smaller scattered patches of Class 5[30] 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, peat depth, and peatland condition assessment surveys have been carried out across the Site to provide high resolution data, and which supersedes the predictive high-level Carbon and Peatland Map data, 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 6.2 (EIAR Volume 4)**, see also **Figures 6.3** and **6.5 (EIAR Volume 3a)**. The results of the peat depth surveys are presented and discussed in **Chapter 8: Hydrology, Hydrogeology and Geology (EIAR Volume 2)** and associated Technical Appendices and results shown on **Figure 8.6 (EIAR Volume 3a)**.

AQUATIC HABITATS

6.3.7 Watercourses within the Site form tributaries ultimately feeding into the River Clyde further downstream. These on-site watercourses drain into the Duneaton Water approximately 2.5 km to the northwest of the Site at its closest via the Snar Water amongst others, Glengonnar Water which splits the centre of the Site, and Elvan Water/Shortcleuch Water along the southeast boundary of the Site, all of which discharge into the River Clyde (see **Figure 8.1 (EIAR Volume 3a)** for surface water features and watercourse network).

6.3.8 The Snar Water is classified by SEPA's Water Classification Hub as having good overall status[19]. The Snar Water feeds into the Duneaton Water, which (upstream (u/s) Black Burn) is also classified as having good overall status[19], with Duneaton Water (downstream (d/s) Black Burn) as having a moderate overall status in 2024.

6.3.9 The River Clyde has been recorded by SEPA[19] as "*a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact on water storage*

[24] Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.
[25] Class 1: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value.
[26] Class 2: Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential.
[27] Class 4: Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils.
[28] 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.
[29] Class 0: Mineral Soil.
[30] 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.

for public drinking water". The overall status of the River Clyde (Potrail Water to Mouse Water) was recorded as moderate ecological potential in 2024.

6.3.10 Glengonnar Water in 2024 has an overall status of moderate[19].

6.3.11 Elvan Water/Shortcleuch Water in 2024 has an overall status of good[19].

Protected Species

6.3.12 A search of the NBN Atlas Scotland[16] covering a 5 km buffer from the application boundary in the past 15 years (i.e. from 2010 onwards)[31] identified records of the following protected or notable species:

- Adder;
- Badger;
- Brown long-eared bat (*Plecotus auritus*);
- Common lizard;
- Common pipistrelle (Pipistrellus pipistrellus);
- Daubenton's bat (*Myotis daubentonii*);
- Mountain hare (*Lepus timidus*);
- Natterer's bat (*Myotis nattereri*);
- Red squirrel; and
- Soprano pipistrelle (*Pipistrellus pygmaeus*).

6.3.13 A further search covering a 10 km buffer from the application boundary over the same time period identified records of the following bat species in addition to those detailed above:

- Leisler's bat (*Nyctalus leisleri*).

6.3.14 Single sightings of red squirrels were recorded by Saving Scotland's Red Squirrels within 5 km of the Site in 2023 - 2020, 2018, 2016 and 2013, with two sightings being recorded in 2025[18]. None of these sightings were within the Site.

6.3.15 The Deer Distribution Survey results indicated the presence of the following deer species in the general area of the Site:

- Roe deer (Capreolus capreolus); and
- Red deer (Cervus elaphus).

6.3.16 The scoping documents for Glensalloch Wind Farm[21], which lies southwest of the Proposed Development, were consulted for information on nearby ecological features. Field surveys (UK Habitat Classification (UKHab) and NVC, PSS, daytime bat walkover (DBW) and ground-level tree assessment (GLTA), bat activity surveys, electrofishing and macro-invertebrate sampling and freshwater pearl mussel habitat suitability assessment) were undertaken in 2025. No results were noted in the scoping report.

6.3.17 The Site is located in the River Clyde catchment. Based on the presence of natural and impassable migratory fish barriers downstream on the River Clyde[20], migratory Atlantic

[31] Data licences and providers are detailed in **Technical Appendices 6.3** and **6.4 (EIAR Volume 4).**

salmon (*Salmo salar*) and European eel (*Anguilla Anguilla*) are known not to be present in the upper River Clyde system in which the Site lies.

Invasive Non-Native Species (INNS)

6.3.18 The NBN Atlas Scotland[16] search returned records of the INNS grey squirrel (*Sciurus carolinensis*) and North American signal crayfish (*Pacifastacus leniusculus*).

Field Surveys

Habitats

NATIONAL VEGETATION CLASSIFICATION (NVC) AND PHASE 1

6.3.19 **Technical Appendix 6.2 (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 Classification[32] 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.

6.3.20 Forty-four NVC communities, three intermediate communities and 23 non-NVC communities were recorded within the Site and wider survey area, which corresponded to 39 different Phase 1 habitat types. These communities and habitat types, and their respective Site-specific correlations are detailed in **Technical Appendix 6.2 (EIAR Volume 4)** and shown on **Figure 6.3 (EIA Volume 3a)**.

6.3.21 The extents of NVC communities and non-NVC types recorded within the Site (i.e. the study area) 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.

6.3.22 The Site predominantly supports a mixture of acid dry dwarf shrub heath, marshy grassland, unimproved acid grassland, blanket bog, wet dwarf shrub heath and wet modified bog, as summarised in **Diagram 6-1**. Other habitat types distributed across the Site include bracken, recently felled coniferous plantation, semi-improved grassland and acid/neutral flushes. All other habitats recorded cover less than 1% of the study area.

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

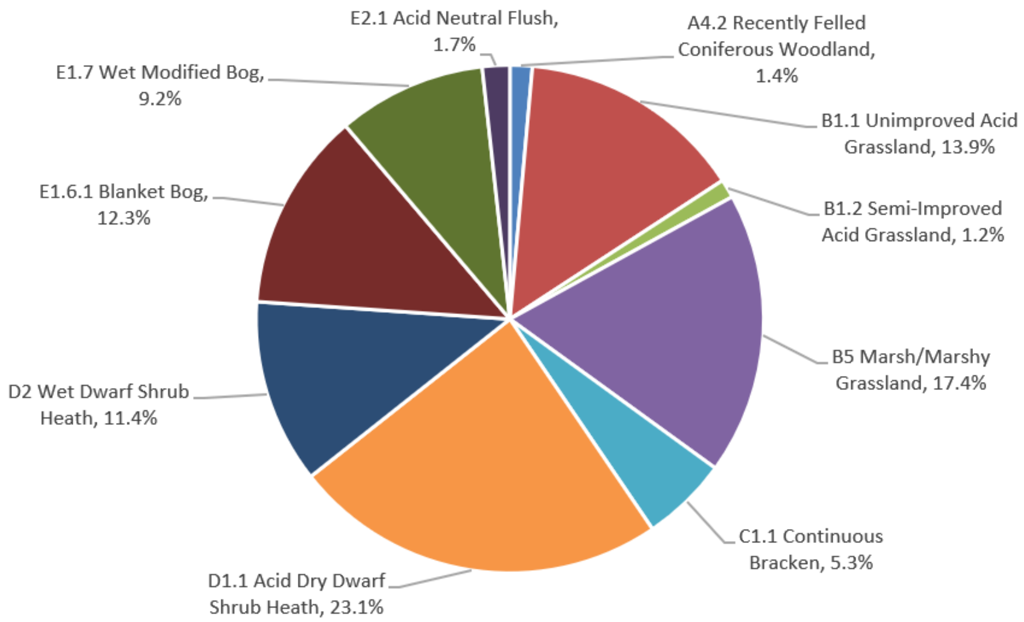

Diagram 6-1 Predominant Phase 1 Habitat Types Recorded within the study area (habitat types making up <1% of the study area are not included).

6.3.23 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 6.2 (EIAR Volume 4)**).

6.3.24 The blanket bog within the Site is predominantly composed of the M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire community (i.e. M19 accounts for 91% of the blanket bog recorded within the study area). M19 is typically the driest of the blanket bog communities. There are smaller scattered patches of M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire locally, but its overall extent is relatively low. Incidences of M3 *Eriophorum angustifolium* bog pool communities are rare. These habitats are likely associated with SBL blanket bog habitat with some areas also corresponding to Annex I type 7130 blanket bog habitat. The blanket bog within the Site, for the most part, is in a relatively degraded and modified condition through primarily historical practices with ongoing legacy effects. The poorer/modified condition of much of the peatland present has arisen via livestock grazing, agricultural improvement, drainage, and muirburn. As a result, several hagg / gully and bare peat features were recorded during surveys. In many areas it can also be seen that likely former better-quality bog has over time transitioned to poorer quality wet modified bog (see below).

6.3.25 Wet modified bog within the study area is mainly composed of M20 *Eriophorum vaginatum* blanket mire and M25a^[33] *Molinia caerulea – Potentilla erecta* mire *Erica tetralix* sub-community, with much smaller extents of a M20-M25a^ intermediate community and M15b^ *Trichophorum germanicum - Erica tetralix* wet heath, typical sub-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, drainage and burning that has led to the scarcity or absence of *Calluna vulgaris* in the sward.

[33] The use of the carat symbol here '^' indicates the marshy grassland or wet heath community appears likely to be on peat over 0.5 m in depth, contains mire associate species, or has been derived from degraded bog, and is therefore more appropriately considered wet modified bog rather than marshy grassland or wet heath.

PEATLAND CONDITION

6.3.26 The PCA study area focussed on areas around proposed infrastructure and tracks, potential Outline Biodiversity Enhancement Management Plan (OBEMP) peatland restoration search areas (as per **Figure 6.14 (EIAR Volume 3a)**), and areas mapped during the habitat surveys and classified using the Phase 1 symbology as containing priority peatland communities (i.e. codes D2 wet dwarf shrub heath, E1.6.1 blanket bog, E1.7 wet modified bog, E4 bare peat, and mosaics thereof); see **Figure 6.5 (EIAR Volume 3a)** for the PCA study area and survey sample locations. The full detailed methodology and sampling strategy applied, and associated presentation of results and discussion is contained within **Annex D** of **Technical Appendix 6.2 (EIAR Volume 4)**; however, a summary of key aspects is provided below.

6.3.27 PCA surveys recorded the peatland within the study area to comprise a patchwork of modified and artificially drained bog along with some areas of actively eroding hagg/gully peatland. Detailed discussion is included in **Technical Appendix 6.2 (EIAR Volume 4)** with overall peatland condition classification results shown on **Figures 6.5 (EIAR Volume 3a)**. Of the 313 survey sample locations taken within peatland habitat, the following Peatland Action Condition Categories were recorded:

- Modified (217/313);
- Drained (artificial) (67/313);
- Actively eroding: hagg/gully (27/313); and
- Drained (hagg/gully) (2/313).

6.3.28 These results indicate much of the peatland within the study area is modified/degraded, drained, or actively eroding, with bare peat areas also recorded at 41 sample locations (see also example Photographs in **Annex B** and **Annex C** of **Technical Appendix 6.2 (EIAR Volume 4)**). No 'Near-natural' peatland was recorded[34].

6.3.29 Peat haggs and/or gully was recorded around 35 sample locations (eight samples have gullies cut through to underlying mineral substrates). Most of these samples were clustered in the actively eroding and deeper peatland in the east around Peat Hill (east of T18) and Wellgrain Dod (southwest of T17); see **Figure 6.5.1 – 6.5.5 (EIAR Volume 3a)**.

6.3.30 Artificial drains were recorded at 68 sample locations and were widely scattered throughout the study area, indicating systematic intensive historic moor grip drainage in certain areas. In some areas there were several drains, or 'double-drains', within the survey plot (48 samples were considered open and active, with 17 of the open drains deeply cut through to the underlying mineral substrates).

6.3.31 Twenty-nine sample locations showed evidence of woodland and scrub invasion. These were mostly around Peat Hill (south and southwest of T12 and T15) and Wellgrain Dod (north of T21) in the east of the Site (see **Figure 6.6 (EIAR Volume 3a)**) and largely consisted of young *Picea sitchensis* encroaching into the survey plots.

6.3.32 Sphagna-rich ridges were considered present at 122 of the 313 peatland samples. However, when present they were usually not abundant nor extensive, but were often comprised of small patches of a single common species, primarily *Sphagnum capillifolium* (see further detailed discussion in **Technical Appendix 6.2 (EIAR Volume 4)**). In terms of abundance

[34] 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.

the following additional data was recorded at each of these 122 relevant sample locations using the DAFOR[35] scale, indicating the general lack of abundant Sphagna-rich ridges: Dominant – 0 samples; Abundant – 4 samples; Frequent – 17 samples; Occasional - 30 samples; and Rare – 71 samples. The general distribution and abundance of Sphagna as recorded using additional quadrat data in this PCA survey is shown in **Figure 6.7 (EIAR Volume 3a)**.

6.3.33 None of the following were recorded at sample locations or incidentally throughout the study area - *Sphagnum-Betula nana* ridges, *Sphagnum fuscum / S. austinii* hummocks, peat mounds, or *Rhynchospora fusca*.

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 260 peatland sample locations. Where *Calluna vulgaris* or other dwarf shrubs were present at a sample location an assessment was made as to the level of browsing impact. The results indicated that grazing impact was High at 0 samples, Moderate at 32 samples and Low at 224 samples[36]. Given the abundance, distribution, height and character of the dwarf shrubs present it is likely the study area does not have a recent history of intensive upland grazing, although this may have been higher in the past in certain areas given the presence of areas of wet modified bog which lack dwarf shrub cover. The study area is currently sustainably grazed by hill sheep through moorland Agri-Environment Climate Schemes (AECS)[37].

6.3.35 Overall, the peatland present exhibits frequent drainage and erosion damage features and 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 peatland[38]. 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 drainage, peat hagging/gullying present and active erosion, and areas of bare peat.

GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEMS (GWDTES)

6.3.36 NVC communities recorded within the survey area were referenced against SEPA guidance[39] 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 6.2 (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 criteria to determine a habitat's

[35] DAFOR = Dominant, Abundant, Frequent, Occasional, Rare.
[36] grazing impacts where generally high in the non-peatland samples as these areas tend to be areas of habitats such as acid grassland which are more suitable for grazing and tend to be preferentially grazed by livestock in comparison to peatland/bog habitats.
[37] Scottish Government (2025) Rural Payments and Services Agri-Environment Climate Scheme. Available at https://www.ruralpayments.org/topics/all-schemes/agri-environment-climate-scheme/ [Accessed April 2026]

[38] 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
[39] 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/. [Accessed February 2026]

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 and Geology (EIAR Volume 2)** and **Technical Appendix 8.2 (EIAR Volume 4)**.

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 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 descriptions[40] 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 6.2 (EIAR Volume 4)**.

SCOTTISH BIODIVERSITY LIST (SBL) HABITATS

6.3.41 The SBL[41] is a list of species and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL was first published in 2005 with updates in 2007, 2012, and most latterly revised in December 2025. The most recent SBL revision started over and is shorter and more targeted. The SBL identifies habitats which are important to furthering the conservation of biodiversity in Scotland; these are termed 'priority habitats'. The names of many priority habitat types have changed from the previous 2012 list, and it appears many of the underpinning habitat or community types that comprise these priority types are also likely to have been revised or changed. Whilst the previous iteration of the SBL provided associated priority habitat definition documents outlining the habitat type, where it occurs, its characteristics, and the associated correlations with Phase 1, NVC and UK BAP habitat types, the most recent revision has not provided such supporting information (at the time of preparation of this chapter). Therefore, at the current time and until such information is made available, it is not possible to definitively or accurately correlate the results of this survey, and the habitat types present within the Site or survey area to the revised SBL priority habitat types. However, for some important and higher conservation value habitat types it may be that the new SBL does still closely mirror the previous SBL, for example, and of relevance to the Site, with regards to the raised and blanket bogs priority habitat type.

Protected Species (Non-avian)

6.3.42 This section outlines the results from the protected species surveys. 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 6.8** to **6.13 (EIAR Volume 3a)**.

[40] JNCC (2025) Habitat List. Available at: https://sac.jncc.gov.uk/habitat/. [Accessed February 2026]
[41] NatureScot (2025). Scottish Biodiversity List. Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list. [Accessed February 2026]

BADGER

6.3.43 No evidence of badger was recorded during the surveys. The Site is mainly open upland moorland with areas of peat and peaty soils that are generally not preferred for sett building.

BATS

6.3.44 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 in **Figures 6.9** - **6.12 (EIAR Volume 3a)**.

DAYTIME BAT WALKOVER AND GROUND LEVEL TREE ASSESSMENT

6.3.45 One feature with the potential to support roosting bats was identified in the course of survey work. This structure was assessed to offer Low suitability as per Collins (2023[42]) and comprised of a ruined stone structure located over 130 m from the nearest Proposed Development infrastructure (a proposed new access track) and over 778 m from the nearest proposed turbine (T3) (see **Figure 6.9 (EIAR Volume 3a)**).

6.3.46 Following guidance (Collins, 2023[42]), no features with PRF-M, moderate or high potential for roosting bats were recorded within 200 m plus rotor radius of a proposed wind turbine location.

AUTOMATED GROUND LEVEL ACTIVITY SURVEYS

6.3.47 Static bat activity surveys were carried out in 2025 following standard guidance[22] and involved the deployment of 17 detectors across the respective survey area at that time, of which 13 are subsequently located within the Site following a reduction in the size of the Site since surveys were undertaken (four detectors deployed are now outwith the Site, but continue to provide additional wider local context relating to bat activity at and in proximity to the Site. Surveys were undertaken from May to September 2025 over a total of 42 days, with 657 complete recording nights of data obtained. Detector locations are detailed on **Figure 6.9 (EIAR Volume 3a)**.

6.3.48 Bats were detected on 35 of 42 nights in 2025. A total of five bat species and two bat genera were recorded, as detailed in **Table 6.1**. Common and soprano pipistrelle combined accounted for 77.2% (n=454) of all registrations.

Table 6.1: Total number of bat passes for each species across all locations 2025

Species/Species Group	Number of Registrations	Percentage of Total
Soprano pipistrelle	116	19.7
Common pipistrelle	338	57.5
Nyctalus spp.	110	18.7
Daubenton's	4	0.7
Myotis spp.	8	1.4
Natterer's	4	0.7
Brown long-eared	8	1.4
Total	**588**	**100.1**[43]

[42] Collins, J. (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition).
[43] The 'Total' percentage may not be exactly 100% due to rounding of the percentages per species.

QUANTIFYING ACTIVITY

6.3.49 The data from 2025 was analysed using the Ecobat tool[44] to gain a measure of relative bat activity at the Proposed Development. The data was then evaluated in accordance with NatureScot *et al*. guidance tables[22] 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 collected for the Proposed Development were compared with data within the region of the survey locations and within one month of the survey date. The full Ecobat report is provided in **Annex F** of **Technical Appendix 6.4 (EIAR Volume 4)**.

6.3.50 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) percentiles[45]. 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 6.2** below.

Table 6.2: Average Annual Site Activity Levels

Species/ Species Group	Site Activity		
	Median	**Maximum**	**Reference Range**
Common pipistrelle	Low	Low	37,908
Soprano pipistrelle	Low	Low	40,575
Nyctalus spp.	Low	Low - Moderate	3,811
Daubenton's	Low	Low	690
Natterer's	Low	Low	198
Myotis spp.	Low	Low	1,743
Brown long-eared	Moderate	Moderate	123

6.3.51 The reference range for Natterer's and brown long-eared fell below the minimum threshold for confidence and therefore the attributed activity levels for these records should be treated with caution.

ASSESSING POTENTIAL RISK

6.3.52 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.

6.3.53 As per NatureScot *et al*. guidance[22], the following species and genus recorded during surveys are deemed to have a high collision risk: common pipistrelle, soprano pipistrelle, and *Nyctalus* spp. All other bat species and genus recorded are categorised as low collision risk following the same guidance.

[44] Mammal Society (2024). Bat survey tools - Ecobat. Available at: https://mammal.org.uk/current-research/bat-survey-tools. [Accessed January 2026]
[45] 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%).

6.3.54 The Ecobat activity levels calculated for high collision risk species and the Site risk level were used to calculate an overall risk assessment score. The overall risk assessment scores for common pipistrelle and soprano pipistrelle were categorised as Low for the median and maximum percentile (both species had high reference ranges, thus allowing these attributions to be treated with confidence). The overall risk assessment scores for *Nyctalu*s spp. were categorised as Low for the median and Low - Moderate for the maximum percentile (again the reference range was high allowing the result to be treated with confidence); see **Table 6.2**.

6.3.55 The median monthly risk assessment scores for high collision risk species are shown on **Figures 6.10** to **6.12 (EIAR Volume 3a)**. These figures provide further detail on the results of the median monthly risk assessment scores for high collision risk bat species recorded at the Site at each survey location, per month, and illustrating how bat activity and risk levels vary within the survey area across the year and by species.

6.3.56 As shown in **Figures 6.10** to **6.12 (EIAR Volume 3a)**, analysis of the risk assessment scores for common pipistrelle, soprano pipistrelle and *Nyctalu*s spp., when based on the median percentile, indicate consistent levels of no/low activity across the survey locations throughout the year, with all high-risk species and locations having a risk assessment score of 2 (i.e. Low overall risk) or 0 (no activity) in each survey visit.

6.3.57 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. No activity for high-collision risk species was recorded within the relevant time parameters. As per the DBW and GLTA discussed above and in **Technical Appendix 6.4 (EIAR Volume 4)** there is a lack of roosting features within the application boundary, and it is unlikely there are any roosts present at the Site, as corroborated by the activity data.

6.3.58 Only some limited bat activity at Location 16 indicated the potential for nearby roost sites during the known emergence time ranges for *Myotis* spp. (a low-risk species). This registration was recorded in August which is out with the maternity roost season (15 June to 30 July). No calls during the maternity roost season were recorded. Location 16 is outwith and more than 1.6 km away from the application boundary (**Figure 6.9 (EIAR Volume 3a)**).

OTTER

6.3.59 Three otter spraints were recorded within the survey area, two of which were in the same approximate location. The spraints were recorded in the southeast of the survey area, outwith the application boundary, at Shortcleuch Water and Elvan Water (**Figure 6.8 (EIAR Volume 3a)**). No protected features for otter (i.e. holts or couches) were recorded during field surveys.

6.3.60 The watercourses on Site are generally open and exposed with little shelter, making them more suitable for foraging and commuting rather than for holts and couches (**Technical Appendix 6.3 (EIAR Volume 4)**).

PINE MARTEN

6.3.61 No field signs attributable to pine marten were recorded within the survey area. Areas of woodland are sparse within the survey area and offer limited shelter, den, foraging and hunting habitat or opportunities for pine marten.

RED SQUIRREL

6.3.62 No evidence of red squirrel was recorded during the surveys. The survey area incorporates very small and fragmented areas of native and commercial woodland and as such there is very little suitable habitat for red squirrel (**Technical Appendix 6.3 (EIAR Volume 4)**).

REPTILES

6.3.63 One sighting of common lizard was recorded within the survey area but outwith the application boundary. No evidence of adder or slow worm was recorded. The open habitat and vegetation present across the Site provides good habitat for reptile foraging. The Site also has a few stone structures, drystone dykes, which may be suitable for use as hibernacula (**Technical Appendix 6.3 (EIAR Volume 4)** and **Figure 6.8 (EIAR Volume 3a)**).

WATER VOLE

6.3.64 Signs of water vole, including burrows, feeding signs, latrines and droppings, were recorded along Glenkip Burn and Snar Water in the southwest of the survey area and within the Site, and along Lead Burn, to the southeast and outwith the application boundary. The prevailing bank profiles and rushy/grassy vegetation present on the Site and along many of the watercourses provide good suitability for water vole (**Technical Appendix 6.3 (EIAR Volume 4)** and **Figure 6.8 (EIAR Volume 3a)**).

FISH

6.3.65 Electrofishing surveys were undertaken by CRF in July 2025, with 13 survey sites representative of the Site and locale surveyed in order to characterise the fisheries baseline situation. The electrofishing sites were located within and outwith the application boundary (see **Figure 6.13 (EIAR Volume 3a)**). Full results from the surveys are contained in **Technical Appendix 6.5 (EIAR Volume 4)**.

6.3.66 Out of the 13 electrofishing sites surveyed, brown trout (*Salmo trutta*) were recorded at 12 sites (i.e. Snar Water, Glendorch Burn, Glengonnar Water d/s Clow Gill, Laggen Gill, Glengonnar Water u/s Glencaple Burn, Glencaple Burn, Elvan Water d/s Glen Aise Burn, Lang Cleuch, Lead Burn, Glengeith Burn, Elvan Water and Glenochar Burn – see **Figure 6.13 (EIAR Volume 3a)**).

6.3.67 No fish were caught at one location (Glenkip Burn) during the electrofishing surveys. This could be caused by barriers to migration for pre-spawning trout further downstream. The watercourse is large enough to support a small population of trout.

6.3.68 Of the watercourses where trout were recorded, densities of fry and parr per 100 m^2 were compared to the quintile ranges presented in Godfrey (2005)[46] for the Clyde coast region in order to determine relative fry and parr density/abundance classifications. Of the watercourses where trout were recorded (i.e. excluding Glenkip Burn), densities per 100 m^2 ranged from low to very high for fry (< one year old) and very low to very high for parr (> one year old). Fry density was very high in seven sample sites, and parr density was very high in two sample sites; the density categorisation per survey site is also presented on **Figure 6.13 (EIA Volume 3a)**).

[46] Godfrey J. D. (2005) Site Condition Monitoring of Atlantic Salmon SAC's. Report by the SFCC to Scottish Natural Heritage, Contract F02AC608.

6.3.69 Brook lamprey (*Lampetra planeri*) (Elvan Water only), minnow (*Phoxinus phoxinus*) (Elvan Water, Glengonnar Water and Lang Cleugh), and three-spined stickleback (*Gasterosteus aculeatus*) (Elvan Water only) were also recorded during electrofishing surveys.

OTHER SPECIES AND INNS

6.3.70 Four mammal holes which could not be attributed with confidence to a particular species were identified across the survey area, with three located outwith the application boundary (**Figure 6.8 (EIA Volume 3a)**). Several of these holes were of a size suitable for use by water vole but lacked any definitive field signs or evidence (**Technical Appendix 6.3 (EIAR Volume 4)**).

6.3.71 North America signal crayfish, an INNS, were recorded in Glengeith Burn and Glenochar Burn during the electrofishing surveys undertaken by CRF for the Proposed Development; they are also known to be present in the Elvan Water (**Technical Appendix 6.5 (EIAR Volume 4)**). Each of these sites where North America signal crayfish have been recorded are outwith the application boundary.

6.3.72 No other instances, signs of notable species, or INNS were recorded during field surveys.

Future Baseline

6.3.73 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. Vegetation and habitat composition, structure and extents within the Site may fluctuate marginally in the long-term in line with increasing or decreasing livestock grazing, fluctuations in deer browsing, and muirburn practices. Vegetation and habitat composition, structure, quality and extents within the Site may be adversely affected by encroachment and invasion of non-native self-seeded conifer trees from adjoining and nearby forestry areas, and the continuing maturity of the existing self-seeded specimens.

6.3.74 Signal crayfish may continue to disperse along watercourses and upstream of current recorded populations and make their way into watercourses within the application boundary through natural colonisation.

6.4 Embedded Mitigation

6.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2: Proposed Development** and **Chapter 3: Design Evolution (EIAR Volume 2)**.

Iterative Design Process

6.4.2 As part of the iterative design process the following ecological constraints and design principles (i.e. embedded mitigation) were considered to avoid or reduce potential negative effects on ecological features where possible:

- Applying a minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where a minimum number of watercourse crossings are required. This would minimise effects on associated habitats and species.
- The track length and alignment has been designed to minimise the extent of new track and number of watercourse crossings required, where feasible re-using and upgrading

existing tracks considering the topography of the Site and other environmental Site constraints.

- The track length and alignment has been designed to reduce the extent of new track crossing blanket bog and wet modified bog, where feasible considering the topography of the Site and other environmental Site constraints.
- Avoidance of deeper peatland (>0.5 m), blanket bog and wet modified bog, and potential GWDTEs for the location of turbines and other infrastructure as far as practicable.
- Avoidance of areas of ancient woodland.
- Positioning of turbines to ensure any potential bat roosts (PRF-M, moderate or high potential) lie outwith the 285 m protection buffer (200 m + candidate turbine rotor radius).
- Establishing a minimum 50 m buffer from turbine blade tips to important edge habitats for bats across the Site to reduce collision risk.
- Establishing a minimum 30 m buffer from water vole burrows to prevent accidental destruction of features or disturbance to animals.

Standard Mitigation Measures

6.4.3 The assessment in this EIAR has been carried out on the basis that all works would be carried out in line with good industry practice construction measures, guidance and legislation.

6.4.4 To ensure all reasonable precautions are taken to avoid adverse effects on habitats, protected species and aquatic interests, a suitably qualified ECoW would be appointed prior to the commencement of construction to advise the Applicant and the Principal Contractor (PC) 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 PC and any sub-contractors.

6.4.5 A SPP (outline SPP provided as **Technical Appendix 6.6 (EIAR Volume 4)**) would be implemented as part of a CEMP or similar during the construction phase to ensure that all reasonable precautions are taken to adhere to the relevant wildlife legislation. 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. 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.

6.4.6 Any micrositing 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 micrositing would also take consideration of any buffer distances on protected features identified, as detailed within the SPP.

6.4.7 There would be a contractual management requirement for the successful PC to develop and implement a comprehensive, Site-specific and robust CEMP in consultation with SEPA and South Lanarkshire Council (SLC) (outline provided in **Technical Appendix 2.1 (EIAR Volume 4)**). This document would detail how the successful 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).

6.4.8 Biosecurity protocols/methods would be in place (if applicable) to ensure there is no spread or release of signal crayfish within the Site.

6.4.9 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.

6.4.10 Based on the time between construction and decommissioning, the mitigation required at decommissioning cannot be accurately identified at this stage. However, it would include as a minimum decommissioning surveys, adherence to the Decommissioning Environmental Management Plan (DEMP), presence of an ECoW, and adherence to a SPP.

6.4.11 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 6.3**, based on survey findings and with consideration of the additional desk study and baseline data collected combined with the iterative design, embedded and standard mitigation measures and project assumptions described above, 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 further desk-based assessment and Site surveys.

DESIGNATED SITES

6.5.2 North Lowther Uplands SSSI lies 3.2 km from the application boundary (**Figure 6.1 (EIAR Volume 3a)**) and as such no direct impacts are expected during construction. The potential for indirect impacts on the relevant qualifying features of North Lowther Uplands SSSI (i.e. upland habitat assemblage) are also scoped out of detailed assessment based on the absence of connectivity and the distance and physical, ecological, and hydrological separation between the SSSI and the Site.

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 Proposed Development infrastructure is 35 m from a section of existing track that would be upgraded as part of the Proposed Development, the closest section of new track would be 37 m distant.

Due to distance, and with standard/best practice mitigation in place, no pollution or indirect effects are anticipated. Effects on ancient woodland are therefore scoped out of the assessment.

TERRESTRIAL HABITATS

6.5.5 The following habitats within the study area (using Phase 1 Habitat terminology and codes)[32] 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 or would be unaffected by the Proposed Development:

- Broadleaved Plantation Woodland (A1.1.2);
- Coniferous Plantation Woodland (A1.2.2);
- 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);
- Improved Grassland (B4);
- Continuous Bracken (C1.1);
- Tall Ruderal and Non-Ruderal (C3.1 and C3.2 respectively);
- Bare Peat (E4);
- Acid/Neutral Exposure (I1.4.1);
- Amenity Grassland (J1.2);
- Building (J3.6);
- Bare Ground (J4); and
- Other Habitat (J5).

6.5.6 Marsh/marshy grassland (B5) and wet dwarf shrub heath (D2) are also scoped out of the assessment.

6.5.7 Marshy grassland covers 444.89 ha (17.4 %) of the study area (**Figure 6.3 (EIAR Volume 3a)**), and comprises MG10, M23, M25 and M27 communities in addition to non-NVC types *Carex*. spp. neutral sedge mire (Mx), *Juncus effusus* (Je) and *Juncus acutiflorus* (Ja) acid grassland communities. M25, a poor-quality habitat type, is the most abundant community present, accounting for approximately 77.1 % of the marshy grassland present.

6.5.8 Wet heath covers 290.42 ha (11.4 %) of the study area, and is made up of the M15 community, predominately the M15b typical sub-community, and sometimes occurs as mosaics of M15 with acid grassland / blanket bog / acid neutral flush / wet modified bog (**Technical Appendix 6.2 (EIAR Volume 4)**).

6.5.9 The range of marshy grassland and wet heath communities within the study area 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 condition. Many of the NVC communities underpinning these marshy grassland and wet heath communities are considered potential GWDTEs in line with SEPA guidance[39]. 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 and Geology (EIAR Volume 2)** and **Technical Appendix 8.2 (EIAR Volume 4)**).

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 likely SBL Priority Habitats (see **Technical Appendix 6.2 (EIAR 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:

- Broadleaved Semi-Natural Woodland (A1.1.1);
- Scattered Broadleaved Tree (A3.1);
- Unimproved Calcareous Grassland (B3.1);
- Acid Dry Dwarf Shrub Heath (D1.1);
- Acid/Neutral Flush (E2.1);
- Basic Flush (E2.2);
- Swamp (F1);
- Water Margin/Inundation Vegetation (F2); and
- Running Water (G2).

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 standard mitigation (e.g. the through the measures detailed in the CEMP).

6.5.12 The Site is inaccessible to migratory fish due to natural barriers to migration identified much further downstream of the Site on the River Clyde. The fish communities in and around the Site are typical of the area and are dominated by variable densities of resident brown trout, with the presence of fry at most survey sites 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 (see **Chapter 8: Hydrology, Hydrogeology and Geology (EIAR Volume 2)**). The design of permanent and temporary access track watercourse crossings would comply with guidance[47] to minimise impacts on fish and their habitat.

6.5.14 As detailed previously, the standard/best practice mitigation includes that construction work would comply with a CEMP developed by the PC, which would be monitored by a suitably experienced ECoW (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 guidance[47]. With this standard mitigation

[47] NatureScot (2024). Good practice during wind farm construction.

in place, potential water pollution impacts and associated effects associated 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 is provided in **Chapter 8: Hydrology, Hydrogeology and Geology (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) guidelines[48].

PROTECTED SPECIES

6.5.15 Effects on badger, hares, otter, pine marten, red squirrel and reptiles are scoped out of the detailed assessment due to the absence of protected features, lack of suitable habitat, limited desk-based assessment or field evidence within the Site and survey area, and/or lack of potential effects from the Proposed Development.

6.5.16 Signs of water vole were recorded along three 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 infrastructure or watercourse crossing, and elsewhere all infrastructure maintains a 50 m buffer from watercourses which exceeds the 10 m exclusion zone required by the standing advice[49]. The SPP (**Technical Appendix 6.5 (EIAR Volume 4)**) would include a requirement for pre-construction surveys 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 such, there is no likelihood for significant impacts on water vole populations, and water vole are scoped out of the assessment.

6.5.17 Effects on roosting bats are scoped out of the assessment. No potential maternity roosts and/or hibernation/swarming sites have been identified within the survey area, with only one low suitability potential roost feature recorded within the Site and which is located over 130 m from the nearest Proposed Development infrastructure (a proposed new access track) and over 778 m from the nearest proposed turbine (T3). The static bat survey data, as discussed in more detail in **Section 6.4**, also suggests the absence of roosts at the Site and locally.

6.5.18 Disturbance effects on foraging/commuting bats are scoped out of the assessment. Construction would mainly take place during daylight hours during the season when bats are active (April to October, inclusive); therefore, any disturbance to foraging and commuting bats of any species is unlikely to occur, or would likely be negligible in magnitude, and is therefore scoped out.

6.5.19 Operational and cumulative effects arising from collision mortality for low collision risk bat species are scoped out of the assessment (as per NatureScot *et al.*, 2021[22]).

6.5.20 Bat activity for high collision risk bat species (common pipistrelle, soprano pipistrelle and *Nyctalus* spp.) recorded at the Site was Low based on the median percentile and Low (common and soprano pipistrelle) or Low-Moderate (*Nyctalus* spp.) based on the maximum percentile; there were also many periods and areas of no bat activity (see **Figures 6.10 – 6.12 (EIAR Volume 3a)**). This together with an overall Low 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. 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.

[48] Scottish Government (2021). Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines.
[49] NatureScot (2024). Standing advice for planning consultations – Water Voles. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-water-voles. [Accessed February 2026]

6.5.21 Overall, the SPP (outline provided in **Technical Appendix 6.6 (EIAR Volume 4)**) to be implemented would provide for suitable mitigation measures and ensure that all reasonably practicable measures are taken during construction so that provisions of the relevant wildlife legislation are complied with in relation to all protected species present or potentially present, should any evidence be found during pre-construction surveys or during construction.

6.5.22 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

6.5.23 Effects on deer are scoped out of the assessment. Roe and red 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 or shelter for deer. Areas of forestry surrounding the Site are also relatively scarce and of a quite fragmented and scattered nature. 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. Observations and information from the landowner also indicates that only low numbers of deer are present at the Site. The size and location of the Proposed Development is not considered to pose a significant barrier to any local movements or migrations of deer. 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.

6.5.24 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, or into built up areas. As a result of the size and location of the Proposed Development, temporary construction period, 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 the low numbers present and minimal displacement expected outwith the Site during construction and operation, no adverse effects, through increased browsing/trampling on surrounding habitats are expected.

Scoped In Receptors

6.5.25 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 6.3** together with their associated nature conservation value (refer to **Technical Appendix 6.1 (EIAR Volume 4**) and justification for inclusion. These comprise blanket bog and wet modified bog.

Table 6.3: Nature Conservation Value and Justification of Scoped in IEFs

IEF (Nature Conservation Value)	**Relevant Legislation / Guidance and Justification**

Blanket Bog and Wet Modified Bog (Local)	The Proposed Development would result in direct habitat loss and potentially indirect habitat loss/modification for blanket bog and wet modified bog habitats. Blanket bog covers 313.77 ha (12.3 %) of the study area, with wet modified bog covering a further 234.35 ha (9.2 %) (see **Annex A** to this chapter). Blanket bog is scattered throughout the study area, with the larger more contiguous areas at higher elevations and watershed plateaus in the east/southeast and southwest of the study area, with smaller scattered patches at lower elevations elsewhere, where it commonly transitions and mosaics with wet modified bog. The priority peatland blanket bog communities present include M17 and M19, with M19 being by far the most extensive. Infrequent records of M3 bog pool communities were also made. Wet modified bog communities represented within the study area were mainly M20 and M25a^, with smaller areas of M20-M25a^ intermediate and M15^ noted. Wet modified bog appears to have been derived from blanket bog through a legacy of drainage, grazing and muirburn resulting in the loss of sub-shrubs and the proliferation of hares-tail cottongrass (*Eriophorum vaginatum*) and purple-moor grass (*Molinia caerulea*) respectively. These wet modified bog communities have a lower relative quality compared to the blanket bog communities and in line with relevant guidance[38] are communities that are unlikely to raise issues of national interest. As indicated by the PCA surveys described above and detailed in **Technical Appendix 6.2 (EIAR Volume 4)**, these communities within the study area are for the most part in relatively poor/degraded condition, having been impacted over time through extensive drainage, grazing, self-seeded conifer invasion, and muirburn, which has also led to drying out of the peatland and the presence of areas of peat haggs and gullies. The peatland within the study area is classified as a mix of modified, drained, and actively eroding, with no near-natural peatland recorded (see **Figure 6.5 (EIAR Volume 3a)**). These habitats are associated with Annex I type 7130 blanket bog habitat and still likely correspond to the SBL raised and blanket bogs priority habitat type, however these mire habitats within the study area are generally considered modified/degraded as noted above. The Carbon and Peatland Map 2016[15] (**Figure 6.2 (EIAR Volume 3a)**) shows that there are some areas of Class 1 peatland within the application boundary 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 generally a degraded resource that has been impacted over time in several ways. As a result of its condition in addition to size, distribution and relatively fragmented nature, the habitat within the study area is not considered to be Nationally or Regionally important. Therefore, assigning a NCV 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 application boundary.

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 hardstandings and borrow pits would be restored at the end of construction.

6.6.3 There may also be some indirect habitat losses or modifications 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, undated[50]). It is expected that any indirect drainage effects would only impact wetland habitats such as blanket bog, flushes, etc. (estimated losses presented in **Annex A**). No indirect drainage effects are expected to impact or alter the quality or composition of non-wetland habitats, such as dry heath, bracken and acid grassland etc., as such only direct habitat loss applies to these habitats.

6.6.4 Temporary habitat losses due to the creation of temporary infrastructure, earthworks areas of cut and fill, and up to four borrow pit search areas (all of which, or the full search area extents, 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 land take for this temporary infrastructure may represent permanent losses for certain wetland habitat types such as bog 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 6.4** 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 and working areas, with habitat loss estimated for all habitat types presented in **Annex A**.

Table 6.4: Estimated Loss of IEF Habitats in study area for Permanent and Temporary Infrastructure

Habitat Type	Extent in study area (ha)	NVC Community or Habitat Type[51]	Direct Habitat Loss (ha) in study area	Direct Habitat Loss as a % of Habitat Type	Indirect Habitat Loss / Modification (ha) in study area	Indirect Habitat Loss / Modification as a % of Habitat Type in study area
Permanent						
Blanket Bog	313.77	M3, M17a-c, M19a-c	3.66	1.17 %	6.69	2.13 %
Wet Modified Bog	234.35	M15b^, M20a-b, M25a^	4.13	1.76 %	8.03	3.43 %
Temporary						
Blanket Bog	313.77	M3, M17a-c, M19a-c	3.72	1.19 %	N/A	N/A

[50] https://informatics.sepa.org.uk/CarbonCalculator/assets/Carbon_calculator_User_Guidance.pdf. [Accessed February 2026]
[51] 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** at the end of this chapter.

Wet Modified Bog	234.35	M15b^, M20a-b, M25a^	5.24	2.23 %	N/A	N/A
Totals	**548.12**		**16.75**	**3.06 %**	**14.72**	**2.69 %**

BLANKET BOG/WET MODIFIED BOG

6.6.6 **Effect Description**: Impacts upon blanket bog and wet modified bog 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, despite being reinstated after construction works, may also lead to the loss of blanket bog and wet modified bog due to the long-term effect on the ecological and hydrological processes, structure, and function of these habitat types. In addition, there may be indirect losses or habitat modification as a result of drainage effects around infrastructure (precautionarily around 10 m from infrastructure is assumed[50]).

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 exist together in mosaics, 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 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 6.3**).

6.6.10 **Conservation Status**: Since leaving the EU, the UK no longer needs to provide Article 17 reports on Annex I habitats and Annex II species to the European Commission. However, understanding the condition of these habitats and species is still important for UK biodiversity. The reporting requirements are detailed in the amended legislation, for Scotland this is The Conservation (Natural Habitats, &c.) Regulations 1994, Regulation 3ZA.

6.6.11 Under the amended Habitats Regulations, NatureScot must produce a public report every six years which includes conservation status assessments, including the current condition of habitats and species (excluding birds) of national interest and how condition has changed and future prospects[52]. The current reports cover the period 2019–2024 with publication in January 2026[53].

6.6.12 The current overall assessment of conservation status for blanket bog in Scotland is 'Unfavourable-Bad' and 'Improving'[54]. The 'Improving' positive trend is due to widespread and ongoing restoration efforts for blanket bog across Scotland.

6.6.13 **Magnitude of Effect**: Scotland has a single best estimate of around 1,759,000 ha of blanket bog[54].

6.6.14 Blanket bog covers approximately 313.77 ha (12.3 %) of the study area, with M19 mire comprising the bulk of the blanket bog vegetation, with smaller extents of M3 and M17 also present (see **Annex A**). As per **Table 6.4**, the direct habitat loss for blanket bog is predicted to be 3.66 ha due to permanent infrastructure with up to an additional 3.72 ha due to temporary works areas and borrow pit search areas. This results in a potential total direct loss of 7.38 ha, equivalent to 2.35 % of the blanket bog within the study area (i.e. within the application boundary).

6.6.15 Wet modified bog covers approximately 234.35 ha (9.2 %) of the study area and is comprised of lower quality and poorer condition M20, M25a^ and M15b^. As per **Table 6.4**, the direct habitat loss for wet modified bog is predicted to be 4.13 ha due to permanent infrastructure with up to an additional 5.24 ha due to the temporary works areas and borrow pit search areas. This results in a potential total direct loss of 9.37 ha, equivalent to 4.00 % of the wet modified bog within the study area (i.e. within the application boundary).

6.6.16 For this blanket mire resource as a whole, i.e. combining blanket bog and wet modified bog, direct losses amount to 7.79 ha for permanent infrastructure and 8.96 ha for temporary works areas and borrow pit search areas: a total of 16.75 ha, or 3.06 %, of the combined resource within the study area.

6.6.17 In addition, there may be some indirect losses or modifications to habitat type/composition because of the potential 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. The intactness of the existing peatland hydrological unit and current condition and quality of the peatland, along with any historical or ongoing effects the peatland has been subject to, such as historical moor grip drainage, burning, erosion and/or hagging/gullying will also influence the likelihood of potential indirect drainage effects and the distance they may be realised (if occurring). Consequently, drainage effects can be restricted to just a few decimetres or metres around the feature or extend out to tens of metres, or occasionally further (e.g., see review within Landry & Rochefort (2012)[55]). 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 further and to around 50 m, whilst in more decomposed (less fibrous) peat drainage effects may only extend to around 2 m. Blanket bog habitats like those present within the study area are commonly are associated with more highly decomposed peats (Nayak *et al*., 2008[56]). For

[52] https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/legal-framework/habitats-directive-and-habitats-regulations/habitats-regulations-0 [Accessed March 2026].
[53] https://jncc.gov.uk/our-work/habitats-regulations-reporting-2019-to-2024/ [Accessed March 2026].
[54] https://statistics.gov.scot/resource?uri=http%3A%2F%2Fstatistics.gov.scot%2Fdef%2Fconcept%2Ffolders%2Forganisations%2Fscottish-natural-heritage [Accessed March 2026].
[55] Landry, J. & Rochefort, L. (2012). The Drainage of Peatlands: Impacts and Rewetting Techniques. Peatland Ecology Research Group, Université Laval, Quebec.
[56] 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.

this assessment, indirect effects are precautionarily assumed to extend out to 10 m from infrastructure in line with carbon calculator guidance[50].

6.6.18 As per **Table 6.4**, if indirect drainage effects were 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 6.69 ha and 8.03 ha for wet modified bog. This worst-case scenario of all direct and indirect habitat loss or modification for permanent and temporary works areas is an overall total of 14.07 ha or 4.48 % of the study area's blanket bog, and 17.40 ha or 7.42 % 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 31.47 ha, or 5.74 % of the combined resource within the study area.

6.6.19 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)[57] 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 wholescale 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.

6.6.20 It should also be noted that much of the peatland within the Site and where proposed infrastructure is to be sited has suffered from historical and ongoing drainage and drying out effects, through artificial drains, erosion, and gullying as was confirmed through the PCA surveys undertaken for the Proposed Development (**Figure 6.5 (EIAR Volume 3a)**). With the peatland in this already drained, eroding and generally modified condition, the potential for additional indirect drying effects is therefore also limited and reduced by the current nature and state of the peatland present.

6.6.21 Furthermore, 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.

6.6.22 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.

[57] 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.

6.6.23 When considering the scale of the above worst-case habitat losses for the Proposed Development, which includes the unlikely scenario of indirect drainage effects being realised out to 10 m in all peatland areas (i.e. direct and precautionary indirect effects on up to 5.74 % 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 (in keeping with the assessment methodology parameters as set out within **Technical Appendix 6.1 (EIAR Volume 4)**).

6.6.24 **Significance of Effect**: Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Effect, the effect significance is considered to be **Minor adverse** and **Not Significant** under the EIA Regulations.

Potential Operational Effects

6.6.25 This section provides an assessment of the likely impacts of the operation of the Proposed Development upon the scoped in IEFs.

Blanket Bog and Wet Modified Bog

6.6.26 **Effect Description**: All likely direct and indirect adverse effects on habitats have been considered in the Potential Construction Effects section above. 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.

6.6.27 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 of assessing effects on habitats these are considered together in the Potential Construction Effects section above.

6.6.28 However, additional compensation and enhancement measures, such as priority peatland restoration, are proposed for the operational phase as part of the Proposed Development's OBEMP as detailed in **Technical Appendix 6.7 (EIAR Volume 4)** and outlined below.

6.6.29 Restoration and enhancement of habitats through the delivery of a BEMP during the operational phase would reduce effects on habitats further. Overall, through a suite of proposals and measures the BEMP would aim to achieve significant biodiversity enhancement at the Proposed Development, in line with objectives outlined in NPF4 Policy 3[58], the Onshore Wind Policy Statement[59], and the Scottish Biodiversity Strategy to 2045[60]. The BEMP would include provisions for the protection, maintenance, restoration and/or enhancement of blanket bog and priority peatland habitats locally and within the Site. Furthermore, the BEMP would deliver several additional proposals, specifically including native broadleaved woodland/scrub and riparian corridor creation/enhancement, bracken management, ground nesting raptor habitat enhancement, and long-term retention of AECS to ensure the long-term sustainable grazing management of the moorland within the application boundary. This suite of proposals would benefit several particular habitat types and non-avian and avian species (see also **Chapter 7: Ornithology (EIAR Volume 2)**) as well as provide multiple benefits to biodiversity in general. Further details of these biodiversity enhancement proposals can be

[58] Scottish Government (2023). National Planning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/.
[59] Scottish Government (2022). Onshore Wind Policy Statement.
[60] Scottish Government (2022). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland.

found in the OBEMP as provided in **Technical Appendix 6.7 (EIAR Volume 4)**[61], with corresponding restoration/enhancement areas shown in **Figure 6.14 (EIAR Volume 3a)**).

6.6.30 **Nature Conservation Value**: Local (as detailed in **Table 6.3**).

6.6.31 **Conservation Status**: The current overall assessment of conservation status for blanket bog in Scotland is 'Unfavourable-Bad' and 'Improving'[54].

6.6.32 **Magnitude of Effect**: The OBEMP 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 (priority peatlands and deep peat habitats), the OBEMP includes for a scheme of peatland restoration and enhancement measures within OBEMP Habitat Management Unit (HMU) A which has been identified and delineated through desk-based review in combination with the respective relevant Site-specific habitat, peatland condition, and peat depth survey results (for example see results presented in **Figures 6.3, 6.5, 6.6** and **8.6 (EIAR Volume 3a)**). HMU A is split across three main core areas where peatland habitats have experienced degradation and modification, and exhibit a range of restorable damage features, such as drains, haggs/gullies, and bare peat. HMU A covers 195.97 ha (172.09[62] ha of which is blanket bog and wet modified bog peatland habitat/communities). When considering the scale of the peatland restoration and enhancement proposal in relation to the study area, an effect magnitude of **medium spatial** and **long-term temporal** is appropriate.

6.6.33 **Significance of Effect**: Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Effect, the effect significance is considered to be **Minor beneficial** and **Not Significant**.

Potential Decommissioning Effects

6.6.34 As noted in **Section 6.3**, decommissioning effects have been scoped out and are usually considered for the purposes of assessment to be similar to (or likely less than) those of construction effects in nature and are likely to be of shorter duration.

Potential Cumulative Effects

6.6.35 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 application boundary. 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.

6.6.36 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,

[61] The detailed and final BEMP would be agreed with South Lanarkshire Council and NatureScot in advance of construction and would ensure the Proposed Development secures significant biodiversity enhancements through restoring degraded habitats, creating new habitats of greater biodiversity/conservation value, and strengthening nature networks.
[62] N.B. Areas of proposed permanent and temporary infrastructure that overlap with HMU A have been excluded from this area calculation.

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.

6.6.37 Within 5 km of the application boundary there is only Clyde Wind Farm (which has been operational since 2012) and the proposed Glensalloch Wind Farm, which is at scoping stage; therefore, neither meet the criteria for relevance to the cumulative assessment for the Proposed Development as set out above. As such, there are no relevant consented or application submitted wind farms within 5 km (see **Figure 4.12 (EIAR Volume 3a)**).

6.7 Additional Mitigation and Enhancement Measures

Construction

6.7.1 General and embedded mitigation measures for habitats and species, such as complying with best practice, micrositing, presence of an ECoW and adherence with a detailed CEMP are included in **Section 6.5**.

6.7.2 As per **paragraph 6.7.23** no significant construction effects were identified on IEFs which require additional or bespoke mitigation measures in the context of the EIA Regulations. However, in addition to general and standard mitigation measures, a number of compensation and biodiversity enhancement measures are proposed as part of the OBEMP, as noted in the Potential Operational Effects section above and detailed in **Technical Appendix 6.7 (EIAR Volume 4)**.

Operation

6.7.3 No IEFs were scoped into the assessment of potential adverse operational effects, and as such no additional mitigation is proposed. Potential direct and indirect effects on habitats were considered as part of the construction effects.

6.7.4 Overall, the OBEMP as detailed in **Technical Appendix 6.7 (EIAR Volume 4)** provides mitigation and further enhancement through a suite of proposals for a range of habitats and species to be delivered primarily during the operational phase of the Proposed Development. Overall, beneficial operational effects have been identified via the OBEMP, as outlined in the Potential Operational Effects section above.

Decommissioning

6.7.5 No non-standard, additional, or bespoke mitigation proposed.

6.8 Assessment of Residual Effects

6.8.1 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 OBEMP within **Technical Appendix 6.7 (EIAR Volume 4)**.

6.8.2 Whilst no significant adverse effects are concluded upon the IEFs scoped into assessment, the implementation of the BEMP would likely result in operational Minor beneficial effects for certain scoped in IEFs (blanket bog/wet modified bog).

6.9 Monitoring

6.9.1 No significant residual effects are predicted; however, likely further future survey requirements and monitoring are noted here.

6.9.2 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 6.3 (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.

6.9.3 Operational phase monitoring for certain habitats and species would be undertaken as part of the final approved BEMP; see outline proposals within **Technical Appendix 6.7 (EIAR Volume 4**).

6.9.4 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 guidance[63].

6.9.5 Further survey and monitoring effort may be implemented by Scottish Ministers, if consent is granted.

6.10 Summary

6.10.1 **Table 6.5** provides a summary of the assessment for the potential significant effects on IEFs scoped into this chapter, i.e. blanket bog/wet modified bog, and describes the embedded, standard and additional environmental measures identified and the means by which they would be secured.

[63] https://www.gov.scot/publications/monitoring-watercourses-in-relation-to-onshore-wind-farm-developments-generic-monitoring-programme/

Table 6.5: Summary of Potential Significant Effects			
Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
Construction			
Direct and Indirect Loss and/or Modification of Blanket Bog/Wet Modified Bog Habitat	No specific additional bespoke mitigation is required. Standard and embedded mitigation includes presence of an ECoW, micrositing 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 OBEMP.	Planning conditions. Delivery of a BEMP; outline included as **Technical Appendix 6.7 (EIAR Volume 4)**.	Minor adverse Not Significant
Operation			
Restoration and Enhancement of Blanket Bog/Wet Modified Bog Habitat	No specific additional bespoke mitigation is required. Peatland restoration and enhancement within the application boundary is proposed as part of the OBEMP (**Technical Appendix 6.7 (EIAR Volume 4)**).	Planning conditions. Delivery of a BEMP; outline included as **Technical Appendix 6.7 (EIAR Volume 4)**.	Minor beneficial Not Significant
Decommissioning			
None identified. Generally, as for Construction (or less). No further direct or indirect habitat losses. Potential net positive effect on habitats through subsequent Site restoration.			
Cumulative			
None identified.			

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

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				**Permanent Direct Loss**	**Permanent Indirect Loss (only applies to Wetland Habitats)[64]**	**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)**
Total		**2554.5**	**100**	**2554.5**	**100**	**23.41**	**28.36**	**37.03**
Broadleaved Semi-Natural Woodland (A1.1.1)	W7b	4.76	0.19%	1.86	0.07%	0.00	0.00	0.00
	W7			0.53	0.02%	<0.01	0.00	0.00
	W11			2.37	0.09%	0.00	0.00	0.00
Broadleaved Plantation Woodland (A1.1.2)	W7(p)	1.77	0.07%	1.25	0.05%	0.00	0.00	0.00
	W10(p)			0.52	0.02%	0.00	0.00	0.00
Coniferous Plantation Woodland (A1.2.2)	YCP	4.88	0.19%	3.53	0.14%	0.00	0.00	0.00
	CP			1.34	0.05%	0.04	0.00	0.04
Scattered Broadleaved Tree (A3.1)	SBT	0.08	<0.01%	0.08	<0.01%	0.00	0.00	0.00
Scattered Coniferous Tree (A3.2)	SCT	0.59	0.02%	0.59	0.02%	0.01	0.00	0.01
Recently Felled Coniferous Woodland (A4.2)	CF	35.21	1.38%	35.21	1.38%	0.00	0.00	0.00
Unimproved Acid Grassland (B1.1)	U4	355.83	13.9%	232.55	9.10%	1.46	0.00	2.57
	U4a			47.79	1.87%	0.04	0.00	0.04
	U4d			0.17	<0.01%	0.00	0.00	0.00
	U5			29.99	1.17%	0.34	0.00	1.05

[64] Based upon the precautionary 10 m indirect drainage assumption.

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats)[64]	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)
	U5a			9.40	0.37%	0.03	0.00	0.06
	U5b			0.02	<0.01%	0.00	0.00	0.00
	U5c			0.28	0.01%	0.00	0.00	0.00
	U6			27.87	1.09%	0.55	0.78	1.30
	U6a			7.62	0.30%	0.01	<0.01	0.01
	U6c			0.14	<0.01%	0.00	0.00	0.00
	U6d			<0.01	<0.01%	0.00	0.00	0.00
Semi-Improved Acid Grassland (B1.2)	U4b-MG9a	29.53	1.16%	0.23	0.01%	0.00	0.00	<0.01
	U4b			29.30	1.15%	0.80	0.00	0.76
Unimproved Neutral Grassland (B2.1)	MG1	13.74	0.54%	9.38	0.37%	0.18	0.00	0.20
	MG1a			0.17	0.01%	0.00	0.00	0.00
	MG9			3.93	0.15%	0.17	0.15	0.32
	MG9a			0.25	0.01%	0.00	0.00	0.00
Unimproved Calcareous Grassland (B3.1)	CG10	0.50	0.02	0.04	<0.01%	0.00	0.00	0.00
	CG10a			0.43	0.02%	0.00	0.00	0.00
	CG10b			0.03	<0.01%	0.00	0.00	0.00
Improved Grassland (B4)	MG6	18.85	0.74%	18.85	0.74%	0.24	0.00	0.09
Marsh/Marshy Grassland (B5)	M23a	444.89	17.42%	49.07	1.92%	0.50	0.58	0.92
	M23b			26.80	1.05%	0.21	0.55	0.23
	M25			11.99	0.47%	0.00	0.00	0.00

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats)[64]	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)
	M25a			187.37	7.33%	1.41	3.30	3.20
	M25b			116.78	4.57%	1.46	2.63	2.67
	M25c			0.20	<0.01%	0.00	0.00	0.00
	M27			0.73	0.03%	<0.01	0.01	<0.01
	M27a			1.24	0.05%	0.00	<0.01	0.00
	MG10a			4.26	0.17%	0.05	0.15	0.02
	MG10(Ja)			1.50	0.06%	0.02	0.06	<0.01
	Ja			24.32	0.95%	0.23	0.56	0.20
	Je			20.60	0.81%	0.09	0.29	0.20
	Mx			0.03	<0.01%	0.00	0.00	0.00
Continuous Bracken (C1.1)	U20	136.37	5.34%	119.57	4.68%	0.09	0.00	0.24
	U20a			16.78	0.66%	<0.01	0.00	<0.01
	U20b			0.02	<0.01%	0.00	0.00	0.00
Tall Ruderal (C3.1)	OV25	1.93	0.08%	1.46	0.06%	0.02	0.00	0.02
	OV27			0.27	0.01%	0.00	0.00	0.00
	W24			0.20	0.01%	0.02	0.00	<0.01
Non-Ruderal (C3.2)	U19	0.25	0.01%	0.24	0.01%	0.00	0.00	0.00
	Daff			0.01	<0.01%	0.00	0.00	0.00
Dry Dwarf Shrub Heath – Acid (D1.1)	H9	590.13	23.10%	31.49	1.23%	0.15	0.00	0.66
	H9c			0.03	<0.01%	0.00	0.00	0.00
	H10			36.61	1.43%	0.16	0.00	0.21

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats)[64]	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)**
	H10a			12.48	0.49%	0.00	0.00	0.00
	H10c			10.23	0.40%	0.00	0.00	0.00
	H10d			0.05	<0.01%	0.00	0.00	0.00
	H12			354.11	13.86%	2.02	0.00	4.82
	H12a			32.11	1.26%	0.10	0.00	0.09
	H12b			23.30	0.91%	0.16	0.00	0.29
	H12c			12.89	0.50%	0.05	0.00	0.05
	H18			1.39	0.05%	0.00	0.00	0.00
	H21			57.62	2.26%	0.14	0.00	0.21
	H21a			17.75	0.69%	0.23	0.00	0.33
	H10-H12			0.13	0.01%	0.00	0.00	0.00
Dry Dwarf Shrub Heath – Basic (D1.2)	H10d	0.05	<0.01%	0.05	<0.01%	0.00	0.00	0.00
Wet Dwarf Shrub Heath (D2)	M15	290.42	11.37%	2.01	0.08%	0.13	0.13	0.29
	M15b			240.93	9.43%	2.49	3.13	5.43
	M15c			0.03	<0.01%	0.00	0.00	0.00
	M15d			47.45	1.86%	0.32	0.82	0.83
Blanket Bog (E1.6.1)	M17	313.77	12.28%	3.96	0.16%	0.07	0.16	0.07
	M17a			4.43	0.17%	0.00	0.00	0.00
	M17b			11.01	0.43%	0.15	0.42	0.08
	M17c			9.88	0.39%	0.21	0.34	0.16

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				**Permanent Direct Loss**	**Permanent Indirect Loss (only applies to Wetland Habitats)[64]**	**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)**
	M19			136.18	5.33%	2.45	4.60	2.47
	M19a			79.70	3.12%	0.55	0.89	0.70
	M19b			65.74	2.57%	0.18	0.12	0.21
	M19c			2.21	0.09%	0.05	0.14	0.03
	M3			0.66	0.03%	0.01	0.03	0.01
Wet Modified Bog (E1.7)	M20	234.35	9.19%	138.47	5.42%	2.34	4.76	2.66
	M20a			5.78	0.23%	0.00	0.00	0.00
	M20b			12.92	0.51%	0.40	0.36	0.57
	M25^			1.21	0.05%	0.00	0.00	0.00
	M25a^			68.81	2.69%	1.13	2.33	1.87
	M20b-M25a^			1.86	0.07%	0.00	0.00	0.00
	M15b^			5.31	0.21%	0.26	0.57	0.14
Acid/Neutral Flush (E2.1)	M4	43.20	1.69%	0.01	<0.01%	0.00	0.00	0.00
	M5			0.01	<0.01%	0.00	0.00	0.00
	M6c			17.86	0.70%	0.07	0.20	0.10
	M6d			25.32	0.99%	0.11	0.28	0.14
Basic Flush (2.2)	M10	0.04	<0.01%	0.04	<0.01%	0.00	0.00	0.00
Bare Peat (E4)	ExP	0.20	<0.01%	0.20	<0.01%	<0.01	0.00	<0.01
Swamp (F1)	S28	0.06	<0.01%	0.02	<0.01%	0.00	0.00	0.00
	S19			0.04	<0.01%	0.00	0.00	0.00
Water Margin/Inundation Vegetation (F2)	MG11	0.01	<0.01%	0.01	<0.01%	0.00	0.00	0.00

Table 6: Habitat Baseline Composition (Study Area) and Habitat Loss Calculations								
		Application Boundary and Study Area (Baseline)				Permanent Direct Loss	Permanent Indirect Loss (only applies to Wetland Habitats)[64]	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)**
Running Water (G2)	RW	3.30	0.13%	3.30	0.13%	0.00	0.00	0.00
Acid/Neutral Exposure (I1.4.1)	RK	2.67	0.10%	2.67	0.10%	<0.01	<0.01	<0.01
Building (J3.6)	BD	0.66	<0.01%	0.66	0.03%	0.00	0.00	0.00
Bare Ground (J4)	BG	18.54	0.73%	18.54	0.73%	1.46	0.00	0.43
Other Habitat (J5)	MB	7.95	0.3%	7.95	0.31%	0.03	0.00	0.02

7 Ornithology

7.1 Introduction

7.1.1 This chapter considers the likely significant effects on ornithological features 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 and significance criteria used in completing the impact assessment;
- identify the potential impacts associated with the Proposed Development, including direct, indirect and cumulative impacts;
- assess the resultant likely significant effects;
- describe the 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[1])

7.1.3 The assessment has been carried out by SLR Consulting in accordance with NatureScot and Chartered Institute of Ecology and Environmental Management (CIEEM 2024[2]) guidelines. All staff contributing to this chapter have undergraduate and/or postgraduate degrees in relevant subjects, have extensive professional ornithological impact assessment experience, and/or hold professional CIEEM membership/abide by the CIEEM Code of Conduct.

7.1.4 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
  - Figure 7.1: Ornithological Designated Sites within 20km
  - Figure 7.2: Vantage Points and Viewsheds
  - Figure 7.3: Site Boundary and Study Areas
  - Figure 7.4: Scarce Breeding Bird Study Area and Survey Areas
  - Figure 7.5: Black Grouse Study Area and Survey Areas
  - Figure 7.6: Breeding Wader and Winter Walkover Study Area and Survey Areas
  - Figure 7.7: Black Grouse: Flight Activity and Point Records
  - Figure 7.8: Raptor and Owl Activity
  - Figure 7.9: Flight Activity: Golden Eagle, Goshawk, Merlin, Peregrine Falcon and Short-Eared Owl
  - Figure 7.10a: Flight Activity: Red Kite (Breeding Seasons)
  - Figure 7.10b: Flight Activity: Red Kite (Non-Breeding Seasons)
  - Figure 7.11a: Breeding Wader Activity (Curlew)
  - Figure 7.11b: Breeding Wader Activity (Other)
  - Figure 7.12: Non-Breeding Wader Activity
  - Figure 7.13: Flight Activity: Curlew, Golden Plover, Lapwing and Ringed Plover

[1] Available at: https://www.gov.scot/publications/national-planning-framework-4/

[2] CIEEM (2024). 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.

  - Figure 7.14: Goose and Gull Activity
  - Figure 7.15: Flight Activity: Herring Gull
  - Figure 7.16: Flight Activity: Greylag Goose, Pink-Footed Goose and Whooper Swan
- Volume 4: Technical Appendices
  - Technical Appendix 7.1: Baseline Ornithology Surveys;
  - Technical Appendix 7.3: Collision Risk Modelling; and
  - Technical Appendix 7.4: Ornithology Assessment Methodology.

7.1.5 Information relating to breeding, roosting and/or lekking sites of sensitive species (as defined in Scottish Natural Heritage (SNH)[3] 2016a[4] and NatureScot 2025a[5]) is summarised to an appropriate level within this Chapter, and further detailed within:

- Volume 5: Confidential Appendices
  - Technical Appendix 7.2: Confidential Ornithology
  - Technical Appendix 7.5: Red Kite Population Model
  - Confidential Figure 7.2.1: Confidential Barn Owl Activity
  - Confidential Figure 7.2.2: Confidential GET Model
  - Confidential Figure 7.2.3: Confidential Hen Harrier Activity
  - Confidential Figure 7.2.4: Confidential Flight Activity: Hen Harrier
  - Confidential Figure 7.2.5: Confidential Red Kite Activity

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 Royal Society of the Protection of Birds (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 7.4: Ornithology Assessment Methodology (EIAR Volume 4)** and follows the principles of CIEEM guidelines (CIEEM 2024[2]) and NatureScot guidance (2025b[6] and 2025c[7]). The chapter will consider the available information (from surveys and desk-based work) for each ornithological feature (including designated sites) identified, with those scoped in to the assessment defined as Important Ornithological Features (IOFs) (as per CIEEM 2024[2]).

[3] Scottish Natural Heritage, the former operating name of NatureScot.

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

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

[6] 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

[7] 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

7.2.2 The assessment is presented with reference to specific 'areas' of the Site within the application boundary. These areas comprise the western and eastern areas and associated access routes, as described in **Chapter 2: Description of the Development (EIAR Volume 2)**.

7.2.3 Effects upon IOFs that are considered to be significant in the context of the EIA Regulations[8] are those classified as being 'Major' or 'Moderate'.

Scope of Assessment

7.2.4 The assessment is based on the Proposed Development as described in **Chapter 2: Proposed Development (EIAR Volume 2)** and has been informed by consultation responses detailed in **Technical Appendix 1.1: Consultation Register (EIAR Volume 4)**, NatureScot guidance (2025b[6]), and the findings of baseline studies.

Potential Impacts Scoped In

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). The scope of the assessment detailed within this chapter, specifically the impacts considered, is set out in **Table 7.1**.

7.2.6 The impacts have been principally assessed both for the Proposed Development in isolation, 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, where relevant, this has been justified within this chapter.

7.2.7 In relation to decommissioning and as noted in **Chapter 2: 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 of 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 is concluded as being consistent with construction phase effects.

Table 7.1: Impacts Considered within the Assessment

Impact	**Phase***		
	C	O/M	D
Nesting and foraging habitat loss, fragmentation or alteration associated with the Proposed Development infrastructure. Disturbance to and loss of nest sites, eggs and/ or dependent young.	Yes	Yes	Yes
Collision mortality risk – the risk of mortality resulting from collision with turbine blades increasing mortality rates.	No	Yes	No

[8] The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

*C=construction, O =Operation and D=decommissioning.

7.2.8 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, under construction and consented developments are considered as part of the baseline. Developments close to the end of their operational life would be included as part of the baseline to present 'worst case scenario'.

Potential Impacts 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. A summary of the impacts scoped out is presented in **Table 7.2**.

Table 7.2: Impacts Scoped Out of the 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 an Outline Biodiversity Enhancement Management Plan (OBEMP) for the Proposed Development finalised in consultation with relevant consultees, see **Section 7.6** and **Technical Appendix 6.7 (EIAR Volume 4)**, direct habitat losses would be relatively localised, sufficiently offset and not significant for any potential IOF.
Artificial lighting	NatureScot (2020a[9]) 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

7.2.10 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

[9] 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

referenced in industry standard guidance (including within SNH 2016b[10], Goodship and Furness 2022[11], and NatureScot 2024a[12] and 2025d[13]):

- Designated sites – a 20 kilometre (km) Study Area from the 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 2016b[4]).
- 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 metre (m) buffer around the turbine array has been used to create a Collision Risk Analysis Area (CRAA) as recommended in NatureScot guidance (2024a[12]) and shown in **Figure 7.2 (EIAR Volume 3a)**.
- Scarce breeding birds – a 2 km and 800 m study area buffer from the turbine array and access tracks/other infrastructure respectively, extended to 6 km from the turbine array and 1 km from the access tracks for eagle species, as shown in **Figure 7.3 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022[11]) and NatureScot guidance (2025d[13]);
- Black grouse – a 1.5 km and 750 m study area buffer from the turbine array and access tracks/other infrastructure respectively as shown in **Figure 7.3 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022[11]) and NatureScot guidance (2025d[13]); and
- Breeding and wintering birds - a 500 m study area buffer around all infrastructure, as shown in **Figure 7.3 (EIAR Volume 3a)**, and informed with reference to Goodship and Furness (2022[11]) and NatureScot guidance (2025d[13]).

7.2.11 Refer to Technical Appendix 7.1: Baseline Ornithology Surveys (EIAR Volume 4) for the definitions of 'survey' and 'study' areas.

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 SiteLink[14];
- Dumfries and Galloway Raptor Study Group (DGRSG);
- Restoring Upland Nature (RUN),the charity now supporting the South of Scotland Golden Eagle Project (SSGEP).

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

[11] 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. Available at: https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance

[12] 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

[13] 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

[14] Available at: https://sitelink.nature.scot/

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 2025b[6]), extended to at least 6 km for eagle species.

Field Survey

7.2.14 Baseline ornithological field surveys to inform the design and assessment of the Proposed Development were undertaken between September 2023 and August 2025.

7.2.15 All field surveys were undertaken in line with appropriate industry standard guidance and species-specific methodologies (Gilbert *et al*. 1998[15], Hardey *et al.* 2013[16], and NatureScot 2025d[13]), with the following specific surveys completed:

7.2.16 Flight activity surveys – September 2023 to August 2025 (two breeding seasons and two non-breeding seasons);

- Black grouse surveys – 2024 and 2025 lekking seasons;
- Scarce breeding bird surveys – 2024 and 2025 breeding seasons;
- Moorland breeding bird surveys – 2024 and 2025 breeding seasons; and
- Winter walkover surveys – 2023/2024 and 2024/2025 non-breeding seasons.

7.2.17 Field survey areas were defined with reference to NatureScot guidance (2025d[13]), on the basis of the maximum developable area at the time of survey commencement, and in review of suitable habitats.

7.2.18 Full details of baseline surveys including methodologies, survey conditions and survey areas are presented in Technical Appendix 7.1 (EIAR Volume 4), Technical Appendix 7.4 (EIAR Volume 5), and on Figure 7.2 to Figure 7.16 (EIAR Volume 3a) and Confidential Figure 7.2.1 to Confidential Figure 7.2.5 (EIAR Volume 5).

Method of Assessment

Overview

7.2.19 The assessment methodology, including the criteria for assessing sensitivity of IOFs, magnitude of change and overall significance criteria, is detailed in **Technical Appendix 7.4 (EIAR Volume 4)**.

7.2.20 **Technical Appendix 7.4 (EIAR Volume 4)** also sets out the list of other wind farm developments considered for potentially significant cumulative effects.

[15] 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.

[16] 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.

Limitations and Assumptions

7.2.21 The assessment presented within this chapter is based on the Proposed Development as described in **Chapter 2: Proposed Development (EIAR Volume 2)**, and the adoption of embedded and standard mitigation set out in **Section 7.4**.

7.2.22 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

7.2.23 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 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.

7.2.24 During the baseline ornithological surveys (September 2023 to August 2025), Stanbury *et al.* (2021[17]) issued an addendum to the Birds of Conservation Concern (BoCC) 5 list in September 2024 (Stanbury *et al.* 2024[18]). This addendum reclassified common gull and great black-backed gull as Red list species (previously Amber list species),which would now include them as target species for recording during onshore wind farm surveys as recommended in NatureScot guidance (2025a[5] and 2025c[7]). 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

7.2.25 The turbine array is completely covered by the flight activity survey viewshed coverage (**Figure 7.2**) and the flight activity survey effort is considered to have met minimum requirements stipulated in NatureScot guidance (2025d[13]).

7.2.26 In general, weather conditions were appropriate for the surveys, but where they were not, surveys were suspended and rescheduled (or additional surveys were undertaken) (**Technical Appendix 7.1**).

7.2.27 As noted in the Scoping Report, the Proposed Development was extended to the south east following the first year of baseline surveys and survey buffers were adjusted to account for the additional land (**Figure 7.4**, **Figure 7.5** and **Figure 7.6**). Since the Scoping Report, the design evolution resulted in the Proposed Development focussing in the northern area (**Chapter 3 Design Evolution**). **Figure 7.4**, **Figure 7.5** and **Figure 7.6** show the comparison between the year 1 and year 2 survey areas alongside the associated study area.

[17] 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 ICUN Red List assessment of extinction risk for Great Britain. British Birds, 114, pp. 723-747.

[18] 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.

7.2.28 It is acknowledged that for the scarce breeding bird (**Figure 7.4**) and black grouse (**Figure 7.5**) study area extends slightly beyond the respective survey areas in the very north east corner of the Proposed Development where a small section of access track extends beyond the survey areas. However considering the proximity to the survey buffers and that this area is within the Site, any activity of breeding Schedule 1 raptors/owls or black grouse in this area would have been identified by surveyors whilst they were monitoring the north west portion of the survey areas/taking access to the Site via Glencaple for surveys.

7.2.29 It is acknowledged that for the moorland breeding bird and wintering bird study areas (**Figure 7.6**), a longer section of access track and some infrastructure is outwith the survey areas. However, this area was all covered by the larger scarce breeding bird and black grouse survey areas (**Figure 7.4** and **Figure 7.5**), and surveyors continue to record any target species observed regardless of the focus of the surveys (refer to **Figure 7.11ab** which shows wader records along this access track). As such, it is considered that there is a robust understanding of the bird activity within the 500 m study area.

7.2.30 Overall, baseline survey coverage is considered to be appropriate and representative to allow for a robust assessment on the potential impacts to ornithological interests.

7.3 Baseline Conditions

Current Baseline

Designated Sites

7.3.1 There are no statutory designations within the Site, however the Proposed Development is located within 20 km of one SPA and three Sites of Special Scientific Interest (SSSIs), as listed below and shown in **Figure 7.1**.

- Muirkirk and North Lowther Uplands SPA (underpinned by the Murkirk Uplands SSSI and North Lowther Uplands SSSI), 3.55 km from the nearest proposed turbine and designated for non-breeding hen harrier, breeding golden plover, hen harrier, merlin, peregrine falcon, short-eared owl and a breeding bird assemblage[19]; and
- Tweedsmuir Hills SSSI, 18.9 km from the nearest proposed turbine and designated for a breeding bird assemblage[20].

7.3.2 Based on the guidance from NatureScot (SNH 2016b[10]) regarding connectivity with SPAs and the foraging ranges of hen harrier, peregrine falcon and short-eared owl (2 km), merlin (5 km) and golden plover (3 km), there is considered to be no connectivity between the Proposed Development and the hen harrier, peregrine falcon, short-eared owl or golden plover Muirkirk and North Lowther Uplands SPA populations.

7.3.3 Due to the Site being within 5 km of the Muirkirk and North Lowther Uplands SPA, there is some potential for there to be connectivity between the Site and the SPA merlin population. In their response to the Scoping Report, NatureScot confirmed their agreement to this conclusion (**Technical Appendix 1.1: Consultation Register (EIAR Volume 4)**). **Section 7.3** therefore considers the potential for likely significant effects on merlin associated with

[19] The citation lists red grouse, raven, dunlin, snipe, teal, curlew, redshank, whinchat and wheatear.

[20] Which includes red grouse, black grouse, golden plover, curlew, dunlin, common snipe, ring ouzel, whinchat, stonechat and wheatear. Several Schedule 1 species also use the site for foraging while breeding off-site, in winter or on passage.

the Muirkirk and North Lowther Uplands SPA within a Habitat Regulations Assessment (HRA) context.

Flight Activity

7.3.4 A summary of all target species recorded during flight activity surveys at the Site is presented in **Table 7.3**. This summarises all flights observed during the baseline survey period regardless of the location of the flights in relation to proposed wind turbine locations. For further details of the flight activity surveys, refer to **Technical Appendix 7.3 (EIAR Volume 4)**.

7.3.5 A summary of collision risk model results is presented in **Table 7.4** (refer to **Technical Appendix 7.3 (EIAR Volume 4)** for detailed results). Note that whilst black grouse, ringed plover, short-eared owl and whooper swan were recorded during flight activity surveys (**Table 7.3**), they were not identified to be 'at-risk' and so were not included in the collision risk model (and are not presented in **Table 7.4**).

Table 7.3: Target species recorded during flight activity surveys

Species	Total number of flights recorded	Total number of birds recorded	Total bird seconds recorded
Black grouse	1	1	6
Curlew	50	77	3,296
Golden eagle	20	22	4,022
Golden plover	20	396	43,050
Goshawk	2	2	81
Greylag goose	7	84	13,591
Hen harrier	34	36	5,478
Herring gull	10	70	10,011
Lapwing	20	35	1,395
Merlin	9	10	579
Peregrine falcon	5	5	313
Pink-footed goose	8	252	40,731
Red kite	547	706	110,903
Ringed plover	1	1	15
Short-eared owl	1	1	73
Whooper swan	2	4	126

Table 7.4: Predicted collision rates

Species	Mean breeding season	Mean non-breeding season	Mean annual	Number of years per collision
Curlew	-	0.0245	0.0245	41
Golden eagle	0.00004	0.0285	0.0286	35
Golden plover	1.2436	-	1.2436	0.80

Table 7.4: Predicted collision rates				
Species	**Mean breeding season**	**Mean non-breeding season**	**Mean annual**	**Number of years per collision**
Goshawk	0.00005	-	0.00005	18,458
Greylag goose	0.0003	0.0015	0.0018	542
Hen harrier	0.0020	0.0006	0.0026	382
Herring gull	-	0.0972	0.0972	10.3
Lapwing	0.0008	0.0035	0.0043	230
Merlin	0.0012	0.0004	0.0017	599
Peregrine falcon	-	0.0037	0.0037	273
Pink-footed goose	0.0365	-	0.0365	27
Red kite	0.1338	0.5711	0.7048	1.42

Black Grouse

7.3.6 Black grouse lek surveys undertaken during the 2024 and 2025 breeding seasons did not identify any active leks. Black grouse were infrequently recorded across the baseline survey period with three incidental records in March 2024 (**Figure 7.5**) and one flight during flight activity surveys in September 2024 (**Table 7.3**, **Figure 7.5**). Flights recorded during flight activity surveys were not identified to be 'at-risk' and therefore no risk of collision was predicted.

7.3.7 As a species listed on NatureScot's '*Sensitive Species of Scotland*' list (NatureScot 2025a[5]), 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**.

7.3.8 Considering the species' limited presence within the Site, absence of predicted collision risk, and embedded mitigation, black grouse is **scoped out** of the assessment.

Raptors and Owls (Schedule 1 / Annex I)

Barn Owl

7.3.9 Baseline surveys identified 15 potential barn owl nest/roost locations within the survey area, with a barn owl also recorded perched on a fence post on one occasion in April 2025 (**Confidential Figure 7.2.1**).

7.3.10 Guidance from Shawyer (2011[21]) for continuous activity disturbance distances provides a range of 20 m (pedestrian movement) to 175 m (heavy construction works) for breeding barn owl and more recently, a review of bird disturbance distances by Goodship & Furness (2022[11]) recommends a buffer of 50 m to 100 m. Of these 15 locations, none are within 500 m of any proposed turbines and two are within 175 m of the proposed tracks (BO_1 and BO_3, **Confidential Figure 7.2.1**).

[21] Shawyer, C. R. (2011). Barn owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.

7.3.11 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, 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**.

7.3.12 Considering the species' limited presence within the Site, absence of predicted collision risk and embedded mitigation, barn owl is **scoped out** of the assessment.

GOLDEN EAGLE

7.3.13 Baseline surveys recorded individual golden eagle within the survey area on 17 occasions (**Figure 7.8**) across the two-year survey period. The majority of these records (15) were of immature birds, and no evidence of breeding was recorded.

7.3.14 Flight activity surveys recorded 20 flights (**Table 7.3**, **Figure 7.9**), and collision risk modelling predicted a mean collision rate of one bird every 35 years (**Table 7.4**).

7.3.15 At the time of writing no consultation response has been received from RUN, in relation to the presence of established and/or establishing golden eagle territories within proximity to the Site. In review of publicly available EIA documentation for the nearby Watchman Energy Park (ECU00006030), it is however understood that the study area for that development overlaps with at least one active golden eagle breeding range, referred to as the F02/A29 range, and for which a successful breeding attempt occurred in 2025.

7.3.16 Satellite tag data for the F02/A29 range was therefore subsequently obtained for male A29, covering the period 30/10/2023 to 14/11/2024. Kernel density estimation[22] of the satellite tag data was used to identify seasonal and annual range boundaries for the F02/A29 range, which followed the methodology set out in Fielding *et al.* (2024a[23]).

7.3.17 As the dataset obtained for range F02/A29 spans at least one year from the male bird, it is considered sufficient to examine range characteristics (as per Fielding *et al.* 2024a[23]). 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. 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.

7.3.18 In review, the analysis of the male A29 satellite tag data identifies that the Proposed Development does not overlap with the annual, breeding season or non-breeding season range boundary estimations (**Confidential Figure 7.2.2**).

7.3.19 The analysis also examined the distribution of nighttime records and identified no nighttime roosting locations within the Site, or within 7.5 km of the turbine array (**Confidential Figure 7.2.2**).

7.3.20 Whilst breeding locations for the F02/A29 have not been possible to obtain in consultation with RUN, it is reasonable to assume that these would be located within the range boundary estimations (**Confidential Figure 7.2.2**), and which are located at least 6 km from the

[22] 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'.

[23] 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.

nearest proposed infrastructure, comprising Turbine T8 and associated hardstandings. This is sufficiently distant to preclude the potential for disturbance (1 km, Goodship and Furness 2022[11]) from the construction and operation of the Proposed Development.

7.3.21 As there is no overlap with the F02/A29 range boundary estimations, and infrastructure will be located sufficiently distant from any known or likely roost and breeding locations for the range, potentially significant effects upon theF02/A29 range are not predicted and scoped out of assessment.

7.3.22 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, standard measures to avoid the potential for disturbance to any possible future roosting and/or breeding golden eagle and enable legislative compliance are set out in **Section 7.4**.

7.3.23 The potential for significant effects to non-range holding golden eagle **is scoped in** to the assessment.

GOSHAWK

7.3.24 Baseline surveys recorded individual goshawk within the survey area on four occasions (**Figure 7.8**) across the two-year survey period with no evidence of breeding recorded.

7.3.25 Flight activity surveys recorded two flights (**Table 7.3**, **Figure 7.9**), and collision risk modelling predicted a mean collision rate of one bird every 81 years (**Table 7.4**).

7.3.26 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**.

7.3.27 Considering the species' limited presence within the Site, absence of known breeding sites, negligible predicted collision risk, and embedded mitigation, goshawk is **scoped out** of the assessment.

HEN HARRIER

7.3.28 Baseline surveys recorded hen harrier within the survey area on 31 occasions (**Confidential Figure 7.2.3**) across the two-year survey period. No confirmed breeding territories were identified, however one probable (HH_1) and one potential (HH_2) breeding territory were identified during the 2024 breeding season with potential breeding also noted at HH_1 during 2025.

7.3.29 Data provided by the DGRSG for the last five years (2021 to 2025) showed the following breeding activity within the 2 km study area (**Confidential Figure 7.2.3**). No evidence of roosting hen harrier was provided.

7.3.30 Due to the confidential nature of the data provided, the nest locations provided by the DGRSG have been given unique codes in the form of '*DGRSG_HH_number*[24]' to maintain confidentiality within the chapter (the data provided by the DGRSG identified these nests using place name locations and grid references). **Confidential Figure 7.2.3** includes these unique codes as labels. The data from the DGRSG indicated a maximum of seven territories

[24] The numbering of the nests is based on an X.X format. The first number denotes the territory and the second number denotes alternative nest sites from different years, e.g., 1.1 and 1.2 indicate the same territory but different nest sites, whereas 1.1 and 2.1 indicate different territories.

within the search area, with a maximum of four in one year (2023), of which DGRSG_HH_5 is the same as HH_1 (identified during baseline surveys) and DGRSG_HH_1 is the same as HH_2 (identified during baseline surveys).

- 2021: three confirmed territories
  - Confirmed: DGRSG_HH_1.1, DGRSG_HH_3.1, DGRSG_HH_4.1
- 2022: one confirmed territory, two potential territories (only a single male present)
  - Confirmed: DGRSG_HH_7.1
  - Potential: DGRSG_HH_1.2, DGRSG_HH_4.2
- 2023: two confirmed territories, two potential territories (only a single male present)
  - Confirmed: DGRSG_HH_1.3, DGRSG_HH_6.1
  - Potential: DGRSG_HH_2.1, DGRSG_HH_4.3
- 2024: three confirmed territories.
  - Confirmed: DGRSG_HH_1.4, DGRSG_HH_5.1, DGRSG_HH_7.2
- 2025: two potential territories (only a single male present)
  - Potential: DGRSG_HH_1.5, DGRSG_HH_5.2

7.3.31 Flight activity surveys recorded 34 flights (**Table 7.3**, **Confidential Figure 7.2.4**), and collision risk modelling predicted a mean collision rate of one bird every 382 years (**Table 7.4**).

7.3.32 Guidance from Goodship and Furness (2022[11]) recommends a buffer of 300 m to 750 m for breeding (or roosting) hen harrier. HH_1/DGRSG_HH_5 is 2.5 km from the nearest proposed turbine and HH_2/DGRSG_HH_1 is 890 m from the nearest proposed turbine; no access tracks or other infrastructure associated with the Proposed Development is located any closer than the nearest proposed turbine locations. Of all other territories identified by the DGRSG:

- DGRSG_HH_2.1 is located 627 m from the nearest proposed turbine;
- DGRSG_HH_3.1 is located 2.9 km from the nearest proposed turbine;
- DGRSG_HH_4.3 (nearest alternative nest location of DGRSG_HH_4) is located 490 m from the nearest proposed turbine;
- DGRSG_HH_6.1 is located 2.3 km from the nearest proposed turbine; and
- DGRSG_HH_7.2 (nearest alternative nest location of DGRSG_HH_7) is located 9.2 km from the nearest proposed turbine.

7.3.33 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, 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**.

7.3.34 Considering the species' negligible predicted collision risk, availability and distances from alternative nest sites for known (or potential) territories to the Proposed Development and embedded mitigation, hen harrier is **scoped out** of the assessment.

MERLIN

7.3.35 Baseline surveys recorded individual merlin within the survey area on four occasions (**Figure 7.8**) across the two-year survey period. No confirmed breeding territories were identified, however a potential breeding territory was identified during the 2024 breeding season with birds seen in a similar area in 2025.

7.3.36 Flight activity surveys recorded nine flights (**Table 7.3**, **Figure 7.9**), and collision risk modelling predicted a mean collision rate of one bird every 599 years (**Table 7.4**).

7.3.37 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, 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**.

7.3.38 Considering the species' limited presence within the Site, absence of known breeding sites, negligible predicted collision risk, and embedded mitigation, merlin is **scoped out** of the assessment.

7.3.39 Whilst the Proposed Development is within 5 km of the Muirkirk and North Lowther Uplands SPA (3.6 km) and therefore within the core foraging range of breeding merlin associated with the SPA, the baseline described above indicates that the Site is not regularly in use by foraging (or breeding) merlin and as such there is considered to be limited likelihood of a likely significant effect on the breeding merlin population associated with the Muirkirk and North Lowther Uplands SPA as a result of the Proposed Development. Consequently, there is considered to be **no adverse effect on the integrity of the Muirkirk and North Lowther Uplands SPA**.

PEREGRINE FALCON

7.3.40 Baseline surveys recorded individual peregrine falcon within the survey area on five occasions (**Figure 7.8**) across the two-year survey period with no evidence of breeding recorded.

7.3.41 Flight activity surveys recorded five flights (**Table 7.3**, **Figure 7.9**), and collision risk modelling predicted a mean collision rate of one bird every 273 years (**Table 7.4**).

7.3.42 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, 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**.

7.3.43 Considering the species' limited presence within the Site, absence of known breeding sites locally, negligible predicted collision risk, and embedded mitigation, peregrine falcon is **scoped out** of the assessment.

RED KITE

7.3.44 Red kite were the most frequently recorded species with 292 records within the survey area across the two-year survey period (**Confidential Figure 7.2.5**). Activity was notably higher during the breeding seasons (137 and 128 records during the 2024 and 2025 breeding seasons respectively) than the non-breeding seasons (12 and 15 records during the 2023/2024 and 2024/2025 non-breeding seasons respectively). Breeding was confirmed at one location during the 2024 breeding season (KT_1) and one location during the 2025 breeding season (KT_2), with the birds at KT_1 suspected to have relocated to KT_2 (**Confidential Figure 7.2.5**). A potential roost location (KT_R1) was also identified during the 2023/2024 non-breeding season (**Confidential Figure 7.2.5**), however monitoring of the location during the 2024/2025 non-breeding season did not identify any roosting activity.

7.3.45 Data provided by the DGRSG for the past five years (2021 to 2025) did not identify any additional nest locations but did confirm the presence of breeding activity at KT_1 in 2024 and 2025 (**Confidential Figure 7.2.5**). No roosting locations were identified by the DGRSG.

7.3.46 Flight activity surveys recorded 547 flights (**Table 7.3**, **Figure 7.10a** and **Figure 7.10b**), and collision risk modelling predicted a mean collision rate of one bird every 1.42 years (**Table 7.4**).

7.3.47 Guidance from Goodship and Furness (2022[11]) recommends a buffer of 150 m to 300 m for breeding (or roosting) red kite. KT_1 is 1.8 km from the nearest proposed turbine, KT_2 is 1.2 km, and KT_R1 is 2 km from the nearest proposed turbine. A 450 m section of access track is also within 300 m of KT_1 (208 m at the closest point).

7.3.48 As a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, 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**.

7.3.49 Considering the species' presence within the Site and predicted collision risk, red kite is **scoped in** to the assessment.

SHORT-EARED OWL

7.3.50 Baseline surveys recorded short-eared owl within the survey area on eight occasions (**Figure 7.8**) across the two-year survey period. No confirmed breeding territories were identified, however a potential territory was identified during the 2024 breeding season (over 700 m from the nearest proposed turbine/infrastructure).

7.3.51 Flight activity surveys recorded one flight (**Table 7.3**, **Figure 7.9**), which was not identified to be 'at-risk' and therefore no risk of collision was predicted.

7.3.52 As a species listed on NatureScot's '*Sensitive Species of Scotland*' list (NatureScot 2025a[5]), 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**.

7.3.53 Considering the species' limited presence within the Site, absence of known breeding sites/breeding activity in proximity to the Proposed Development, absence of predicted collision risk, and embedded mitigation, short-eared owl is **scoped out** of the assessment.

Waders

7.3.54 Moorland breeding bird surveys recorded an assemblage of breeding waders representative of the open moorland and agricultural grassland habitats present within the Site. The number of estimated breeding wader territories of target wader species recorded during surveys is summarised in **Table 7.5**, with species breeding registrations illustrated on **Figure 7.11a** and **Figure 7.11b (EIAR Volume 3a)**. Due to the difficulty in accurately estimating territory numbers, a range is provided in some cases.

Table 7.5: Number of wader breeding territories (min-max)[25]

Species	**2024**	**2025**
Curlew	14 – 17 (8 – 9)	15 – 19 (7 – 9)

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

Table 7.5: Number of wader breeding territories (min-max)[25]		
Species	**2024**	**2025**
Golden plover	5 – 6 (4)	4 – 5 (3 – 4)
Lapwing	17 – 20 (0)	10 – 15 (5 – 6)
Ringed plover	0 – 1 (0)	0 (0)

CURLEW

7.3.55 Flight activity surveys recorded 50 flights (**Table 7.3**, **Figure 7.13**), and collision risk modelling predicted a mean collision rate of one bird every 41 years (**Table 7.4**).

7.3.56 As a result of its breeding presence in proximity to the turbine array, current conservation status (BoCC Red-list, as per *Stanbury et al*. 2021[17]), 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 2025b[6]), curlew is **scoped in** to the assessment.

GOLDEN PLOVER

7.3.57 In addition to the breeding activity detailed above, some evidence of wintering/non-breeding golden plover was recorded during baseline surveys, with flocks of one to 20 birds recorded (**Figure 7.12**).

7.3.58 Flight activity surveys recorded 20 flights (**Table 7.3**, **Figure 7.13**), and collision risk modelling predicted a mean collision rate of one bird every 0.80 years (**Table 7.4**).

7.3.59 As a result of its breeding presence in proximity to the turbine array, and listing as priority for assessment when considering the development of onshore wind farms in Scotland (as per Annex 1 of NatureScot guidance 2025b[6]), golden plover is **scoped in** to the assessment.

LAPWING

7.3.60 In addition to the breeding activity detailed above, some evidence of wintering/non-breeding lapwing was recorded during baseline surveys, with flocks of one to 31 birds recorded (**Figure 7.12**).

7.3.61 Flight activity surveys recorded 20 flights (**Table 7.3**, **Figure 7.13**), and collision risk modelling predicted a mean collision rate of one bird every 230 years (**Table 7.4**).

7.3.62 As a result of its breeding presence in proximity to the turbine array, current conservation status (BoCC Red-list, as per *Stanbury et al*. 2021[17]), 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 2025b[6]), lapwing is **scoped in** to the assessment.

RINGED PLOVER

7.3.63 No further activity to the potential breeding activity detailed above was recorded during the two-year survey period.

7.3.64 Flight activity surveys recorded one flight (**Table 7.3**, **Figure 7.13**), which was not identified to be 'at-risk' and therefore no risk of collision was predicted.

7.3.65 Considering the species' limited presence within the Site, absence of known breeding sites/breeding activity in proximity to the Proposed Development, absence of predicted collision risk, and embedded mitigation, ringed plover is **scoped out** of the assessment.

Waterfowl

Greylag Goose

7.3.66 Baseline surveys recorded greylag geese within the survey area on 24 occasions (**Figure 7.14**) across the two-year survey period. With the exception of one record, activity was all during the breeding seasons and activity focussed along the Elvan Water and at the reservoir at Peden Burn (**Figure 7.14**) with evidence of breeding in both locations. No evidence of geese breeding, roosting or foraging within 500 m of the Proposed Development was recorded.

7.3.67 Flight activity surveys recorded seven flights (**Table 7.3**, **Figure 7.16**), and collision risk modelling predicted a mean collision rate of one bird every 542 years (**Table 7.4**).

7.3.68 Considering this species' limited presence within the study area and negligible predicted risk of collision, greylag goose is **scoped out** of the assessment.

Pink-Footed Goose

7.3.69 Flocks of migratory pink-footed goose were infrequently recorded during the baseline survey period with seven records (flocks of 28-290 birds). No evidence of birds foraging or roosting was recorded (within the 500 m study area or wider survey areas).

7.3.70 Flight activity surveys recorded eight flights (**Table 7.3**, **Figure 7.16**), and collision risk modelling predicted a mean collision rate of one bird every 27 years (**Table 7.4**).

7.3.71 Considering this species' limited presence within the study area and negligible predicted risk of collision, pink-footed goose is **scoped out** of the assessment.

Whooper Swan

7.3.72 Flight activity surveys recorded two flights (**Table 7.3**, **Figure 7.16**), which were not identified to be 'at-risk' and therefore no risk of collision was predicted. No further records of whooper swan were recorded during baseline surveys.

7.3.73 Considering this species' limited presence within the study area and no predicted risk of collision, whooper swan is **scoped out** of the assessment.

Gulls

7.3.74 Baseline surveys across the two-year survey period recorded five species of gull (black-headed, common, great black-backed, herring and lesser black-backed), however as noted in the limitations section above, gull species were broadly considered to be secondary species. Of these, black-headed gull and common gull were identified to be breeding at a colony at the Elvanfoot substation (over 2 km from the nearest proposed turbine). Records of great black-backed, herring and lesser black-backed gulls were infrequent (20, three and seven records respectively across the two year baseline survey period) with no evidence of breeding nor any regular aggregations of foraging birds.

7.3.75 Flight activity surveys recorded 10 herring gull flights (**Table 7.3**, **Figure 7.15**), and collision risk modelling predicted a mean collision rate of one bird every 10.3 years (**Table 7.4**).

7.3.76 Considering the limited presence 500 m of the Proposed Development and low predicted risk of collision for herring gull, gull species are **scoped out** of the assessment.

Additional Species

7.3.77 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 2025b[6]).

7.3.78 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.* 2021[17]) and lower priority for consideration in the assessment of renewable energy developments (NatureScot 2025b[6]).

7.3.79 Observations of fieldfare, redwing and snow bunting (all Schedule 1 listed passerines) were made over the course of the surveys, but breeding within the Site is considered very unlikely for these species (all records were outwith the breeding season and were of wintering/migratory birds).

7.3.80 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 fieldfare, redwing and snow bunting are therefore **scoped out** of the assessment.

Future Baseline

7.3.81 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.

7.3.82 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 moorland management for gamebird shooting.

Summary of IOFs

7.3.83 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 though baseline studies.

These IOFs are summarised in **Table 7.6** and the conservation status of each IOF is detailed in **Table 7.7**.

Table 7.6: Summary of Scoped In IOFs

Feature	NCI	Justification for NCI
Golden eagle	Medium	Schedule 1/A1 and Annex I listed. Priority bird species for assessment (NatureScot 2025b[6]).
Red kite	Medium	Schedule 1/A1 and Annex I listed. Priority bird species for assessment (NatureScot 2025b[6]).
Curlew	Medium	BoCC Red list (Stanbury *et al.* 2021[17]). Priority bird species for assessment (NatureScot 2025b[6])
Golden plover	Medium	Annex I listed. Priority bird species for assessment (NatureScot 2025b[6])
Lapwing	Medium	BoCC Red list (Stanbury *et al.* 2021[17]). Priority bird species for assessment (NatureScot 2025b[6])

Table 7.7: Conservation Status of IOFs Scoped In to the Assessment

Feature	Conservation Status	Information
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 *et al.* 2007[26]) to 508 territories following the 2015 Scottish national census (Hayhow *et al.* 2017[27]). 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 (2014[28]), were checked in South Scotland in 2023 (Peniche *et al.* 2025[29]). 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 were also known to successfully fledge a chick[30]. 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 *et al.* (2020[31]) 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 *et al*. 2021[17])

[26] 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.

[27] 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.

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

[29] 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.

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

[31] 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.

Table 7.7: Conservation Status of IOFs Scoped In to the Assessment		
Feature	**Conservation Status**	**Information**
		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 291[32] pairs in 2023 (Peniche *et al*. 2025[29]), with the most recently cited NHZ 19 population estimate being 83 breeding pairs (Wilson *et al.* 2015[33]) 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 *et al.* 2025[29]), 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 *et al.* 2022[34]). In this case, as the NHZ 19 area is largely comparable in extent with the SRMS Dumfries & Galloway (D&G) monitoring area 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 *et al*. 2020[31]), with long-term declines documented across Scotland. The most recently published breeding bird survey report from 2025 suggests a 12 % decline in breeding curlew numbers for the period 2014 to 2024 (Heywood *et al.* 2026[35]) The NHZ 19 population was most recently estimated by Wilson *et al.* (2015[33]) as 4,284 pairs (range 3,851 to 4,717). Based on suggested population trends and a 12 % decline in Scotland, the current NHZ 19 population figures may be around 3,770 breeding pairs. The continued inclusion of the species on the BoCC Red list (Stanbury *et al.* 2021[17]) and population declines suggests that the national and regional NHZ populations are in an unfavourable conservation status
Golden plover	Favourable	The most recent national breeding golden plover population was estimated to be 32,500-50,500 pairs in 2016 (Woodward *et al*. 2020[31]), with the Scottish population considered to be stable. The most recently published breeding bird survey report from 2025 suggests a 6 % increase in breeding golden plover numbers between 2014 and 2024 (Heywood *et al.* 2026[35]). The NHZ 19 population was estimated to be 778 (716-839) pairs in 2005 (Wilson *et al.* 2015[33]). Based on suggested population trends and a 6 % increase in Scotland, the current NHZ 19 population figures may be around 825 breeding pairs. The continued inclusion of the species on the BoCC Green list (Stanbury *et al.* 2021[17]) and population increase suggests that the national and regional NHZ populations are in a favourable conservation status.

[32] Number of home ranges checked.

[33] 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.

[34] 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.

[35] Heywood, J.J.N., Massimino, D., Baker, L., Balmer, D.E., Brighton, C.H., Kelly, L.A., Noble, D.G., Pearce-Higgins, J.W., White, D.M., Workman, E. & Wotton, S. 2026. The Breeding Bird Survey 2025. BTO Research Report 802 British Trust for Ornithology, Thetford, Norfolk

Table 7.7: Conservation Status of IOFs Scoped In to the Assessment		
Feature	**Conservation Status**	**Information**
Lapwing	Unfavourable	The most recent national breeding lapwing population was estimated to be 98,000 pairs in 2016 (Woodward *et al*. 2020[31]), with long-term declines documented across Scotland. The most recently published breeding bird survey report from 2025 suggests a 7 % decline in breeding lapwing numbers between 2014 and 2024 (Heywood *et al.* 2026[35]), suggesting that the Scottish population may currently be around 91,140 pairs. The continued inclusion of the species on the BoCC Red list (Stanbury *et al.* 2021[17]) and population declines suggests that the national and regional NHZ populations are in an unfavourable conservation status. The NHZ 19 lapwing population is unknown but based on the Scottish population, a minimum of 5,000 pairs are likely to be within NHZ 19.

7.4 Embedded Mitigation

7.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2: Proposed Development** and **Chapter 3: Design Evolution (EIAR Volume 2)**.

Iterative Design Process

7.4.2 As part of the iterative design process the following ornithological constraints and design principles (i.e. embedded mitigation) were considered to avoid or reduce potential negative effects on ecological features where possible.

7.4.3 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 (2024b[6]) and Goodship and Furness 2022[11], where possible.

7.4.4 The following species-specific disturbance avoidance buffers were adopted in the siting of proposed turbine locations (and other key infrastructure), in so far as possible:

- Barn owl – 175 m from identified breeding/roosting sites;
- Hen harrier – 750 m from identified breeding sites; and
- Red kite – 300 m from identified breeding/roosting sites.

7.4.5 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 and maintenance 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.

7.4.6 The under-grounding of all on-site cables would also serve to minimise any additional collision risk for bird species.

Standard Mitigation Measures

7.4.7 The assessment in this EIAR has been undertaken on the basis that all works would be carried out in line with industry good practice construction measures, guidance and legislation.

7.4.8 To ensure all reasonable precautions are taken to avoid disturbance to birds and comply with environmental legislation, prior to construction and decommissioning the Applicant will appoint a suitably qualified Ecological Clerk of Works (ECoW) who will advise the Applicant and the Contractor on all ornithological matters (with the assistance of a suitably qualified/licenced ornithologist if required). The ECoW will be required to be present on Site during the construction and decommissioning periods and will carry out monitoring of works and briefings with regards to any ornithological sensitivities on the Site to the relevant staff within the Contractor and subcontractors.

7.4.9 A Bird Disturbance Management Plan (BDMP) will be implemented during construction of the Proposed Development and will form part of the Construction Environmental Management Plan (CEMP). The BDMP will detail measures to ensure legal compliance and safeguard breeding birds known to be in the area and will include species-specific guidance. The BDMP shall include pre-construction surveys and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new breeding bird activity in the vicinity of the construction works. The ECoW will oversee the implementation of the above measures The BDMP 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 1, A1 and 1A of the Wildlife and Countryside Act 1981. 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 2022[11], controlling the timing, location and nature of construction activities).

7.4.10 There would be a contractual management requirement for the successful Principal Contractor to develop and implement a comprehensive, Site-specific and robust CEMP which would be submitted to South Lanarkshire Council (SLC) for consideration in consultation with SEPA (outline provided in **Technical Appendix 2.1 (EIAR Volume 4)**). This document would detail how the successful Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIAR, the BDMP, 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).

7.4.11 Based on the time between construction and decommissioning, the mitigation required at decommissioning cannot be accurately identified at this stage. However, it would include as a minimum decommissioning surveys, adherence to the Decommissioning Environmental Management Plan (DEMP), presence of an ECoW, and adherence to a BDMP.

Summary of Mitigation

7.4.12 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.

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 7.4 (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 (2025c[7]) and where it is considered most appropriate to do so. Where alternative geographical populations are considered more appropriate this is justified within the text.

Golden Eagle

7.5.4 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.* 2024b[36]), effects are considered at the South of Scotland population level rather than NHZ level, with reference to predicted population sizes and hill regions as set out by Fielding and Haworth (2014[28]).

Construction Phase

7.5.5 **Impact**: Disturbance to breeding, roosting and/or foraging golden eagles resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.6 Sensitivity: Medium NCI (Table 7.6) and unfavourable conservation status (Table 7.7).

7.5.7 **Magnitude of Impact**: No evidence of golden eagle breeding sites or observations of roosting birds were recorded over the course of baseline surveys; and therefore within 2 km of any proposed turbine location or within 1 km of any other proposed infrastructure. Construction works for the Proposed Development would therefore occur beyond advised disturbance avoidance buffers from any currently established breeding site or regularly used roosting sites for the species (1 km, Goodship and Furness 2022[11]).

7.5.8 Through their listing on Schedule 1, A1 and 1A of the Wildlife and Countryside Act 1981, measures to avoid the potential for construction disturbance to any future breeding and/or roosting golden eagles (and ensure legislative compliance) would be included within the Proposed Development's BDMP, 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).

7.5.9 Construction works within and around the turbine array may restrict birds from foraging over areas of open moorland habitats close to human and other construction related activity.

[36] 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.

However, as golden eagle can roam widely in search of food, as illustrated by the estimated F02/A29 range boundary (**Confidential Figure 7.2.2**), 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 2017[37], and Fielding *et al*. 2024b[36]), the loss of potential foraging habitat would be relatively small.

7.5.10 Overall, construction disturbance to golden eagles, with regard to breeding, roosting and/or foraging birds, is therefore considered to be **short-term** and no more than **negligible** magnitude.

7.5.11 **Significance of Effect**: The effect on the South of Scotland golden eagle population as a result of construction works is concluded to be **negligible** and, therefore, **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER EFFECTS

7.5.12 **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.

7.5.13 Sensitivity: Medium NCI (Table 7.6) and unfavourable conservation status (Table 7.7).

7.5.14 **Magnitude of Impact**: 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 locations of golden breeding sites being sufficiently beyond the currently advised disturbance avoidance buffer for the species (1 km, Goodship and Furness 2022[11]), and the implementation of a finalised BDMP over the Proposed Development's operational phase (see **Section 7.4**). J

7.5.15 Research into the movements of golden eagle in Scotland provides evidence that golden eagle display a high degree of avoidance of onshore wind farms (Haworth Conservation 2015[38], Fielding *et al.* 2021[39], 2022[40], 2023[41] and 2024c[42]), with early studies suggesting a decrease in use of habitats within 500 m of operational wind turbines (Haworth Conservation, 2015[38]). More recent research, involving the analyses of data from GPS-tagged golden eagles, has however concluded that 500 m is likely an overly conservative distance for assessing potential indirect habitat losses to golden eagles from onshore wind farms, with minimum displacement

[37] 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.

[38] 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.

[39] 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

[40] 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.

[41] 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

[42] 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.

distances of only 70 to 75 m from operational wind turbines observed in such studies (Fielding *et al.* 2021[39], 2022[40] and 2023[41]).

7.5.16 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.* 2021[39], 2022[40], 2023[41] and 2024c[42]). Turbine rotor size, blade motion status and wind speed has not been demonstrated as a clear prediction of how close golden eagle will approach operational turbines (Fielding *et al.* 2021[39] and 2022[40]), although there is some evidence of closer approach distances at higher wind speeds (Fielding *et al.* 2024c[42]). Fielding *et al.* (2023[41]) also found no evidence of territorial birds' habituation in their responses to operational wind turbines and were generally more wary of turbines than non-territorial dispersing birds.

7.5.17 NatureScot (2021[43]) currently advises that the Golden Eagle Topographical (GET) model (Fielding *et al*. 2019[44]) 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 external edge of the turbine array (as per Fielding *et al.* 2021[39] and 2022[40]), this comprises an area of approximately 5.8 km^2 of which approximately 5.5 km^2 is identified as being 'good' golden eagle habitat. This is defined as habitat 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 (**Confidential Figure 7.2.2**).

7.5.18 For non-breeding dispersing birds, given they can cover vast areas (e.g. Whitfield and Fielding 2017[37], and Fielding *et al*. 2024b[36]), 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.

7.5.19 Whilst there is no predicted impact upon the F02/A29 range as a result of the construction or operation of the Proposed Development, the F02/A29 range represents one of up to 13 golden breeding eagle ranges conservatively predicted to be supported in the south of Scotland (Fielding and Haworth, 2014). Up to three of these ranges are predicted to be supported within the Lowther Hills[45] (Fielding and Haworth, 2014), and within which the Proposed Development is located.

7.5.20 For any future golden eagle breeding ranges that may establish within the Lowther Hills, during the continued establishment of the South of Scotland population, the potential for operational displacement effects would depend on several factors, including:

- the extent of overlap between any future range overlaps and the Proposed Developments displacement buffer;
- the size, configuration and actual spatial use of the range;
- the extent of available habitat within the range;

[43] 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

[44] 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.

[45] One each side of the A74/M74 and one to the north of the Clyde wind farm (Fielding and Haworth, 2014), including the F02/A29 range.

- the relative importance of habitats within the Proposed Developments displacement buffer;
- the availability of connected alternative habitat within the wider landscape; and
- the ability of range holding birds to respond to localised habitat displacement.

7.5.21 Consequently, the presence of overlap between a future range and displacement buffer, would not simply in itself, necessarily result in a significant effect on a range or its viability

7.5.22 In the absence of any confirmed additional occupied golden eagle ranges within the Lowther Hills being known at this time but recognising the potential for some uncertainty around associated establishment patterns, a precautionary assessment scenario has been adopted. Whereby, under a highly conservative worst-case scenario, it is assumed that the Proposed Developments displacement buffer could fall entirely within a single future hypothetical range of a suitable size. Actual range overlap with the Proposed Developments displacement buffer would however, be much lower, given the known location and configuration of the F02/A29 range together with the occurrence of more extensive areas of connected golden eagle habitat being located to the south of the Site and north of the Clyde Wind Farm (**Confidential Figure 7.2.2**) and where the probability of active golden eagle ranges has been more strongly predicted within the Lowther Hills (Fielding *et al*. 2024d).

7.5.23 In identifying a suitable range size, recent research has shown that there is considerable inter-regional variation in golden eagle average range sizes across Scotland; Argyll 58.9 km^2, Northwest Highlands 61.7 km^2, Northeast Highlands 89.3 km^2 and South of Scotland 91.9 km^2 (Fielding *et al*. 2024d[46]). Ranges in the Outer Hebrides region, where ranges are tightly packed, have also been found to be much smaller, at 24.0 km^2 (Fielding *et al*. 2024d). Average range areas were also found to be generally reduced to 70–80% when restricted to useable golden eagle habitat, as estimated by the GET model (Fielding *et al*. 2024d).

7.5.24 In review, the relatively large mean range size estimated for the South of Scotland, is likely a reflection of the current establishing nature of the population (Fielding *et al*. 2024d). With range sizes likely to decrease as more ranges establish and compress the boundaries of existing ranges (Fielding *et al*. 2024d).

7.5.25 Therefore, using a conservative mainland Scotland average usable range area[47] of 55.1 km^2, the Proposed Developments displacement buffer (5.5 km^2) would represent approximately 10% of a hypothetical future golden eagle usable range area, albeit under a highly precautionary assumption of complete overlap.

7.5.26 As indicated above, any actual overlap of future ranges with the Proposed Development is likely to be much lower given:

- the location and configuration of the established F02/A29 range, representing one of up to three ranges that could possibly be supported in the Lowther Hills (and one of two south of the Clyde Wind Farm);
- the extent and availability of connected suitable golden eagle habitat within the wider landscape and outside the Proposed Developments displacement buffer;

[46] Fielding, A. H., Anderson, D., Barlow, C., Benn, S., Chandler, C. J., Reid, R., Tingay, R., Weston, E. D. and Whitfield, D. P. (2024c). The characteristics and variation of the Golden Eagle *Aquila chrysaetos* home range. *Diversity*, **16** (9), p. 523

[47] Where using 0.730 calculated GET 6+/Planar Area for the South of Scotland (as per Table 4, Fielding *et al*., 2024d)

- the predicted spatial distribution of future range establishment within the Lowther Hills; and
- the likelihood that future ranges would, only partially overlap the displacement buffer, if at all.

7.5.27 Additionally, the Proposed Development turbine layout is not considered likely to create a barrier to movement between core areas of suitable habitat within the Lowther Hills or between adjacent hill regions.

7.5.28 As such, with respect to potential future golden eagle range establishment within the Lowther Hills, the Proposed Development may result in a limited and localised reduction in available golden eagle habitat within part of a hypothetical future range, and under a precautionary scenario.

7.5.29 However, the extensive availability of connected habitat within the wider landscape, the absence of overlap with currently known occupied ranges, the likely flexibility of future range configurations as the South of Scotland population continues to re-establish, and the relatively limited proportion of habitat potentially affected at an average golden eagle range scale, indicate that any impact would be no more than of **long-term** and of **low** magnitude upon the Lowther Hills and wider South of Scotland golden eagle population.

7.5.30 The implementation of the BDMP would also continue as required throughout the operational phase of the Proposed Development, to enable the avoidance of disturbance to breeding and roosting birds (see **Section 7.4**).

7.5.31 **Significance of Effect**: The effect of operational displacement on the Lowther Hills and wider South of Scotland golden eagle population is predicted to be of no more than **minor** and, therefore, **not significant** in the context of the EIA Regulations.

7.5.32 Habitat enhancement measures to be included as part of Proposed Development and set out further in **Section 7.6** 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 areas outwith the Proposed Developments displacement buffer.

Collision Mortality Risk

7.5.33 **Impact**: Golden eagle may be subject to a collision risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.

7.5.34 Sensitivity: Medium NCI (Table 7.6) and unfavourable conservation status (Table 7.7).

7.5.35 **Magnitude of Impact**: a very low mean annual collision risk of 0.0286, or one collision event every 35 years is predicted for golden eagle (**Table 7.4**), which corresponds with the low activity levels recorded during baseline surveys.

7.5.36 Evidence presented in Fielding *et al.* (2021[39], 2022[40], 2023[41] and 2024c[42]) suggests that the general risk of collision to golden eagles in Scotland is also low due to their strong avoidance behaviour of operational wind turbines. Reported collisions are considered to be very rare (seven fatalities reported in the last 10 years[48]).

[48] 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

7.5.37 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.

7.5.38 **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, therefore, **not significant** in the context of the EIA Regulations.

7.5.39 To further minimise the magnitude of potential operational collision risks upon golden eagle, it is proposed that an operational livestock carcass monitoring and removal strategy would be implemented for the Proposed Development (OR01, **Table 7.8**). This would include for the regular searching of livestock carcasses within the turbine array, and removal of such off Site to an agreed location (**Section 7.6**).

Cumulative Effects

7.5.40 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.* 2021[39], 2022[40], 2023[41] and 2024c[42]).

7.5.41 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.

7.5.42 Operational displacement effects associated with the Proposed Development in combination with other operational, consented or proposed wind farm developments within the Lowther Hills are not predicted to materially alter the conclusions of the assessment above. No cumulative overlap with the known occupied F02/A29 golden eagle range is predicted and, whilst some additional localised reduction in golden eagle habitat availability within any hypothetical future range cannot be entirely excluded under a precautionary scenario, extensive areas of connected suitable habitat would remain available for golden eagle occupancy within the Lowther Hills and wider South of Scotland region. Consequently, cumulative operational displacement effects are not predicted to constrain the continued re-establishment of golden eagle within the South of Scotland.

7.5.43 As such, the contribution of the Proposed Development to potential significant cumulative operational disturbance/displacement effects to golden eagle, is considered to remain no more than **minor** and **not significant** in the context of the EIA Regulations

Red Kite

Construction Phase

7.5.44 **Impact**: Disturbance to breeding and/or foraging red kite resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.45 Sensitivity: Medium NCI (Table 7.6) and favourable conservation status (Table 7.7).

7.5.46 **Magnitude of Impact**: Baseline surveys identified two red kite breeding sites and one potential roosting site within proximity to the Proposed Development (**Confidential Figure 7.2.5**). Both breeding sites are considered to relate to the same breeding pair, with one site (KT_1) located within the upper recommended disturbance buffer distance (300 m, Goodship and Furness 2022[11]) of a section of the access track. The potential roost is outwith a distance that would be impacted by the Proposed Development.

7.5.47 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 BDMP, 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.

7.5.48 Red kite usually forage within 3 km of their nest sites but can forage up to 6 km (Hardey *et al.* 2013[16]). 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.

7.5.49 Red kites are generally accepted as being opportunistic foragers and scavengers and can often be found nesting close to human habitation and roadways (**Confidential Figure 7.2.5**). Any disturbance of foraging birds within proximity to construction working areas is therefore likely to be minimal.

7.5.50 Overall, construction impacts to red kite is therefore predicted to be **short-term** and of **negligible** magnitude.

7.5.51 **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, therefore. **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER EFFECTS

7.5.52 **Impact**: Displacement and therefore indirect habitat loss for breeding and/or foraging red kite due to the presence and operation of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.53 Sensitivity: Medium NCI (Table 7.6) and favourable conservation status (Table 7.7).

7.5.54 **Magnitude of Impact**: Current evidence suggests that red kite do not exhibit a strong degree of displacement from operational wind farms in Scotland (Duffy and Urquhart 2014[49]). It is also reasonable to assume that pairs recorded nesting in proximity to the Proposed Development (**Confidential Figure 7.2.5**) currently have a degree of tolerance to the passing of nearby vehicles and therefore any operational vehicle access taken along access tracks.

7.5.55 The implementation of the BDMP (OR01,) would also continue as relevant throughout the operational phase of the Proposed Development, to avoid disturbance to breeding (and where relevant roosting) birds (see **Section 7.4**).

7.5.56 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 available foraging habitat and nesting opportunities for the species surrounding the Proposed Development.

[49] 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.

7.5.57 **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

7.5.58 **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.

7.5.59 Sensitivity: Medium NCI (Table 7.6) and favourable conservation status (Table 7.7).

7.5.60 **Magnitude of Impact**: A mean annual collision mortality risk of 0.7048 is predicted for red kite. Based on a likely minimum regional NHZ 19 population of 248 adult breeding birds (**Table 7.7**), the additional mortality due to collisions represents an increase in baseline mortality of 0.73 % (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.* 2016[50]).

7.5.61 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 (**Confidential Technical Appendix 7.5, EIAR Volume 4**).

7.5.62 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.* (2016[50]) and Hereward *et al*. (2024[51]) 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.

7.5.63 The addition of 0.7048 deaths on average per year was shown to change the predicted growth rate very little, with a reduction from 13.6% to 13.4% in the NHZ 19 population growth rate, thus remaining healthy (total population at year 25 would be c. 10,500 individuals).

7.5.64 These findings are consistent with previous population modelling for the north Scotland population (Samson *et al.* 2016[50]) 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.

7.5.65 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.

[50] 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.

[51] 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.

7.5.66 **Significance of Effect**: The effect on the NHZ 19 red kite population as a result of potential collision risk is concluded to be **negligible**, therefore, and **not significant** in the context of the EIA Regulations.

7.5.67 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 (OR01, **Table 7.8**). This would include for the regular searching of livestock carcasses within the turbine array, and removal of such off Site to an agreed location (**Section 7.6**).

Cumulative Effects

7.5.68 Given the evidence for limited displacement of red kite around operational wind farms, only collision mortality risks are assessed within a cumulative regional (NHZ 19) context.

7.5.69 **Technical Appendix 7.4 (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.

7.5.70 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 cumulative 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 (**Confidential Technical Appendix 7.5**, EIAR Volume 5), and as taken from the most recent annual SRMS monitoring reports.

7.5.71 Nevertheless, an NHZ 19 cumulative annual collision mortality risk of 2.9478 is estimated. This is comprised of estimates for the Proposed Development (0.7048), operational developments (0.014), those under construction (0.387), consented development (1.001) and other application stage developments (0.841) and should be considered as a minimum estimate, both due to possible information gaps, and the increasing red kite population.

7.5.72 When considering this additional mortality on the NHZ 19 population in the population model, an additional three 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.

7.5.73 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).

7.5.74 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.

7.5.75 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** and, therefore, **not significant** in the context of the EIA Regulations.

7.5.76 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 (**Section 7.6**).

Breeding Wader Assemblage

Construction Phase

7.5.77 **Impact**: Disturbance to breeding and/or foraging curlew, golden plover and/or lapwing resulting from construction works. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.78 **Sensitivity**: Medium NCI (**Table 7.6**); unfavourable conservation status (curlew and lapwing) and favourable conservation status (golden plover) (**Table 7.7**).

7.5.79 **Magnitude of Impact**: Baseline surveys over the 2024 and 2025 breeding seasons recorded the following breeding activity (refer to **Table 7.5** for a more detailed breakdown):

- Curlew: 14-19 territories with a maximum of nine (representing 0.24 % of the possible current NHZ 19 breeding population, **Table 7.7**) within 500 m of the Proposed Development.
- Golden plover: four to five territories with a maximum of four (representing 0.48 % of the possible current NHZ 19 breeding population, **Table 7.7**) within 500 m of the Proposed Development.
- Lapwing: 10-20 territories with a maximum of six (representing 0.12 % of the possible current NHZ 19 breeding population, **Table 7.7**) within 500m of the Proposed Development.

7.5.80 A disturbance buffer of up to 300 m is currently recommended as being appropriate to avoid the potential for disturbance to breeding curlew, and 200 m to 500 m for breeding golden plover (Goodship and Furness 2022[11]). Specific disturbance buffers for lapwing are not available, however given their breeding behaviour, the distances provided for curlew are likely to be an appropriate proxy for lapwing. As such, it is unlikely that all breeding curlew and/or golden plover pairs within 500 m of the core construction area of the Proposed Development would be displaced from the regional NHZ 19 population in any year due to construction activities associated with the Proposed Development.

7.5.81 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 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**).

7.5.82 As a worst-case, assuming some breeding pairs would be temporarily displaced during the construction phase, (and considered temporarily lost to the NHZ 19 populations for the purposes of assessment) an impact of no more than **negligible** and **short-term** magnitude is predicted.

7.5.83 **Significance of Effect**: the effect on the regional NHZ 19 curlew, golden plover and lapwing populations as a result of construction disturbance is therefore considered to be no more than **negligible** and, therefore, **not significant** in the context of the EIA Regulations.

Operational Phase

DISPLACEMENT AND BARRIER EFFECTS

7.5.84 **Impact**: Displacement and therefore indirect habitat loss for breeding or foraging curlew, golden plover and/or lapwing due to the presence and operation of turbines or other infrastructure. Potentially impacting on breeding success, productivity and/or survival rates.

7.5.85 **Sensitivity**: Medium NCI (**Table 7.6**); unfavourable conservation status (curlew and lapwing) and favourable conservation status (golden plover) (**Table 7.7**).

7.5.86 **Magnitude of Impact**: Current evidence does not suggest the occurrence of total displacement of breeding curlew, golden plover and/or lapwing from onshore wind farm sites.

7.5.87 Evidence from monitoring surveys at the operational Fallago Rig Wind Farm referred to within the Fallago Rig II EIA Report (2015[52]) indicate that curlew 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.

7.5.88 A study by Pearce-Higgins *et al.* (2009[53]) 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.* (2010[54]), whilst on a smaller scale, also recorded the presence of breeding curlew territories within 500 m of operational turbines. In the Whitfield *et al.* (2010[54]) study, one turbine from one wind farm had three territories located within 200 m, even though there had been no curlew reported at the particular location prior to construction.

7.5.89 It is therefore unlikely that all breeding curlew recorded within 500 m of the 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.* (2009[53]) study and a 42 % decrease in the number of breeding curlew pairs within 500 m of the turbine array (up to seven pairs), this would represent a potential displacement of up to three pairs, representing 0.08% of a possible NHZ 19 breeding population estimate of 3,641 breeding pairs (**Table 7.7**). At least some of such pairs would however most likely be displaced into suitable alternative breeding habitat within the Site or surrounding area.

---

[52] 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.

[53] 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

[54] 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.

7.5.90 Evidence suggests that complete displacement of golden plover within 500 m is unlikely. Pearce-Higgins *et al*. (2012[55]) found population densities of golden plover were not affected by the presence of wind farms, and years since construction and the relative overlap between the survey area and the wind farm were unrelated to golden plover densities. A lack of displacement effects for breeding golden plover has also been reported from operational monitoring at Beinn Tharsuinn Wind Farm (Douglas *et al.* 2011[56]) and Farr Wind Farm (Fielding and Haworth 2013[57]). Sansom *et al.* (2016[58]) did show in their study that breeding golden plover abundance may be reduced by 79 % up to 400 m away from operational turbines, although hatching and fledging success were not affected by proximity to turbine locations.

7.5.91 Results at the operational Fallago Rig Wind Farm supports evidence that breeding golden plover displacement from operational turbines is limited, with surveys in 2013 and 2014 for the extension application EIA (Fallago Rig II[52]) finding that five of the seven and six of the 14 territories recorded in 2013 and 2014 respectively were within approximately 500 m of the Fallago Rig I turbines, operational at the time of surveys. This was broadly consistent with the nine territories recorded in the same area during the baseline surveys in 2005 for Fallago Rig Wind Farm (i.e. prior to the turbines but in the same area), as reported in the Fallago Rig II assessment.

7.5.92 It is therefore unlikely that all breeding golden plover recorded within 500 m of the turbine array would be lost from the regional NHZ 19 population over the Proposed Development's operational lifetime. Adopting the findings of the Sansom *et al.* (2016[58]) study and a 79 % decrease in the number of breeding golden plover pairs within 400 m of the turbine array (up to four pairs), this would represent a potential displacement of up to three pairs, representing 0.36 % of a possible NHZ 19 breeding population estimate of 825 breeding pairs (**Table 7.7**). At least some of such pairs would however most likely be displaced into suitable alternative breeding habitat within the Site or surrounding area.

7.5.93 It is similarly considered unlikely that all breeding lapwing recorded within 500 m of the turbine array would be lost from the regional NHZ 19 population over the Proposed Development's operational lifetime. Some pairs where affected would most likely be displaced into suitable breeding habitat within the Site or surrounding area. Of the five to six6 pairs recorded within 500 m of the Proposed Development only one pair is within 500 m of the turbine array, representing 0.02 % of a possible NHZ 19 breeding population estimate of 5,000 breeding pairs (**Table 7.7**). At least some of such pairs would however most likely be displaced into suitable alternative breeding habitat within the Site or surrounding area.

7.5.94 The BDMP (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.

---

[55] Pearce-Higgins, J.W., Stephen, L., Douse, A. and Langston, R.H.W. (2012). Greater impacts of Windfarms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. Journal of Applied Ecology 49: 386-394.

[56] Douglas, D.J.T., Bellamy, P.E. & Pearce-Higgins, J.W. (2011). Changes in the abundance and distribution of upland breeding birds at an operational wind farm. Bird Study, 58, 37–43.

[57] Fielding, A.H. & Haworth, P.F. (2013). Farr wind farm: A review of displacement disturbance on golden plover arising from operational turbines 2005-2013. Haworth Conservation, Isle of Mull.

[58] Sansom, A., Pearce-Higgins, J. W. and Douglas, D. J. T. (2016), Negative impact of wind energy development on a breeding shorebird assessed with a BACI study design. Ibis, 158: 541–555. doi:10.1111/ibi.12364

7.5.95 An impact of **negligible** but **long-term** magnitude is therefore predicted for curlew, golden plover and lapwing.

7.5.96 **Significance of Effect**: The effect on the regional NHZ 19 curlew, golden plover and/or lapwing population as a result of operational displacement is concluded to be **negligible** and therefore **not significant** in the context of the EIA Regulations.

7.5.97 Habitat enhancement measures to be included as part of Proposed Development are set out further in the OBEMP (**Technical Appendix 6.7**) are also likely to provide benefits to curlew, golden plover and lapwing (at least at a local level) and offset potential displacement effects to some extent.

COLLISION MORTALITY RISK

7.5.98 **Impact**: Curlew, golden plover and/or lapwing may be subject to a collision risk with turbines, thereby potentially increasing the annual mortality rate of the population above background levels.

7.5.99 **Sensitivity**: Medium NCI (**Table 7.6**); unfavourable conservation status (curlew and lapwing) and favourable conservation status (golden plover) (**Table 7.7**).

7.5.100 **Magnitude of Impact**: An annual mean collision mortality risk of 0.0245 for curlew, 1.2436 for golden plover, and 0.0043 for lapwing is predicted (**Table 7.4**).

7.5.101 Curlew activity across the baseline survey period was almost exclusively recorded during the breeding seasons (March to August) and predicted collision rates are therefore attributed to the NHZ 19 breeding population, conservatively estimated at 3,770 breeding pairs (**Table 7.7**). The additional predicted annual mortality due to collision with operational turbines would result in an increase of 0.003 % over the calculated annual baseline mortality rate (0.101, British Trust for Ornithology (BTO) BirdFacts[59]), which is very small in the context of the regional population level.

7.5.102 Golden plover activity across the baseline survey period was recorded during the breeding and non-breeding seasons, however potential 'at-risk' flights included within the collision model have all been attributed to the breeding season (refer to **Table 7.4**) and predicted collision rates are therefore attributed to the NHZ 19 breeding population, conservatively estimated at 825 breeding pairs (**Table 7.7**). The additional predicted annual mortality due to collision with operational turbines would result in an increase of 0.28 % over the calculated annual baseline mortality rate (0.295, BTO BirdFacts[60]), which is very small in the context of the regional population level.

7.5.103 Lapwing activity across the baseline survey period was almost exclusively recorded during the breeding seasons (March to August) and predicted collision rates are therefore attributed to the NHZ 19 breeding population, conservatively estimated at 5,000 breeding pairs (**Table 7.7**). The additional predicted annual mortality due to collision with operational turbines would result in an increase of 0.0001 % over the calculated annual baseline mortality rate (0.295, BTO BirdFacts[61]), which is very small in the context of the regional population level.

[59] Available at: https://www.bto.org/learn/about-birds/birdfacts/curlew

[60] Available at: https://www.bto.org/learn/about-birds/birdfacts/golden-plover

[61] Available at: https://www.bto.org/learn/about-birds/birdfacts/lapwing

7.5.104 The increase in annual baseline mortality for curlew, golden plover and/or lapwing is therefore considered to be an effect of **negligible** but **long-term** magnitude.

7.5.105 **Significance of Effect**: The effect on the NHZ 19 curlew, golden plover and lapwing populations as a result of potential collision risk is concluded to be **negligible** and, therefore, **not significant** in the context of the EIA Regulations.

Cumulative Effects

7.5.106 Given the very small collision mortality risk predicted for curlew, golden plover and/or lapwing 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. Furthermore, given that a maximum of one lapwing territory (representing 0.02 % of the NHZ 19 population), it is considered that the Proposed Development's contribution to any potential cumulative displacement to breeding lapwing is **negligible** at best.

7.5.107 In review of available information for other wind farm developments located within NHZ 19 (**Technical Appendix 7.4**), a minimum estimate (due to unavailable data) of around 132 pairs of curlew are estimated to be displaced from operational, under construction, consented and application stage developments, including the Proposed Development, representing up to 3.62 % of the breeding population (3,641 pairs, **Table 7.7**).

7.5.108 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 developments 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, Goodship and Furness 2022[11]).

7.5.109 In review of available information for other wind farm developments located within NHZ 19 (**Technical Appendix 7.4**), a minimum estimate (due to unavailable data) of around 14 pairs of golden plover are estimated to be displaced from operational, under construction, consented and application stage developments, including the Proposed Development, representing up to 1.7 % of the breeding population (825 pairs, **Table 7.7**).

7.5.110 This estimate is however considered to represent an unlikely scenario for the regional NHZ 19 golden plover population. In some cases, information available for the various cumulative developments relates to the number of breeding golden plover territories located within 500 m of proposed infrastructure, and therefore beyond currently recommended buffers to avoid the potential for disturbance to breeding golden plover (400 m, Sansom *et al.* (2016[58]).

7.5.111 The estimations also do not take into account the potential for any overlap in "*zones of influence*" for each cumulative 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.

7.5.112 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, golden plover and/or lapwing, such as those set out for the Proposed Development, for Watchman, M74 West, Cloud Hill (and likely other projects) to further reduce potential displacement effects and deliver enhancements for curlew, golden plover and lapwing (and other breeding waders) in the short to long-term future.

7.5.113 Potential cumulative operational displacement effects upon 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, therefore, **not significant** in the context of the EIA Regulations.

Decommissioning Phase

7.5.114 As set out in **Section 7.2** potential impacts and likely significant effects on IOFs 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.

7.5.115 The BDMP 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**).

7.5.116 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, therefore. **not significant** in the context of the EIA Regulations.

7.6 Additional Mitigation and Enhancement Measures

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 golden eagle and 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 7.8**. To further minimise the risk of potential collision mortality to golden eagle and red kite, an operational livestock carcass recovery protocol (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.

7.6.4 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 7.8: 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 golden eagle and red kite.	OR01	Operational carcass recovery protocol	Minimise collision mortality risks.	Operation	Consultation and approval with NatureScot and SLC.

**PC=Pre-construction, C=Construction, O =Operation and D=decommissioning.*

Enhancement

7.6.5 The Proposed Development would include for the implementation of a Biodiversity Enhancement Management Plan (BEMP). The BEMP would be finalised in consultation with relevant landowners and stakeholders prior to the commissioning of the Proposed Development and would be based on the OBEMP presented as **Technical Appendix 6.7 (EIAR Volume 4)**.

7.6.6 The BEMP is proposed to have five aims, which encompass moorland, peatland, wetland, woodland and grassland enhancement, and long-term positive management commitments informed by an appointed Biodiversity Advisory Group (BAG). Collectively these aims would serve to improve nesting and foraging opportunities for the breeding waders and foraging raptors, including in areas away from operational infrastructure (**Figure 6.14.1**, **Figure 6.14.2** and **Confidential Figure 6.14.1**).

7.6.7 The formation of the BAG 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.

7.6.8 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

7.7 Assessment of Residual Effects

7.7.1 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, therefore, **not significant** in the context of the EIA Regulations.

7.8 Monitoring

Construction (and Decommissioning) Phase Monitoring

BDMP

7.8.1 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

7.8.2 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

7.8.3 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 IOFs numbers and distribution.

7.8.4 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.

7.8.5 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

7.8.6 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.

7.9 Summary of Potential Significant Effects

Table 7.9: Summary of Potential Significant Effects

Likely Significant Effect	Description of Mitigation	Means of Implementation	Residual Effect
Construction			
Golden eagle, red kite, curlew, lapwing and golden plover – disturbance	Implementation of BDMP Appointment of ECoW Implementation of CEMP	Planning condition	Short-term, negligible; not significant
Operation			
Golden eagle, red kite, curlew, lapwing and golden plover – disturbance	Implementation of BDMP	n/a	Long-term, negligible; not significant
Curlew, lapwing and golden plover – collision mortality risk	Not required	n/a	Long-term, negligible; not significant
Golden eagle and red kite – collision mortality risk	Livestock carcass recovery protocol	Planning condition	Long-term, negligible; not significant

Table 7.9: Summary of Potential Significant Effects			
Likely Significant Effect	**Description of Mitigation**	**Means of Implementation**	**Residual Effect**
Decommissioning			
Golden eagle, red kite, curlew, lapwing and golden plover – disturbance	Implementation of BDMP Appointment of ECoW Implementation of CEMP	Planning condition	Short-term, negligible; not significant
Cumulative construction			
Assessment not required			
Cumulative operation			
Golden eagle – displacement	Not required	n/a	Long-term, negligible; not significant
Red kite – collision risk mortality	Livestock carcass recovery protocol	Planning condition	Long-term, minor adverse; not significant
Curlew, golden plover and lapwing – displacement	Not required	n/a	Long-term, minor adverse; not significant

8 Hydrology, Hydrogeology, and Geology

8.1 Introduction

8.1.1 This chapter of the Environmental Impact Assessment (EIA) Report (EIAR) considers the likely significant effects on Hydrology, Hydrogeology and Geology 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 hydrology, hydrogeology 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 hydrology assessment has been carried out by Tom Cusworth and Jo Thorp of Ramboll Uk Limited (Ramboll). Tom Cusworth (MCIWEM) has over four years' experience of hydrological assessment for onshore wind farms and energy infrastructure. Jo Thorp (MCIWEM) has eight years' experience of hydrological assessment for onshore wind farms and energy infrastructure.

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, MIEnvSc, PIESP, 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:

- Volume 3a: Figures (EIAR Volume 3a):
  - Figure 8.1: Surface Water Features;
  - Figure 8.2: Water Resources;
  - Figure 8.3: Superficial Geology;
  - Figure 8.4: Bedrock Geology;
  - Figure 8.5: 625k Hydrogeology;
  - Figure 8.6: Peat Depth; and
  - Figure 8.7: SNH Carbon and Peatland Map 2016.
- Volume 4: Technical Appendices (EIAR Volume 4):
  - Technical Appendix 8.1: Assessment Methodology;
  - Technical Appendix 8.2: Groundwater Dependent Terrestrial Ecosystems;
  - Technical Appendix 8.3: Watercourse Crossing Assessment;
  - Technical Appendix 8.4: Private Water Supply Assessment;
  - Technical Appendix 8.5: Peat Depth Survey Results;

- Technical Appendix 8.6: Outline Peat Management Plan;
- Technical Appendix 8.7: Peat Landslide Hazard Risk Assessment; and
- Technical Appendix 8.8: Mining 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: Assessment Methodology (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 western and eastern areas of the Site and associated access routes, as described in **Chapter 2: Description of the 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 Impacts 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 The scope of this chapter is set out in **Table 8. 1**. The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.1: Consultation Register (EIAR Volume 4).**

Table 8. 1: Impacts Considered within the Assessment

Impact	**Phase***		
	C	**O/M**	**D**
Hydrogeology & Private Water Supply	Yes	Yes	Yes
Private Water Supplies	Yes	Yes	Yes
Peat Landslide Hazard	Yes	No	No
Potential for loss/disturbance to peat and carbon rich soils	Yes	No	No
Mining risks and contamination	Yes	No	No
Surface Water & Watercourse Crossings	Yes	Yes	Yes
Flood Risk (crossing of Glengonnar Water at NGR: 290224, 620584)	Yes	Yes	Yes

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

8.2.6 At one location where crossing of a larger watercourse is proposed (crossing of the Glengonnar Water at NGR: 290224, 620584), the river channel is approximately 4.5 m wide at this location and the proposed track alignment would cross a distance of approximately 65 m within the Medium (1 in 200 (0.5%)) annual chance + climate change flood extent. Therefore, the potential for the crossing at this location to result in an increase in flood risk is scoped in to the assessment.

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

8.2.8 Potential cumulative construction and operation effects with regard to geology and soils have been scoped out of assessment on the basis that no potential for significant cumulative effects has 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.

8.2.9 The assessment is based on the Proposed Development as described in Chapter 2: Development Description (EIAR Volume 2) and takes into account the Outline Construction Environmental Management Plan (Technical Appendix 2.1, EIAR Volume 2).

Potential Impacts Scoped Out

8.2.10 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 8. 2.**

Table 8. 2: Impacts Scoped Out of the Assessment

Impact	Reasoning
Flood Risk	The majority of the Proposed Development would be located within areas shown by SEPA to be at a very low (<1 in 1,000 (0.1%)) annual chance of flooding from rivers, and areas of the site at an increased chance of flooding from surface water and small watercourses (>1 in 1,000 (0.1%) annual chance)are generally confined to narrow flow paths, the channels of small watercourses or very minor topographical depressions. Additionally, all watercourse crossings would be designed to accommodate the 1 in 200 (0.5%) annual probability flood including allowance for climate change. Therefore, further assessment of flood risk across the wider site has been scoped out of the assessment.
GWDTE	Based on hydrogeological and hydrological review of the Site (**Technical Appendix 8.2, EIAR Volume 4**), the habitats within the Site identified as potential GWDTE are assessed as being of low importance in terms of groundwater dependency, reflecting the underlying low productivity aquifer, limited groundwater availability, and the absence of evidence for sustained groundwater inputs identified during hydrological walkover surveys. Therefore, as set out in the baseline information provided below and Technical Appendix 8.2, these habitats are not considered to be sensitive to alterations in groundwater supplies and in line with SEPA guidance, no further assessment of their groundwater dependence is required.
Potential effects on geological designations and geological assets	Raven Gill Site of Special Scientific Interest (SSSI) is located within the Site as shown on **Figure 3.2: Environmental Constraints (EIAR Volume 3a).** However, the Proposed Development is not likely to result in likely significant impacts on this designated geological resource given the distance between it and ground breaking works that would form part of the Proposed Development, therefore this has been scoped out of the assessment.

Method of Baseline Characterisation

Extent of the Study Area

8.2.11 The Study Area for desktop assessment of hydrology, hydrogeology and soils includes the Site and land within a 2 km radius, as well as receptors with downstream connectivity with the Proposed Development.

8.2.12 Field surveys were carried out over the area of the Proposed Development and where any potentially sensitive receptors were identified within hydrological connection to the Proposed Development to a maximum buffer of 250 m from the site boundary.

8.2.13 The Study Area, in respect of potential impacts on geology, peat and carbon rich soils, considers land within the Site boundary.

Desk Study

8.2.14 The methodology for baseline characterisation is set out as follows:

- describe surface water hydrology, including watercourses, springs and lochs and lochans;
- identify existing catchment pressures;
- identify private drinking water abstractions and PWS within the Study Area;
- identify GWDTE habitats through National Vegetation Community (NVC) surveying;
- 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 Scotland[1], British Geological Survey (BGS) information[2], SNH Carbon and Peatland Map[3], mining and geohazard information[4], and online aerial, Ordnance Survey and historical mapping.

8.2.15 Published information consulted to determine the baseline conditions are outlined below in **Table 8. 3**.

Table 8. 3: Baseline Information Sources

Topic	Sources of Information
Topography	• Aerial Photography[5] • 5 m contour data derived from Ordnance Survey (OS) Digital Terrain Model (DTM) data[6] • 1:25,000 OS Raster Data[6]
Designated Nature Conservation Sites	• SNHi Sitelink website[7]
Solid and Superficial Geology and	• British Geological Survey Digital Data provided at BGS online viewer[8]

[1] National Soils Map of Scotland. Available at: https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/ [Accessed January 2026]

[2] Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ [Accessed January 2026]

[3] SNH Carbon and Soils Map Available at: Carbon and peatland 2016 map | Scotland's soils [Access June 2026]

[4] Mining Remediation Authority Map Viewer [Accessed January 2026]

[5] Google Earth Imagery, Bing Maps

[6] Under license acquired from Ordnance Survey

[7] SNHi Sitelink. Available at: https://sitelink.nature.scot/map [Accessed January 2026]

[8] BGS Onshore GeoIndex. Available at: www.bgs.ac.uk [Accessed January 2026]

Table 8. 3: Baseline Information Sources

Topic	Sources of Information
Geohazard Information	• BGS Borehole Records[8] • Mining Remediation Authority data[4] • Memoir - Special Report on the Mineral Resources of Great Britain, Vol. XVII "The Lead, Zinc and Nickel Ores of Scotland" 1921 published by the Geological Survey of Scotland[9] • National Library of Scotland (NLS) historic maps web page[10] for historic Ordnance Survey, County and other maps dating from 1654. • Historic Scotland Pastmap website[11]: Royal Commission on the Ancient and Historic Monuments in Scotland (RCAHMS) • Mine plans and other documentation from the Hopetoun Papers Archive, held at Hopetoun House • 'Streaming and Hushing for Scottish Gold: The Archaeology of Early Gold Working at Leadhills and Wanlockhead' by John Pickin, Mining History: The Bulletin of Peak District Mines Historical Society (2004)[12] • 'The Paragenetical Mineralogy of the Leadhills and Wanlockhead Lead and Zinc Deposits' – a thesis submitted by A. K. Temple for his PhD at the University of Leeds (1954)[13] • 'Lead mines and associated remains, Leadhills' - Scheduled Monument Designation SM5817, Historic Environment Scotland[14] • 'Historic gold workings, Leadhills, South Lanarkshire' - Scheduled Monument Designation SM13677, Historic Environment Scotland[14]
Soils and Peat	• SNH Carbon and Peatland Map (2016)[15] • BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)[8] • National Soils Map of Scotland[15] • Online aerial, Ordnance Survey and historical mapping
Surface Water Hydrology	• 1:10,000 OS Raster Data[6] • 1:25,000 OS Raster Data[6] • OS Open Rivers[16]
Flooding	• Indicative River and Coastal Flood Map (SEPA)[17]
Water Quality	• SEPA, Water Classification Hub[18]
Water Resources	• Private water supply information provided by South Lanarkshire Council Environmental Health Department • Drinking Water Protected Areas (DWPAs) in the Scotland River Basin District (RBD) maps[19]. • 1:10,000 OS Raster Data[6] • 1:25,000 OS Raster Data[6]
Hydrogeology	• BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)[8]

[9] Geological Survey of Scotland (1921). Memoir - Special Report on the Mineral Resources of Great Britain, Vol. XVII "The Lead, Zinc and Nickel Ores of Scotland"

[10] https://maps.nls.uk/

[11] https://pastmap.org.uk/

[12] Pickin, John (2004). Streaming and Hushing for Scottish Gold: The Archaeology of Early Gold Working at Leadhills and Wanlockhead. Mining History: The Bulletin of Peak District Mines Historical Society.

[13] Temple, A.K. (1954).The Paragenetical Mineralogy of the Leadhills and Wanlockhead Lead and Zinc Deposits. (thesis submitted for PhD at the University of Leeds).

[14] https://www.historicenvironment.scot/

[15] National Soil Map of Scotland. Available at: https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/ [Accessed January 2026]

[16] OS Open Rivers. Available at: https://osdatahub.os.uk/ [Accessed January 2026]

[17] SEPA Flood Maps. Available at: www.sepa.org.uk [Accessed January 2026]

[18] SEPA, Water Classification Hub. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/ [Accessed January 2026]

[19] Drinking Water Protected Areas (DWPAs) in the Scotland River Basin District (RBD) maps. Available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ [Accessed January 2026].

Table 8. 3: Baseline Information Sources	
Topic	**Sources of Information**
	• BGS Groundwater Vulnerability Maps[8] • BGS 1:625,000 hydrogeological map of the UK[8] • The River Basin Management Plan for Scotland 2021 – 2027[20]

Field Survey

HYDROLOGICAL SURVEY

8.2.16 Site surveying was conducted by Ramboll in October 2025. The purpose of the Site walkover was to:

- assess the general hydrological condition of the Site;
- characterise watercourses within the Site such that proposed watercourse crossing points could be assessed; and
- assess hydrological conditions at potential GWDTE locations.

8.2.17 The survey consisted of visual inspection and geolocated surveying of watercourses across the Site. Where potentially groundwater dependent vegetation communities were identified by ecological surveying (**Technical Appendix 8.2: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment (EIAR Volume 4**)) site specific review was conducted to identify visual evidence of groundwater emergence, association of habitats to surface water features, evidence of connection to upslope surface water runoff and the presence of deep peat in association with habitats.

8.2.18 Ecological surveying in order to identify potential groundwater dependent vegetation communities was carried out by SLR Consulting in in September-November 2024 and July 2025. Further details of the methodology for National Vegetation Classification (NVC) surveying of habitats are provided in **Technical Appendix 8.2: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment (EIAR Volume 4)**.

PEAT SURVEY

8.2.19 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.

8.2.20 The surveys were undertaken on the following dates:

- Stage 1 peat probing undertaken by Ramboll in December 2024 and by Fluid Environmental Consulting Limited in January 2025; and
- Stage 2 peat probing and coring undertaken by Fluid Environmental Consulting in November 2025 and February 2026.

8.2.21 In addition, historical publicly available peat probing data[21] from a survey conducted in 2018 that covered a wider area outside of the Site was also used.

[20] The River Basin Management Plan for Scotland 2021 – 2027 (2021). Available at: https://www.sepa.org.uk/media/594088/211222-final-rbmp3-scotland.pdf. [Accessed January 2026]

[21] Data was taken from the Harryburn wind farm consent application, which was submitted in 2018. Available online: https://www.energyconsents.scot/ApplicationDetails.aspx?cr=EC00005277, access 26.03.2026

8.2.22 Surveys followed relevant good practice guidance published at the time of the surveys with regard to surveying for developments on peatland[22].

8.2.23 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.

8.2.24 The survey points and field data were collected using a handheld Trimble GPS unit. Peat depth data was modelled using Inversive Distance Weighted (IDW) interpolation in GIS software, and a depth model generated using incremented peat depth categories.

8.2.25 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.

8.2.26 Again, this was carried out using collapsible avalanche probes, and data collected using a handheld Trimble GPS unit.

8.2.27 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 humification[23] 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.

8.2.28 A peat depth probe was taken adjacent to the core location, and cores were photographed.

8.2.29 Further information on the survey methodology is included in the Peat Depth Report **(Technical Appendix 8.4, EIAR Volume 4)**.

[22]Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. Guidance on Peatland, online version only. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-andguidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance2017/govscot:document/Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf

[23] 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

PEAT LANDSLIDE HAZARD RISK ASSESSMENT

8.2.30 A Peat Landslide Hazard Risk Assessment (PLHRA) was undertaken by Ramboll in 2026 in accordance with the methodologies set out within Scottish Government guidance[22]. The results are included in **Technical Appendix 8.7 (EIAR Volume 4)**.

MINING AND POTENTIAL CONTAMINATION

8.2.31 A mining assessment including potential legacy ground contamination was undertaken by Wardell Armstong on behalf of the Applicant in July 2024, including a site walkover undertaken in June 2024. The results are included in **Technical Appendix 8.8 (EIAR Volume 4)**.

BORROW PIT ASSESSMENT

8.2.32 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 using data prepared by Pell Frischman. 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

8.2.33 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

8.2.34 This assessment refers to, and uses, publicly available data sources and relies upon the accuracy of this data.

8.2.35 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.

8.2.36 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 8.6, 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 entirety of the Site, including access tracks and proposed turbine locations is shown to be within the River Clyde catchment (SEPA Catchment No. 97). Larger tributaries of the River Clyde, that are located within the Site boundary are included below:

- Glengonnar Water (Flows in a generally northerly direction adjacent to the B797, crossed from east to west at the location of a current ford, close to the Lettershaws properties
- Laggen Gill (Crossed by proposed access track at its downstream extent approximately 100m north east of the proposed Construction Compound 2 at an existing ford location)
- Kirk Gill (Crossed by proposed access track at its downstream extent approximately 750m north east of the proposed Construction Compound 2 at an existing ford location)
- Glencaple Burn (Crossed by the access track at its upstream extent between Turbine 11 and Turbine 12, , and crossed by the access track at its downstream extent approximately 250m north of the Glencaple properties at an existing ford location)
- Glenkip Burn (Crossed by proposed access track between Turbine 4 and Turbine 7)
- Glendorch Burn (Crossed by proposed access track between Turbine 1 and Turbine 3)
- Elvan Water/Shotcleuch Water (Offsite, adjacent to the south east of the B7040, immediately south of the southern site boundary)

8.3.2 Multiple unnamed watercourses are present on the Site, including a number of watercourses which are crossed by existing infrastructure in the form of circular culverts.

Flood Risk

8.3.3 SEPA Flood Risk mapping indicates that there is minimal risk of fluvial flooding to the majority of Site (a less than 1 in 1,000 (0.1%) annual chance of flooding). Areas assessed by SEPA to be at an increased chance of flooding from rivers, are limited to the immediately vicinity of the watercourses located on Site.

8.3.4 Areas on Site that are immediately adjacent to the Glengonnar Water and Glencaple Burn, are shown to have an elevated risk of flooding. Immediately south of the southern Site boundary, areas in the immediate vicinity of both the Elvan Water and Shortcleuch Water watercourses, are shown to have an elevated risk of flooding.

8.3.5 Areas of the proposed access route running from the M74 and parallel to Glengonnar Water are assessed by SEPA to be at an increased chance of river flooding. This elevated risk of flooding is associated with any flood waters emanating form the Glengonnar Water. This water course flows south to north along the northwestern site boundary, and B797 road, and is crossed by the proposed northern access track.

8.3.6 Any existing tracks are served by a number of existing watercourse crossings which would reduce the risk of flooding, and which are not represented in SEPA national-scale mapping.

8.3.7 SEPA mapping identifies some limited areas of elevated surface water flood risk on the Site. Generally, the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability).

8.3.8 Surface water flood risk associated with the aforementioned watercourses, appears to be confined to the main channel and immediate surrounding area. Small areas of Low risk of flooding are expected to impact the northern access track, with the area of highest risk of associated with land in the north where the proposed access track crosses Laggen Gill and Glengonar Water.

GWDTE

8.3.9 NVC habitat surveying carried out by SLR has confirmed that areas of the Site are classified as potentially Groundwater Dependent Terrestrial Ecosystems (GWDTE) as detailed in **Chapter 6: Ecology (EIAR Volume 2)**. Therefore, further hydrological assessment has been carried out by Ramboll to determine the actual likelihood of groundwater dependency and the sensitivity of such habitats. Hydrological assessment of potential impacts of the Proposed Development on GWDTE is provided in **Technical Appendix 8.2: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment (EIAR Volume 4).**

Water Resources

8.3.10 According to BGS 1:625k hydrogeological mapping the majority of the Site is shown to be within an area associated with a Low productivity Aquifer, comprising several different groups. Details on each group can be found below in **Table 8.4.**

Table 8.4: Summary of Hydrogeological Conditions

Rock Unit	Character & Location	Summary
Kirkcolm Formation	Northern site area, adjacent to B797, western site area. Low productivity aquifer	Highly indurated greywackes with limited groundwater in near surface weathered zone and secondary fractures
Crawford Group and Moffat Shale Group (undifferentiated)	Northern site area. Low productivity aquifer	Very limited groundwater from fractures. Very limited outcrop areas.
Portpatrick Formation and Glenwhargen Formation (undifferentiated)	Central, southern and southwestern site area. Low productivity aquifer	Highly indurated greywackes with limited groundwater in near surface weathered zone and secondary fractures

8.3.11 Located immediately northwest of the Site, is an area defined as being within the Stewartry Group and is identified as being a Highly productive aquifer. This area can be summarised as follows:

- Regionally important aquifer up to 1500 m thick with sandstones and breccias yielding up to 40 L/s[24].

8.3.12 The nearest PWS located within this area is approximately 1.1km north of the site and outside of potential hydrogeological connection to the Proposed Development.

8.3.13 PWS registers held by South Lanarkshire Council (SLC) indicate that a total of thirteen 13 (12) PWS sources are recorded within a 2 km radius of the Site boundary, of which three (3) are located on Site,. A further PWS source (associated with Waterhead Toll Cottage) has been

[24] BGS Hydrogeology 625K digital hydrogeological map of the UK. Available online: https://www.bgs.ac.uk/

identified by a land owner and recorded as RAM_PWS01. At one location (North Shortcleugh Farm, SLC Ref.: PWS WN9*L1NORT/) the location of the PWS was verified during the hydrology site walkover to be approximately 100m north of the mapped location and has been recorded as RAM_PWS02. Site specific assessment is required where PWS are located within a 250m buffer of excavations of a depth greater than 1m, the wider 2km buffer has been applied in order to take into accountthe potential for supplies from surface water to be in connection to the site.

8.3.14 The description of the associated PWS' are provided in **Table 8.5** below.

Table 8.5: Private Water Supply Locations				
PWS Name	**SLC PWS Reference**	**Direction and Distance from site**	**Grid Reference**	
			X	**Y**
Lettershaws Farm CottageSupply	WN9*L1BIN/4	On site	289902	620502
Waterhead Source	RAM_PWS01	On Site	288587	618347
North Shortcleugh Farm	WN9*L1NORT/1	On Site	292700	617700
	RAM_PWS02		292735	617823
Glencaple	WN9*L1ABIN/5	On Site	292009	621192
The Firs	WN6*L1BIGG/1	1.8km North	293900	623900
GILKERSCLEUGH	WN6*L1ABIN/10	1.4km North	290300	622400
LETTERSHAWS CARAVAN SITE	WN9*L1ABIN/1	0.7km North	289313	621295
CLEUGH FARM	WN6*L1CRAW/5	1.6km North	286803	620992
STRANCLEUGH	WN6*L1CRAW/10	1.1km North	287000	620500
Snar	WN9*L1CRAW/4	0.7km North West	286657	619930
Stoneyburn	WN6*L1BIGG/26	1.5km East	294508	620596
SOUTH SHORTCLEUGH	WN9*L1ELVA/5	0.6km South	292927	616730
The Hass	WN9*L1HASS/1	1km South	290400	615400
NEW GLENDORCH	WN9*L1BIGG/4	0.7km South	288978	617353

8.3.15 Further details of PWS locations is provided in **Technical Appendix 8.4: PWS Assessment** and PWS locations are shown in **Figure 8.4.1: PWS Locations.**

8.3.16 A review of Scottish Water mapping has confirmed that there are no Scottish Water drinking water catchments designated as Surface Water Drinking Water Protected Areas (DWPAs) within the Site.

Geological Baseline

8.3.17 According to the (BGS) Geology Map Viewer[8], the superficial geology underlying the Site predominantly comprises Devensian Till (Diamicton) and peat deposits. Small areas of Alluvium, comprising clay, silt, sand and gravel, are present in proximity to the burns and watercourses at the Site. There are also small areas of hummocky (moundy) glacial deposits (Diamicton). Large areas of the Site have no superficial deposits mapped. This is shown in **Figure 8.3 (EIAR Volume 3a)**.

8.3.18 The underlying bedrock across the Site comprises Portpatrick Formation (Wacke) to the north of Leadhills, Kirkcolm Formation (Wacke) in the northwest portion, and Shinnel Formation (Wacke) in the southeast portion of the Site. There are small areas of Crawford Group (Chert) which is faulted, shown crossing the Site in a northeast to south westerly direction, and this comprises lava, chert, tuff and mudstone succession. This is shown in **Figure 8.4 (EIAR Volume 3a)**.

8.3.19 A review of the NatureScot Carbon and Peatland 2016 map[4], an extract of which is shown on **Figure 8.7 (EIAR Volume 3a)**, confirms the Site is predominantly overlain by mineral soils and 'Class 4' soils, which are defined as 'mineral soils with some peat present' and do not typically support peatland habitats.

8.3.20 Large areas of 'Class 3' soils are found across the Site, which typically are carbon-rich soils, with some areas of deep peat. Multiple discreet areas of 'Class 1' peatland are also identified across the Site. Class 1 soils are defined as nationally important carbon-rich peatland soils, deep peat and priority peatland habitat and likely to be of high conservation value. Smaller areas of 'Class 5' are also shown, defined as areas of peat soil where soil information takes precedence over vegetation data. No peatland habitat was previously recorded in these areas, which may also include areas of bare soil.

8.3.21 The Scotland's Environment Map online viewer[15] shows a Geological Conservation Review Site and Site of Special Scientific Interest (SSSI) located in the northeast portion of the Site known as Raven Gill, which has been designated for its geological importance and covers an area of 6.66 ha. The designated area includes rocks and exposures of Arenig – Llanvirn age, representing the British geological record of Earth history from about 483 to 460 million years ago (Ma)131. No aspect of the Proposed Development is proposed within this area.

8.3.22 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.

8.3.23 A review of aerial imagery and online historical maps indicate that areas of the Site have been used for lead mining.

8.3.24 The Mining Remediation Authority Map Viewer indicates that there are Abandoned Mines Catalogue sites present, covering both surface and deep mining operations, which depict areas of coal and other mineral extraction and the point of entry into these workings located within or in proximity to the Site. Leadhills is identified as having several abandoned mines located around the village.

8.3.25 A mining risk assessment (**Technical Appendix 8.8, EIAR Volume 4**) has been undertaken, which identified that historically the Leadhills Estate was subject to lead (and more historically gold) mining activity with evidence of disused mines and mining assets extensive on parts of the Estate. Abandoned mines and their associated mining assets may represent potential sources of ground instability and soil and water contamination.

8.3.26 Historically, the Leadhills Estate was subject to lead and gold mining activity from the 16th century through to the 20th century and evidence of disused mines and mining related assets are visible on and adjacent to the Site. Abandoned mines and their associated mining assets may represent potential sources of ground instability (through potential collapse leading to surface subsidence) and soil and water contamination and represent risks to both the integrity of the permanent engineering works and construction health and safety.

8.3.27 The main area of recorded mining activity in the locality is around the villages of Leadhills and Wanlockhead. The mines around these villages were rich in lead with extensive underground workings and were operated virtually continuously from the 17th Century to 1934. There were, however, mining activities undertaken in the surrounding hills from earlier periods. The earlier workings predate the legal requirement for the deposition of mine plans on the abandonment of a mine and, as such, records of mining activities are often lacking. The presence of mining activities on and adjacent to the Site appears to be limited to the slate quarry at Glenochar and small-scale quarrying shown on the eastern slopes of Watchman Hill.

8.3.28 The mineralisation in the Leadhills and Wanlockhead area is found in mineral veins, covering an area approximately 3 km wide and stretching for approximately 8 km in a north-east to south-west direction, orientated parallel to the strike of the rock. The veins are vertical or very steeply dipping and the majority strike north north-west to south south-east, with widths generally about 1 m, although in some cases mineralised veins of up to 5 m have been recorded.

8.3.29 It is recorded that the richest portion of the veins are present within the greywacke of the Portpatrick Formation, due to the more brittle nature of this type of rock causing more open fracture lines forming when the rock was folded, and thereby allowing increased percolation of mineral bearing solutions.

8.3.30 The primary ore to be found in the area is galena (lead sulphide) although sphalerite (zinc sulphide) has also been extracted in the area but to a much more limited extent.

8.3.31 Chalcopyrite (copper sulphide) has also been recorded to be present, but only very rarely at an economic grade. Alluvial gold has also been an important economic mineral but has not been encountered in the veins themselves.

Peat Depth and Characteristics

8.3.32 Findings of the peat depth surveys are presented in **Technical Appendix 8.5 (EIAR Volume 4)**. In summary, a total of 897 peat depth probes were taken during the Stage 1 peat survey, and 8,118 peat probes during Stage 2. This resulted in a combined peat depth dataset of 9,015 probes.

8.3.33 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 83% of samples).

8.3.34 In accordance with the Peatland Survey Guidance[22], 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.

8.3.35 Based on this definition, 83% of samples recorded organic layers of less than or equal to 0.5 m or were absent of peat. Further, approximately 97% of the peat depth probes recorded peat depths less than or equal to 1 m depth.

8.3.36 The peat depth survey results for the Site are summarised as follows:

- 697 no. samples (8.6%) located on land with no peat present;
- 6,044 no. samples (74.5%) located on land with > 0.05 m and ≤0.5 m depth of peat or organo-mineral soil;
- 1,118 no. samples (13.8%) located on land with >0.5 m and ≤1.0 m depth of peat;
- 184 no. samples (2.3%) located on land with >1.0 m and ≤1.5 m depth of peat;
- 45 no. samples (0.6%) located on land with >1.5 m and ≤2.0 m depth of peat; and

- 30 no. samples (0.4%) located on land with >2.0 m and <4.0 m depth of peat.

8.3.37 The maximum peat depth recorded during the Stage 2 surveys was 3.7 m and the average (mean) was 0.36 m. The maximum and mean peat depth of the entire data set including data outside the Proposed Development was 5.4 m and 0.37 m respectively. The peat depth interpolated contours are shown on **Figure 8.6 (EIAR Volume 3a)**.

8.3.38 Most of the infrastructure of the Proposed Development has been located in areas where the peat depth is expected to be absent or 0.5 m or less. This includes all of the turbines and their associated hardstanding areas, with the exception of turbines T6 and T10, where the peat depth is expected to be up to 0.51 m and 0.53 m respectively.

8.3.39 The peat depth beneath the proposed substation and BESS compound, and the borrow pits and borrow pit search areas are located in areas with peat depths of 0.5 m or less.

8.3.40 There are areas of deeper peat within the Site that interface with sections of the proposed permanent access tracks, specifically the area west of T16 where it has not been possible to completely avoid deep peat. Floating track has been proposed in this area to minimise disturbance and excavation of peat in this section.

8.3.41 The peat across the Site is generally fibrous in nature, with the majority of the samples assessed as having low to moderate fine fibre content (F1-F2) becoming low fine fibre with depth. Low to high coarse fibre content (R1 to R3) was recorded in the acrotelmic peat becoming low to moderate with depth.

8.3.42 The results of the Von Post classification indicate that the majority of the samples tested scored between H5 and H8, indicating moderate to strong rates of decomposition.

8.3.43 The mean water content of the peat at all sample locations was typically moderately wet (B3).

Peat Geomorphology

8.3.44 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 8.7 (EIAR Volume 4)**, were subsequently verified during a Site walkover and survey undertaken by an experienced peatland geotechnical engineer in 2025.

8.3.45 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.

8.3.46 It is estimated that the borrow pits would generate approximately 165,750m^3 of stone for use in the construction (e.g., access tracks / hardstandings) of the Proposed Development. It is estimated that approximately 9,316 m^3 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 8.6, EIAR Volume 4**).

Future Baseline

8.3.47 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.

8.3.48 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. These climate change factors have been taken into account when considering the potential for significant effects.

8.3.49 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

8.3.50 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 8.6**, together with their associated sensitivity.

Table 8.6: Summary of Sensitive Receptors

Receptor	Sensitivity	Justification
Watercourses and Surface Water Features	High	Watercourses crossing the Site, access track and adjacent to the Site boundary are considered to be of high sensitivity based on the water quality and hydrological characteristics.
Flood Risk Status	High	Changes to flood risk within a catchment as a result of Proposed Development could, if not appropriately mitigated, increase the flood hazard to existing land uses.
Private Water Supplies	High	There is the potential for construction activity to result in alteration to hydrological and hydrogeological conditions, which could lead to impacts on water supplies.
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 Directive, 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 Map 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 8.5 (EIAR Volume 4**).

Table 8.6: Summary of Sensitive Receptors		
		The definitions of shallow and deep peat used for this assessment align with those used by the Soil Survey of Scotland[25]. 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.
Mining and contamination	Low (locally Medium or High)	Effects of the Proposed Development on mining and associated contamination risks to human receptors have been considered, and vary across the Site depending on the sensitivity. Whilst most of the Site is considered to be of Low sensitivity (where 'the presence of mineralisation is not expected and there is a very low likelihood of mining having taken place there is a negligible to low risk of ground instability due to former mining activities'), there are areas of Medium and High sensitivity. Medium sensitivity is where 'there is potential for mineralisation and localised exploration features are present but more extensive mining is not recorded and not expected. There is a low to medium risk of ground instability from former mining activities'. Areas of High sensitivity are defined by 'mining and/or exploration features are recorded in the vicinity with a high likelihood of additional features being present. There is a medium to high risk of ground instability from former mining activities' and where there is 'extensive mining recorded, and numerous mining features present are recorded and visible on Site. There is a high to very high risk of ground instability from former mining activities'.

8.4 Embedded Mitigation

8.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2** and **Chapter 3 (EIAR Volume 2)**.

8.4.2 A summary of the embedded and standard mitigation considered for the hydrology, hydrogeology, geology and soils assessment is set out below.

Design Mitigation

8.4.3 The Proposed Development has been subject to a number of design iterations and evolution in response to constraints identified as part of the baseline studies, intended to reduce environmental effects.

8.4.4 The design of the Proposed Development has been set out such that the number of watercourse crossings shall be minimised. Detailed design of new watercourse crossings would

[25] 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

seek to maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath. Watercourse crossings would also be designed to 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).

8.4.5 Where upgrades to or new watercourse crossing are proposed, standard best practice measures would be implemented at these locations prior to the commencement of construction. This would include designing and constructing any crossings in alignment with the 1 in 200 (0.5%) AEP event, with appropriate allowances for climate change made. Each crossing would be designed to ensure there would be no increase in flood risk elsewhere, in line with SEPA requirements. The crossing would be regulated under the Environmental Authorisations (Scotland) Regulations 2018 (EASR) and, as a minimum, would be required to comply with the Standard Conditions for crossings which involve engineering works on the banks. SEPA will not authorise this activity if it poses an unacceptable risk to the environment.

8.4.6 With specific regard to the crossing associated with the Glengonnar watercourse, the associated bridge is currently at indicative design stage only. It is currently anticipated that the bridge would comprise a large bottomless culvert to convey the active watercourse channel (with engineering works on the banks only and avoiding the channel bed). There may also need to be a series of smaller pipes beneath the road either side of the culvert where road levels may be raised above existing ground, if additional conveyance capacity for out-of-bank flows in flood conditions is required. The design of the bridge and assessment of potential consequences to flood risks would be completed at detailed design stage and would be subject to further consultation with and approval by SEPA prior to commencement of works. As is the case for other crossings, the crossing of the Glengonnar watercourse would be regulated under the EASR and, as a minimum, would be required to comply with the Standard Conditions for crossings which involve engineering works on the banks. SEPA would not authorise this activity if it were to pose an unacceptable risk to the environment.

8.4.7 The Proposed Development would incorporate a drainage design using SuDS principles in accordance with The SuDS Manual (C753) 2015[26]. These would be maintained to ensure their effective capacity remains for the lifespan of development.

8.4.8 The design process aimed, as far as practicable, to avoid areas of deeper peatland (greater than 1.0 m) in accordance with the peat hierarchy in NPF4 Policy 5, blanket bog and wet modified bog, and potential high GWDTEs for the location of turbines and other infrastructure.

8.4.9 Floating access tracks have been proposed in areas where new access tracks are located over deep peat.

8.4.10 The design process has taken into account mining and contamination risk through locating the Proposed Development outside the areas identified as being of high risk.

Construction Phase Mitigation

8.4.11 Details of construction phase, SuDS would be included in the Pollution Prevention Plan (PPP) and the final CEMP, as required, to provide a surface water management and treatment train that would mitigate potential adverse impacts on the hydrology of the Site and surrounding areas during the construction phase of the Proposed Development. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. A full SuDS solution would be developed prior to construction. Construction site

[26] URL: https://www.susdrain.org/resources/SuDS_Manual.html [Accessed January 2026]

plans and proposed drainage measures would form a PPP that would be compiled by the Principal Contractor.

8.4.12 At the limited number of locations where a track is required to cross a watercourse, or where other infrastructure is necessary within 50 m of a surface watercourse, either as described in this Chapter or as identified by the Environmental Clerk of Works (ECoW), the installation of SuDS measures would be supervised by the ECoW during the construction phase of works. Any requirement for monitoring of water quality within watercourses downstream of the Proposed Development would be approved in consultation with SEPA. Procedures for this would be detailed in the CEMP. Stockpiling of materials, if necessary, would be avoided in areas where SEPA mapping suggests a fluvial flood risk and a mechanism would be in place to temporarily cease operations in the event of an extreme weather warning or flood warning being issued.

8.4.13 All proposed borrow pit locations, construction compounds, the BESS location, the substation, turbine locations and associated turbine hardstands are all located outwith a 50m buffer from watercourses and waterbodies. Any location where tracks or enabling works are proposed within 50 m of a watercourse would be specifically identified within the CEMP. Measures that would be overseen by an ECoW at these locations would include:

- the installation of silt fences at the downslope extent of works;
- the installation of SuDS measures to prevent the uncontrolled release of sediment laden water from areas on which construction is being carried out (in line with other locations);
- existing cut of ditches upslope of the existing track would remain in situ and cross drains would be extended to take into account the widening of the track. This would ensure the continued conveyance of clean surface water runoff to downslope areas (in line with construction methodology for all areas of track upgrades; and
- works would remain outside of a 15 m buffer from watercourses and waterbodies in line with the SEPA Recommended Riparian Buffer.

8.4.14 A Borrow Pit Assessment (BPA) is provided in **Technical Appendix 2.2 (EIAR Volume 4).** The BPA sets out measures that would be implemented for the management of striping and preparation, excavation and crushing and screening of material. Additionally the BPA sets out high level requirements for drainage of proposed borrow pits, including management of surface water and the requirement for further ground investigation that would determine the flow capacity of the bedrock and confirm requirements for any required groundwater management.

8.4.15 An outline PMP is provided in **(Technical Appendix 8.6 (EIAR Volume 4**)), which provides details of best practice peat management measures that would be followed during construction.

8.4.16 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. 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 8.6, EIAR Volume 4**).

8.4.17 Micrositing tolerances would be used in the event of encountering unexpected pockets of deep peat. All micrositing would be supervised by a ECoW or suitably appropriately experienced engineer.

8.4.18 Standard mitigation measures for managing peat slide risk are detailed in **Technical Appendix 8.7 (EIAR Volume 4)**. These measures would be included in the detailed PMP.

Operation Phase Mitigation

8.4.19 A site maintenance programme with regard to site plant and infrastructure would be implemented by the Principal Contractor.

8.4.20 A maintenance schedule would be developed for all SuDS and drainage assets installed at construction stage to ensure that the function and benefit provided by the asset remains for the lifetime of the Proposed Development.

Decommissioning Phase Mitigation

8.4.21 It is anticipated that at the time of decommissioning, a CEMP would be implemented by an 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.

8.4.22 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.

8.4.23 Additional mitigation comprises additional mitigation measures which have been included to further reduce the magnitude of impact / significance of effect identified through the EIA.

8.4.24 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 Surface Water Flows and Runoff

8.5.1 There could be a potential for the introduction of hardstanding surfaces, 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. The potential for adverse impact on runoff volumes and rates and fluvial morphology through the alteration of drainage patterns would be mitigated during construction through the implementation of best practice measures as outlined and set out in the CEMP. The design of watercourse crossings associated with infrastructure would be in line with the EASR and set out in a Construction Site License in consultation with SEPA and SLC. Where encroachment to within a 50 m buffer from watercourses has been identified, additional mitigation measures have been set out to further reduce the potential magnitude of alteration to surface water flows and runoff to **Small**. Therefore, the residual effect on Watercourses and Surface Water Features (**High** sensitivity) would be **Minor** and **Not Significant**.

Sedimentation and Increased Erosion Rates

8.5.2 The potential for adverse impact on water quality and fluvial morphology associated with sediment-laden runoff or impacts on bank integrity is taken into account in the design of the Proposed Development and the maintenance of a suitable buffer to watercourses from areas in which infrastructure is proposed. Furthermore, SuDS design shall ensure the capture of any additional sediment load that could be released in the construction phase. Where a section of access track is proposed within a 50 m buffer of a watercourse, the implementation of additional sediment control measures would be overseen by the ECoW, who would also carry out daily inspection of sediment control measures and the watercourse such that the magnitude of impact associated with Sedimentation and Increased Erosion Rates would be **Small**. Therefore, the residual effect on Watercourses and Surface Water Features (**High** sensitivity) would be **Minor** and **Not Significant**.

Impacts on Fluvial Flows (and associated flood risks) as a Result of Watercourse Crossings (Upgrades to Existing or New Crossings)

8.5.3 It is expected that upgrades to the existing watercourse crossings will be needed in order to improve the quality and condition of the existing culverts. As such there is the potential for disruption of flows in the watercourse channels during construction of the crossings.

8.5.4 As set out in Paragraphs 8.4.5 and 8.4.6, the upgraded crossings would be designed with sufficient conveyance capacity to accommodate the 1 in 200 year plus climate change event to avoid increases in flood risks during this event. Associated upgrade works would be undertaken following best practice procedures, to be set out in the CEMP, and conditions would be returned to ‘as before’ conditions once construction works have ceased in accordance with the Standard Conditions for such works mandated under the EASR. Therefore, the detailed design, to be agreed with and approved by SEPA, would ensure that the magnitude of impact of fluvial flows as a result of watercourse crossings would be **Small**. Therefore, the residual effect on the Flood Risk Status of adjacent land (**High** sensitivity) would be **Minor** and **Not Significant**.

Chemical Pollution

8.5.5 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. However, pollution prevention measures would be implemented through the CEMP and the PPP in order to prevent the release of pollutants to the water environment. In the unlikely event of an accidental release of potentially contaminative material, clean up procedures set out in the CEMP would be followed and SEPA would be notified of any release of pollutants to controlled waters. Therefore, the magnitude of impact associated with Chemical Pollution would be **Small**. Therefore, the residual effect on Watercourses and Surface Water Features (**High** sensitivity) would be **Minor** and **Not Significant**.

Potential for loss/disturbance to peat and carbon rich soils

8.5.6 The Proposed Development has the potential to affect 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, substation, BESS and access tracks.

8.5.7 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 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**).

8.5.8 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.

8.5.9 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 micrositing within defined tolerances, reduced excavation, and the use of floating road construction where suitable engineering criteria are met, for example shallow topography (below 5%).

8.5.10 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

8.5.11 A PHLRA has been undertaken for the Proposed Development (refer to **Technical Appendix 8.7, EIAR Volume 4**) has been undertaken for the Proposed Development. This concludes that the Site is considered to be low or very low risk with regards to peat slide risk with the exception of eight track locations which are considered to be Moderate.

8.5.12 It is considered that the standard best practice mitigation measures included within **Technical Appendix 8.7 (EIAR Volume 4)** would be sufficient to provide mitigation for very low and low risk areas of the Site.

8.5.13 In the absence of further specific mitigation the risk level of peat land slide would remain as **Moderate** adverse **(Significant)** for the eight track locations. Further details on specific mitigation for these areas are detailed in **Technical Appendix 8.7 (EIAR Volume 4)**.

Mining Risk and Contamination

8.5.14 A mining and contamination assessment has been undertaken for the Proposed Development (refer to **Technical Appendix 8.8, EIAR Volume 4**). The turbines, access tracks and other infrastructure has been located outwith areas where there are increased risks associated with relict mining activity, ground stability and contamination where practicable, particularly those areas defined as 'extensive mining recorded, and numerous mining features present are recorded and visible on site. There is a high to very high risk of ground instability from former mining activities' and 'mining and/or exploration features recorded in the vicinity with a high likelihood of additional features being present. There is a medium to high risk of ground instability from former mining activities' (denoted as 'black' or 'red' zones respectively in **Technical Appendix 8.8, EIAR Volume 4**).

8.5.15 Some infrastructure, namely Turbines 12, and 15 to 21 and associated access tracks are located in parts of the Site where 'there is the potential for mineralisation and localised exploration features are present but more extensive mining is not recorded and not expected. There is a low to medium risk of ground instability from former mining activities' (denoted as 'amber' zone in **Technical Appendix 8.8, EIAR Volume 4**). These areas are considered to be **Moderate** adverse **(Significant)** in the absence of mitigation. Further details on specific mitigation for these areas are detailed in **Technical Appendix 8.8 (EIAR Volume 4)**.

8.5.16 Due to the age and relatively small scale of the workings, waste material from the mining activities appears to be generally localised to the proximity of the shafts and adits. It is likely that this spoil will have arisen mainly from the excavation of the shaft or adit itself and is country rock or low-grade ore. Subsequently, the ore extracted from the vein would have been sorted initially underground and only the material that appeared to contain payable grades of lead transported to surface. Once on the surface, rich pieces of ore would have been picked out and the remainder 'dressed' by crushing and washing to remove the galena from the waste to form an ore concentrate. This concentrate would then be smelted to form lead ingots.

8.5.17 Notwithstanding the above, it is likely that any spoil tips would have some levels of lead, and quite likely other heavy metal contamination. As mentioned above, dressing of the lead ore is also likely to have been undertaken in the vicinity of the shafts and adits resulting in areas of soil contamination. Due to the proximity of the mining areas to watercourses, it is possible that the tips are contributing to elevated levels of heavy metals within the watercourses.

Potential Operational Effects

Impacts on Watercourses and Surface Water Features as a result of Alteration to Surface Water Flows and Runoff, Sedimentation and Increased Erosion, or Chemical Pollution

8.5.18 Periodic maintenance of access tracks, drainage systems and turbines is anticipated throughout the operational phase. Occasional maintenance and repair of turbines 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.

8.5.19 Any resulting impacts are expected to mirror potential construction impacts but with reduced magnitude and spatial extent. Where maintenance constitutes construction-type activity, the mitigation measures specified in the approved final CEMP would be implemented and enforced via a long-term operational management plan to ensure no significant adverse effects. Therefore, whilst the sensitivity of watercourses at the Site is assessed to be High, taking in to account embedded mitigation by design (including the maintenance of SuDS features in line with a maintenance plan and suitable management of materials handling), the magnitude of impact would be **Small** and therefore have the potential to result in a **Minor** and **Not Significant** effect.

Potential for Loss/Disturbance to Peat and Carbon Rich Soils

8.5.20 There are not anticipated to be any impacts on loss/disturbance to peat further to those identified during the construction phase; therefore, no adverse effects during operation are predicted.

Peat Slide Risk

8.5.21 The PHLRA (refer to **Technical Appendix 8.7, 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 **Technical Appendix 8.7 (EIAR Volume 4**).

8.5.22 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.

Mining Risk and Contamination

8.5.23 The mining assessment (refer to **Technical Appendix 8.8, EIAR Volume 4**) concludes that the majority of the Site is considered to be low or very low risk with regards to mining risk, following the implementation of specific mitigation during the design and construction (with reference to the specific mitigation requirements detailed in **Section 8.8**).

8.5.24 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.

Potential Decommissioning Effects

8.5.25 While the risks to water resources are similar to those identified during the construction phase, decommissioning shall additionally 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.

8.5.26 During the decommissioning phase there is the potential for construction activity to impair the condition of hydrological and hydrogeological resources on and downstream of the turbine array. NatureScot commissioned research[27] identifies potential risks to the ground and surface water environment; these may include the potential for:

- bank instability and increased erosion leading to effects on the quality of aquatic habitats and ecology;
- establishing rapid drainage paths leading to the potential for increased pollution extent;
- the drainage of water dependent habitats;
- sedimentation and pollution from suspended materials leading to effects on fisheries and protected habitats/ species;

[27] Nature Scot, 2026. Guidance - Decommissioning and Restoration Plans for wind farms. Version 2. Available online: https://www.nature.scot/doc/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016

- spills of fuels and oils from vehicles, turbine gearboxes and transformers leading to effects on fisheries and protected habitats/ species; and
- soil compaction leading to increased runoff and erosion potential.

8.5.27 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 Effects

8.5.28 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 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 wind turbine array; 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.

8.5.29 Operational schemes are assessed as part of the baseline conditions within the Desktop study area.

8.5.30 **Table 8.7** details the cumulative developments (from those defined in **Chapter 4, EIAR Volume 2**) that have been assessed on the basis of their potential for hydrological interaction with the Proposed Development (i.e. within a shared catchment).

Table 8.7: Cumulative developments (Consented/In planning) considered to have hydrological connection to the Proposed Development

Site	Current planning status	Distance and Direction from the nearest proposed turbine	Catchment (nearest downstream watercourse in shared connection)
M74 West	Application	5.76 km, north	Clyde (Duneaton Water)
Priestgill	Under Construction	5.72 km northeast	Clyde
Lion Hill	Consented	8.92 km southeast	Clyde

Potential Cumulative Construction Effects

8.5.31 Potential cumulative environmental impacts to water resources have been assessed where concurrent proposed wind farm sites or construction activity may be in hydrological connection with the Proposed Development, or water resource receptors.

8.5.32 As the identified schemes are in excess of 5 km from the Proposed Development and as in the majority of cases the cumulative schemes are in shared connection to the large Clyde catchment, it is considered very unlikely that cumulative effects would occur due to concurrent construction phases of wind farm developments. All the 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 authorisation by SEPA and the implementation of construction environmental management procedures. Therefore, there would be no cumulative effects on the water environment during the construction phase.

Potential Cumulative Operational Effects

8.5.33 The potential for impacts on the water environment is significantly lower during the operational phase of the Proposed Development and cumulative schemes assessed above. At all cumulative schemes, 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.

Potential Cumulative Decommissioning Effects

8.5.34 All the developments considered above would be subject to the same planning and regulatory requirements as the Proposed Development regarding the protection of the water environment. At each site, this would include the management of decommissioning activities under an authorisation by SEPA and the implementation of environmental management procedures. Therefore, there would be no cumulative effects on the water environment during the decommissioning phase.

8.6 Additional Mitigation and Enhancement Measures

8.6.1 As described above, the Proposed Development has been subject to a number of design iterations and evolution in response to constraints identified as part of the baseline studies, which were intended to reduce environmental effects.

Peat Management

8.6.2 Further specific mitigation is proposed in relation to potential effects on peat and carbon rich soils, in line with the principles of the mitigation hierarchy under National Planning Framework 4, Soils, Policy 5[28]. 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 and enhancement of some of the currently degraded peatland habitats present on the Site as set out in the Outline Biodiversity and Enhancement Management Plan (OBEMP) (**Technical Appendix 6.7, EIAR Volume 4**).

8.6.3 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 8.6, EIAR Volume 4**).

8.6.4 At this stage it is estimated that the Proposed Development would result in the excavation of approximately 122,396 m^3 of peat including peaty/organo-mineral soils. (comprising approximately 122,184 m^3 acrotelmic peat and 212 m^3 of catotelmic peat).

[28] Scottish Government, National Planning Framework 4. Available at https://www.gov.scot/publications/national-planning-framework-4/ [Accessed June 2026]

8.6.5 Potential reinstatement opportunities for excavated peat, comprising temporary infrastructure reinstatement, and borrow pit restoration are estimated to be 239,533 m^3, which demonstrates that all excavated peat can be reused for reinstatement opportunities.

8.6.6 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.

Water Environment and Ground Conditions

8.6.7 It is expected that upgrades to the existing watercourse crossings would be needed in order to improve the quality and condition of the existing culverts. As such there is the likelihood of environmental disruption in the area and an increase of sediment leaching into the watercourse. As such, additional mitigation measures may be needed once construction has ceased. This mitigation would be in the form on re-occurring water quality monitoring in order to observe any lasting effects on the watercourses.

8.6.8 As stated in **Technical Appendix 8.8 (EIAR Volume 4)** ground investigation would be undertaken pre-construction to confirm ground conditions at each turbine location and other infrastructure associated with the Proposed Development. This would also include a detailed mining assessment to understand what micrositing maybe required.

8.6.9 Existing spoil tips present at the Site are to be avoided and left undisturbed, and fenced off during construction to prevent accidental disturbance. Areas of spoil and other made ground are not suitable for providing suitable founding formations, and would require removal with the subsequent handling and waste licensing implications if excavated.

8.6.10 Any disturbance of this material may also cause re-activation of the contaminants and increased levels of pollution. Soil testing would be undertaken during the pre-construction ground investigation to ascertain the potential presence of any waste materials, and sampling and testing of them carried out to determine their status.

8.6.11 A water quality monitoring programme would be undertaken by the Principal Contractor pre-construction, during and post construction to demonstrate that the development does not cause water pollution, or if pollution does occur, to enable its cause to be identified mitigation action taken.

8.6.12 No additional mitigation is expected to be required during the decommissioning phase.

8.7 Assessment of Residual Effects

Residual Construction Effects

8.7.1 The assessment has identified that there is no potential for significant effects on the water and soils environment arising from the Proposed Development, taking in to account mitigation measures implemented during 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 is no potential for significant effects on the water and soils environment arising from the Proposed Development, taking in to account mitigation measures implemented during 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.

8.7.4 It is therefore considered that the residual effect would be **Negligible** and **Not Significant**.

Residual Cumulative Effects

8.7.5 No significant residual cumulative effects to hydrological and/or geological receptors are anticipated during the construction phase as a result of the proposed development and the

8.7.6 The potential for impacts on the water environment is significantly lower during the operational phase of the Proposed Development and cumulative schemes assessed above. At all cumulative schemes, drainage design for the implementation of SuDS measures would prevent alteration of runoff rates and hydrological conditions in the surrounding area.

8.7.7 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.

8.7.8 All the developments considered above would be subject to the same planning and regulatory requirements as the Proposed Development regarding the protection of the water environment. At each site, this would include the management of decommissioning activities under an authorisation by SEPA and the implementation of environmental management procedures.

8.7.9 Therefore, there is considered to be a very low likelihood of cumulative impacts during the decommissioning phase of the Proposed Development. The potential magnitude of cumulative impacts during the decommissioning phase would be small and therefore likely to result in a **Minor and Not Significant** effect.

8.8 Monitoring

Construction Phase Monitoring

8.8.1 Best practice monitoring measures would be set out in the CEMP and PMP to be prepared and implemented by the Principal contractor. These plans would be secured through a suitably worded planning condition and submitted to the LPA for approval.

8.8.2 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. As works are set to be instructed under best practice conditions, it is anticipated that no further monitoring will be needed during the construction phase.

8.8.3 Water quality monitoring would be undertaken during pre-construction and construction to confirm whether there are changes to water quality, specifically heavy metals, from the Proposed Development. This would be included as a specific management plan within the CEMP and prepared and implemented by the Principal Contractor. These plans would be secured through a suitably worded planning condition and submitted to the LPA for approval.

Operational Phase Monitoring

8.8.4 Additional water quality monitoring may be required in order to observe the watercourse that cross the access track, in order to determine the conditions of the wider hydrological area, once watercourse crossing upgrades have been completed.

8.8.5 During operation, monitoring of key infrastructure locations would continue via 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.

8.8.6 Water quality monitoring would be continued through operation to monitor changes to water quality, specifically heavy metals, from the Proposed Development.

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 the LPA for approval and secured as part of a suitably worded planning condition.

8.8.8 As works are set to be instructed under best practice conditions, it is anticipated that no further monitoring will be needed during the decommissioning phase.

8.9 Summary

8.9.1 Table 8.8 below provides a summary of the potential significant effects of the Proposed Development on hydrology, hydrogeology and geology and summarises the additional mitigation proposed.

Table 8.8: Summary of Potential Significant Effects

Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
Construction			
Potential for loss/disturbance to peat and carbon rich soils including peat landslide hazards	Preparation and implementation of CEMP.	Submitted to LPA for approval in consultation with SEPA.	Negligible (Not Significant)
	Implementation of detailed PMP to be prepared by the Principal Contractor.	Detailed PMP, PLHRA and CEMP to be submitted to and approved by the LPA, in consultation with SEPA.	Negligible (Not Significant)
	Implementation of good practice and specific mitigation measures as outlined by the PLHRA. Undertake periodic monitoring during construction.	The construction Contactor should follow specific and general good practice mitigation measures as provided in **Technical Appendix 8.7 (EIAR Volume 4).**	Negligible (Not Significant)

Table 8.8: Summary of Potential Significant Effects			
Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
Mining and Contamination	Targeted ground investigation to be undertaken pre-construction by the Principal Contractor to include a detailed mining assessment for the Proposed Development, and micrositing undertaken where necessary.	The Principal Contractor to undertake the ground investigation supported by an experienced mining professional to undertake mining assessment.	Negligible (Not Significant)
	Implementation of water quality management plan and water monitoring during pre-construction and construction.	Detailed CEMP to be submitted to and approved by the LPA, in consultation with SEPA.	Negligible (Not Significant)
	Implementation of measures to minimise disturbance of contaminated soils. To be managed through preparation of a detailed soils plan in the CEMP.	Detailed CEMP to be submitted to and approved by the LPA, in consultation with SEPA.	Negligible (Not Significant)
Operation			
Mining and Contamination	Water quality monitoring during operation phase to monitor presence of heavy metals.	Site maintenance works to be carried out under long-term operational management plan.	Negligible (Not Significant)
Decommissioning			
N/A	N/A	N/A	N/A
Cumulative construction			
N/A	N/A	N/A	N/A
Cumulative operation			
N/A	N/A	N/A	N/A

9 Traffic and Transport

9.1 Introduction

9.1.1 This chapter considers the likely significant effects on traffic and transport associated with the construction, operation and decommissioning of the Proposed Development.

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 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.

9.1.3 The author of this chapter is Elaine Moran BEng (Hons), MSc, who is 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 five years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms and other energy generation and distribution projects in the UK. Elaine is a Member of the Chartered Institution of Highways and Transportation (MCIHT).

9.1.4 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.

9.1.5 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
- Figure 9.1: Study Area;
- Figure 9.2: Traffic Count Locations;
- Figure 9.3: Personal Injury Accident Plan; and
- Figure 9.4: Abnormal Indivisible Load Route Plan.
- Volume 4: Technical Appendices
  - Technical Appendix 9.1: Transport Assessment; and
  - Technical Appendix 9.2: Outdoor Access Management Plan.

9.1.6 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 The assessment is presented with reference to specific 'areas' of the Site within the application boundary. These areas comprise the western and eastern areas and associated access routes, as described in **Chapter 2: Description of the Development**.

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 Impacts 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)[1];
- South Lanarkshire Local Development Plan 2 (2021)[2];
- South Lanarkshire Local Development Plan 2 – Supporting Planning Guidance: Renewable Energy (2021)[3];
- Institute of Environmental Management and Assessment (IEMA) (now ISEP), Environmental Assessment of Traffic and Movement (2023)[4];
- IEMA (now ISEP), Guidelines for the Environmental Assessment of Road Traffic (1993)[5];
- IEMA (now ISEP) 'Guidelines for Environmental Impact Assessment' (2005)[6];
- LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB) (2020)[7];
- 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]; and
- Transport Scotland, Transport Assessment Guidance (2012)[10].

[1] Scottish Government (2023), National Planning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/
[2] South Lanarkshire Council (2021), Local Development Plan 2. Available at: https://www.southlanarkshire.gov.uk/downloads/file/14534/ldp2_volume_1_document
[3] South Lanarkshire Council (2021), Local Development Plan 2 – Supporting Planning Guidance: Renewable Energy. Available at: https://www.google.com/search?q=%E2%80%A2+South+Lanarkshire+Local+Development+Plan+2+%E2%80%93+Supporting+Planning+Guidance%3A+Renewable+Energy
[4] Institute of Environmental Management and Assessment (IEMA) (2023), Environmental Assessment of Traffic and Movement.
[5] IEMA (1993), Guidelines for Environmental Impact Assessment of Road Traffic.
[6] IEMA (2005), Guidelines for the Environmental Assessment.
[7] Highways England, Transport Scotland, Welsh Government & Department for Infrastructure (2020), LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB).
[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". Available at: http://www.sias.com/2013/TS/201303NesaManual.pdf
[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

Consultation

9.2.5 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.

9.2.6 Full details of the consultation responses and the Applicant's response can be reviewed **in Technical Appendix 1.1 (EIAR Volume 4)**.

Potential Impacts Scoped Out

9.2.7 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, and are presented in **Table 9.1**.

Table 9.1: Impacts Scoped Out of the Assessment

Impact	Reasoning
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 Proposed Development is proposed. As such, the effects of operational traffic 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 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

9.2.8 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.

9.2.9 Locally sourced material would be used where feasible, and traffic would avoid impacting on local communities as far as possible.

9.2.10 Construction vehicles would enter the Site through B797 via newly provided access junctions, which would facilitate access to the eastern section and the western section of the Site. A crossing point would be provided on the C16 Crawfordjohn Road between the B797 and B740 at Crawfordjohn.

9.2.11 AIL delivery vehicles would access the Site via a newly provided temporary construction Site entrance from the A74(M), with a crossing of the B797 to access the western section. Empty AIL delivery vehicles would return to the road network via the B797 and A702, rejoining the M74 at Junction 14.

9.2.12 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:

- 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 a newly provided off-slip access junction on the A74(M) to the south of Junction 13 near Abington, which will provide direct access to the Site.

9.2.13 Based on the above, the Study Area for the assessment has therefore been assumed to be:

- The B797 Leadhills Road, between the A702 and Leadhills;
- The C16 Crawfordjohn Road, within the Site boundary;
- The A702, between Junction 13 of the M74 / A74 (M) and Junction 14 of the A74(M); and
- The M74 / A74(M) between Junctions 12 and 14.

9.2.14 The Study Area is presented in **Figure 9.1 (EIAR Volume 3a)**.

9.2.15 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.

9.2.16 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.

Desk Study

9.2.17 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

9.2.18 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 March 2026 to establish a baseline on the local road network.

Method of Assessment

Assessment of Potential Effect Significance

9.2.19 The ISEP 'Guidelines for Environmental Impact Assessment' (2005) notes that the ISEP Guidelines related to road traffic should be used for characterising the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. More recent guidance published by the ISEP, namely 'Environmental Assessment of Traffic and Movement' (2023) provides an update to the previously used guidance, 'Guidelines for the Environmental Assessment of Road Traffic' (1993) and this document has been used in the assessment and are referenced as ISEP Guidelines. The guidelines intend to complement professional judgement and the experience of trained assessors.

CRITERIA FOR ASSESSING SENSITIVITY OF RECEPTORS

9.2.20 The receptors are the users of the roads within the Study Area and the locations through which those roads pass.

9.2.21 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 9.2**.

Table 9.2: 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.
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.

9.2.22 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 9.2**. In these situations, professional judgement has been applied and justification for any changes provided.

Criteria for Assessing Magnitude of Change

9.2.23 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.

9.2.24 Examples of sensitive areas are presented in the ISEP Guidelines as hospitals, churches, schools, historical buildings, and tourist attractions . These locations are to be assessed in relation to "Rule 2".

9.2.25 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 **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 this appendix.

9.2.26 While not specifically identified, as more vulnerable road users, cyclists are considered in similar terms to pedestrians.

CRITERIA FOR ASSESSING SIGNIFICANCE

9.2.27 Table 3.7 of LA104 Environmental Assessment Methodology of the Design Manual for Roads and Bridges (DMRB) sets out four levels against which the magnitude of these impacts should be assessed – major, moderate, minor, and negligible (refer to **Table 9.3**).

Table 9.3: 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.

9.2.28 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 9.4**.

Table 9.4: 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

9.2.29 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.

9.2.30 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

9.2.31 Limitations to the assessment are as follows:

- There was no available traffic data along C16 Crawfordjohn Road on the Department for Transport (DfT) database. However, C16 Crawfordjohn Road is included as a sensitive receptor in the assessment of construction effects, as there will be a crossing point on this road. It should be noted that C16 Crawfordjohn Road is a narrow road and outwith Crawfordjohn, it does not provide access to residential properties. As such, it can be reasonably concluded that baseline traffic flows along this length of road are low and the magnitude of change will be high.

- 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

9.2.32 The following main assumptions have informed the assessment of effects:

- A construction programme of 18 months has been assumed.
- Based on grid connection date of 2036, construction is assumed to commence in 2035 and this 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.

9.2.33 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 on B797 Leadhills Road in the vicinity of the access to the eastern and western sections of the Site, such as footways in the immediate vicinity of the Site, reflecting its rural setting.

9.3.2 A review of SLC's Core Path network indicates that there are a number of Core Paths, Aspirational Core Paths and Wider Network Paths within the Site boundary, which are shown in **Technical Appendix 9.1 (EIAR Volume 4)** in **Figure 6** and further information is provided in the OAMP in **Technical Appendix 9.2 (EIAR Volume 4)**

9.3.3 Details of the path network within the Site boundary is outlined in **Table 9.5**.

Table 9.5: Path Network within the Site Boundary			
Reference	**Path Name**	**Path Type**	**Total Length (m)**
CL/5071/1	SL164 Abington - Lettershaws	Wider Network	310

Table 9.5: Path Network within the Site Boundary			
Reference	**Path Name**	**Path Type**	**Total Length (m)**
CL/5069/1	SL164 Abington - Lettershaws	Wider Network	1,175
CL/5067/1	SL164 Abington - Lettershaws	Wider Network	540
CL/5074/1	SL164 Abington - Lettershaws	Wider Network	1,855
CL/5073/1	SL164 Abington - Lettershaws	Wider Network	315
CL/5066/1	SL167 Track near Glencaple	Wider Network	600
CL/5064/1	SL165 Track Kirkton Rig-Glencaple	Wider Network	350
CL/5063/1	SL165 Track Kirkton Rig-Glencaple	Wider Network	855
CL/5055/1	SL165 Track base of Kirkton Rig	Wider Network	10
CL/5057/1	SL165 Track base of Kirkton Rig	Wider Network	560
CL/5034/1	Glentewing - Black Hill, Leadhills	Wider Network On Road	3,820
CL/5023/1	LMC past Glendowran Hill	Wider Network	735
CL/5701/1	Snar Farm-Leadhills	Aspirational Core Path	5,680
CL/3529/1	Hunt Law Leadhills-Snarhead	Core Path	3,170
CL/5015/1	SL135 Snar Water - Leadhill	Wider Network	2,920
CL/5689/1	Leadhills to Elvanfoot Dismantled Rlwy	Aspirational Core Path	8,600

* Approximate measurement – measured from OS mapping

9.3.4 In their Scoping Opinion response , ScotWays provided information on Public Rights of Ways (PRoWs) and Scottish Hill Tracks (see **Technical Appendix 1.1: Consultation Register (EIAR Volume 4)** for details). Upon review, the PRoWs and Scottish Hill Tracks are located along path routes as described in **Table 9.5**.

9.3.5 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.

9.3.6 With regards to cycling, a review of Walk Wheel Cycle Trust's (formerly Sustrans) National Cycle Network (NCN) map indicates that the closest 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. In relation to the Site, the closest section of NCN Route 74 in the vicinity of the B797 Leadhills Road / A702 priority junction, and is approximately 60 m from the Site boundary on the opposite side of the A74(M). This section of the NCN Route 74 comprises mainly an on-road route along the A702 within the Study Area.

Road Access

B797

9.3.7 The B797 is a two-way single carriageway road which is generally subject to the national speed limit (60 miles per hour (mph)), which reduces to 30 mph and 20 mph within Leadhills village. The B797 is generally in an overall reasonable condition, however, there are sections of deterioration on the road, which is visible from available online imagery. A cattle grid is located on the B797 approximately 2.5 kilometres (km) north of Leadhills village. The B797 is maintained by SLC.

C16 CRAWFORDJOHN ROAD

9.3.8 The C16 Crawfordjohn Road is a narrow two-way single carriageway road which is subject to the national speed limit within the Site boundary. The C16 Crawfordjohn Road is generally in an overall reasonable condition and includes passing places. It 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 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). To the south of the B797 Leadhills Road / A702 priority junction, there are cycle lane markings located along the road.

THE A74(M) / M74

9.3.10 The A74(M) / M74 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 Road Network. The A74(M) is maintained by Autolink on behalf of Transport Scotland and the M74 is maintained by Amey on behalf of Transport Scotland. The A74(M) / M74 is subject to a speed limit of 70 mph.

ROAD SUITABILITY

9.3.11 The Agreed Timber Route Map 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'.

9.3.12 '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.

9.3.13 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. Within the Study Area, the B797 and the A702 are considered as Agreed Routes, and C16 Crawfordjohn is considered a Consultation Route.

Existing Traffic Conditions

9.3.14 In order to assess the impact of the Proposed Development construction traffic on the Study Area, an Automatic Traffic Count (ATC) was undertaken over a seven-day period in March 2026. To complement the ATC survey, existing traffic count data was obtained from the DfT database and the TS database, with 2025 data utilised, where available.

9.3.15 The traffic count sites used were as follows:

i. B797, at Site Accesses (ATC);
ii. B797, north of Leadhills Village (DfT 804991);
iii. A702, north of Abington Village (DfT 80555);
iv. The A702, between Junction 13 of the M74 / A74 (M) and Junction 14 of the A74(M);
v. M74, south of Junction 12 (TS ATC6 11N & 11S); and
vi. A74(M), north of Junction 14 (TS ATC6 21N & 21S).

9.3.16 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).

9.3.17 A Tempro 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 2026. The Tempro low growth factor for 2025 to 2026 is 1.012.

9.3.18 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 9.6** summarises the Average Daily Traffic (ADT) traffic data collected and used in the assessment.

Table 9.6: Two-Way Average Daily Traffic Data (2026)

No.	Survey Location	Cars & Lights	HGV	Total
1	B797, at Site Accesses	371	75	446
2	B797, north of Leadhills	506	18	525
3	A702, north of Abington Village	1,819	114	1,933
4	A702, north of A702/Carlisle Rd/A74(M) Rbt	853	125	978
5	M74, south of Junction 12	23,320	12,131	35,451
6	A74(M), north of Junction 14	25,567	13,111	38,678

Please note minor variances may occur due to rounding.

9.3.19 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 9.7**.

Table 9.7: Speed Summary				
No.	**Survey Location**	**Mean Speed (mph)**	**85%ile Speed (mph)**	**Speed Limit (mph)**
1	B797, at Site Accesses	42.6	51.0	60.0
2	B797, north of Leadhills *	-	-	60.0
3	A702, north of Abington Village *	-	-	60.0
4	A702, north of A702/Carlisle Rd/A74(M) Rbt	-	-	60.0
5	M74, south of Junction 12 **	64.6	74.2	70.0
6	A74(M), north of Junction 14 **	67.4	76.3	70.0

**No speed data available from DfT database*

***Speed data from 2025 TS database*

9.3.20 Speed information from **Table 9.7**, suggests that the 85th percentile speeds recorded on the M74 and A74(M) are marginally above the posted speed limits. Police Scotland may wish to consider enforcement spot checks in these areas, if deemed necessary.

Accident Review

9.3.21 PIA data for the five-year period covering 01 January 2020 to 31 December 2024 was obtained from the online resource CrashMap[11] which uses data collected by the police about road traffic crashes occurring on British roads, where someone is injured.

9.3.22 TA Guidance[12] 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 B797 and A702 within the Study Area have not been identified as having a high accident rate, a five-year review has been undertaken to ensure a comprehensive assessment has been undertaken.

9.3.23 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.

[11] CrashMap (2025). Available at: https://www.crashmap.co.uk/Search
[12] UK Government (2014) Travel Plans, Transport Assessments and Statements Available at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements

9.3.24 A summary of the PIAs recorded within the Study Area are shown in **Table 9.8** and their locations are shown in **Figure 9.3 (EIAR Volume 3a)**.

Table 9.8: Personal Injury Accident Summary (within the Study Area)				
Location	**Slight**	**Serious**	**Fatal**	**HGV Incidents**
B797	2	1	0	0
A702	0	1	0	0
Total	**2**	**2**	**0**	**0**
Percentage of total accidents	**50%**	**50%**	**0%**	**0%**

9.3.25 A summary analysis of the incidents indicates that:

- A total of four accidents were recorded on the B797 and A702, within the Study Area, within the five-year period, which includes three accidents recorded on the B797 and one accident recorded on the A702;
- Of those three accidents recorded on the B797, two were classed as "slight", and one as "serious". There were no fatalities recorded;
- All three accidents recorded on the B797 involved cars. The two "slight" accidents were single vehicle accidents while the "serious" accident involved a collision between two cars;
- The closest accident recorded to the B797 Site access is approximately 1 km to the southwest of the western section's access;
- One accident was record on the A702, which involved a car and a motorcycle and resulted in a "serious" casualty;
- None of the recorded accidents involved HGVs; and
- None of the recorded accidents involved cyclists or pedestrians.

9.3.26 In general, there are no clusters of PIAs at any location in the assessed area or high numbers of accidents involving HGVs for example.

9.3.27 Based on the information available, it has been established that there are no specific road safety issues within the vicinity of the Proposed Development that currently require to be addressed or would be exacerbated by the construction of the Proposed Development.

Future Baseline

2035 Traffic Flows

9.3.28 Construction of the Proposed Development is estimated to commence during 2035 if planning permission is granted and is anticipated to last approximately 18 months depending on weather conditions and ecological considerations.

9.3.29 To assess the likely effects during the construction, base year traffic flows were determined by applying a Tempro low growth factor to the surveyed traffic flows. The Tempro low growth factor for 2026 to 2035 is 1.016. These factors were applied to the survey data to estimate the 2035 base traffic flows, as shown in **Table 9.9**. This forecast forms the baseline for the assessment of traffic and transport related effects in this chapter.

Table 9.9: Two-Way Average Daily Traffic Data (2035)				
No.	**Survey Location**	**Cars & Lights**	**HGV**	**Total**
1	B797, at Site Accesses	377	76	452
2	B797, north of Leadhills	515	18	533
3	A702, north of Abington Village	1,849	115	1,965
4	A702, north of A702/Carlisle Rd/A74(M) Rbt	867	127	994
5	M74, south of Junction 12	23,703	12,330	36,032
6	A74(M), north of Junction 14	25,986	13,326	39,312

Please note minor variances may occur due to rounding.

FUTURE BASELINE IN THE ABSENCE OF THE PROPOSED DEVELOPMENT

9.3.30 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

9.3.31 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 9.10**, together with their associated sensitivity.

Table 9.10: Summary of Sensitive Receptors		
Receptor	**Sensitivity**	**Justification**
B797 Users	Medium	Where the road is a local A or B class road, capable of regular use by HGV traffic.
Residents along B797	Negligible	Where a location includes individual dwellings or scattered settlements with no facilities.
C16 Crawfordjohn Road	High	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs.
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.
A74 (M) / M74 Users	Negligible	Where roads have no adjacent settlements.
Leadhills Residents	Low	Where a location is a small rural settlement, containing a few community or public facilities or services.
Lettershaws 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.
Core Path / Path Network	High	Minor paths used by walkers and cyclists, not constructed to accommodate HGV traffic flows.

9.3.32 As previously noted in the 'Criteria for Assessing Magnitude of Change' section, examples of sensitive areas are presented in the IEMA Guidelines as locations which include hospitals, churches, schools, historical buildings tourist attractions for example. Based on these indicators which are stated within the IEMA Guidelines, the following locations within the study area have been identified as sensitive areas in this assessment:

- Leadhills (school);
- Lettershaws (tourist attraction);
- Abington (school, fire station and tourist attraction); and
- Core Path / Path Network (tourist attraction).

9.3.33 These locations are therefore subject to 'Rule 2' of the IEMA Guidelines which requires a full assessment of effects if the locations are subject to a total traffic increase of 10% or more. All other locations within the study area are subject to 'Rule 1' and are assessed if total traffic flows (or HGV flows) on highway links increase by more than 30%.

9.4 Embedded Mitigation

9.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2** and **Chapter 3 (EIAR Volume 2)**.

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 and/or borrow pit areas. 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 from the on-site borrow pits and during construction of the other Site infrastructure. 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 on 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 below for the construction phase:

- 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 9.7.**

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.

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, BESS and associated infrastructure;
- AILs consisting of the turbine sections, transformers 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 Construction vehicles would enter the Site from the B797 via newly provided access junctions, which would facilitate access to the eastern section and the western section of the Site.

9.5.5 AIL delivery vehicles would access the Site via a newly provided temporary construction Site entrance from the A74(M), with a crossing of the B797 to access the western section. Empty AIL delivery vehicles would return to the road network via the B797 road, rejoining the M74 at Junction 14.

9.5.6 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, A74(M), M6, Junction 42 Golden Fleece, M6 and A74(M). Loads would exit A74(M) at a newly provided off-slip access junction on the A74(M) to the south of Junction 13 near Abington, which would provide direct access to the Site.

9.5.7 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.

9.5.8 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)**.

9.5.9 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. Two transformers will also be delivered to Site.

9.5.10 The resulting traffic generation profile is presented in **Technical Appendix 9.1 (EIAR Volume 4)**.

9.5.11 The peak of construction activity is expected to occur in month 11 when there will be a total of 6,148 vehicle movements which will result on average of 280 vehicle movements per day, comprising 194 two-way HGV movements and 86 two-way car / LGV movements.

9.5.12 This would equate to approximately 23 two-way total vehicles movements including 16 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.

9.5.13 It should however be noted that the Proposed Development’s trip generation assumes that 100% of all aggregate materials would be imported to the Site from nearby quarries and should therefore be considered a significant over-estimate of the number of HGV movements that would travel to and from the Site during the peak month of activity. It is expected that up to 100% of these aggregate requirements would be sourced from on-site extraction of materials related to construction of Site infrastructure (e.g. BESS and substation compounds) and from the four on-site borrow pits.

9.5.14 In a scenario whereby 100% of aggregate material would be won on-site, with the exception of sand and aggregates required for on-site concrete batching, the peak of construction activity is still expected to occur in month 11 where there would be a total of 122 vehicle movements per day, comprising 36 two-way HGV movements and 86 two-way car / LGV movements.

9.5.15 This would equate to approximately 10 two-way total vehicles movements or three 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.

9.5.16 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) / M74, which forms part of the trunk road network, accessed via the A702 and the B797. Construction vehicles delivering loads to and from the Site would likely be delivered via the A74(M) / M74 and would be delivered to Site via Junction 14 of the A74(M), the A702 and B797. No HGVs are proposed to travel through Leadhills or Abington villages. The assumptions for the distribution of construction traffic during the peak month are presented in **Technical Appendix 9.1 (EIAR Volume 4)**.

9.5.17 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 9.11**.

Table 9.11: Peak Construction Traffic (Month 11)

No.	Survey Location	Cars & Lights	HGV	Total
1	B797, at Site Accesses	86	194	279
2	B797, north of Leadhills	14	0	14
3	A702, north of Abington Village	73	0	73
4	A702, north of A702/Carlisle Rd/A74(M) Rbt	0	194	194

No.	Survey Location	Cars & Lights	HGV	Total
5	M74, south of Junction 12	31	194	225
6	A74(M), north of Junction 14	31	194	225

Please note minor variances due to rounding may occur.

9.5.18 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 9.12**.

Table 9.12: 2035 Baseline + Construction Development – Flows and Impact

No.	Survey Location	Cars & Lights	HGV	Total	% Increase Cars & Lights	% Increase HGV	% Increase Total
1	B797, at Site Accesses	462	269	732	22.78%	255.48%	61.77%
2	B797, north of Leadhills	529	18	548	2.80%	0.00%	2.70%
3	A702, north of Abington Village	1,922	115	2,038	3.96%	0.00%	3.73%
4	A702, north of A702/ Carlisle Rd/ A74(M) Rbt	867	321	1,188	0.00%	152.62%	19.48%
5	M74, south of Junction 12	23,734	12,524	36,257	0.13%	1.57%	0.62%
6	A74(M), north of Junction 14	26,017	13,520	39,537	0.12%	1.45%	0.57%

Please note minor variances may occur due to rounding.

9.5.19 The total traffic movements are predicted to increase by a maximum of 61.77% on the B797 and 19.48% on the A702 north of A702 / Carlisle Rd / A74(M) roundabout. At all other locations, the total increase is less than 10% which are within generally acceptable traffic flow variations.

9.5.20 **Table 9.12** shows that highest HGV traffic movements increase would occur on the B797, where it is estimated to increase by 255.48%, and whilst this increase could be considered statistically high, it is generally caused by the low HGV flows on the road at this location. The second highest HGV traffic movements increase would occur on the A702, north of A702 / Carlisle Rd / A74(M) roundabout, where it is estimated to increase by 152.62%.

9.5.21 To put the increase into perspective, the B797 and A702 would see an additional 194 HGV movements per day or 16 HGV movements per hour over the course of a typical 12-hour shift. This is not considered significant in terms of overall traffic flows.

9.5.22 A review of existing theoretical road capacity has been undertaken using The NESA Manual, 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 9.13**.

Table 9.13: Theoretical Road Capacity

No.	Survey Location	2035 Baseline Flow	2035 Base + Development Flows	Theoretical Road Capacity (12hr)	Spare Road Capacity
1	B797, at Site Accesses	452	732	21,600	97%
2	B797, north of Leadhills	533	547	21,600	97%
3	A702, north of Abington Village	1,965	2,038	21,600	91%
4	A702, north of A702/Carlisle Rd/A74(M) Rbt	994	1,188	21,600	95%
5	M74, south of Junction 12	36,032	36,258	136,800	73%
6	A74(M), north of Junction 14	39,312	39,538	136,800	71%

Please note minor variances may occur due to rounding.

9.5.23 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.

9.5.24 Based on the information provided in **Table 9.12** and in accordance with the ISEP Guidelines Rules 1 and 2, the following receptors have been taken forward for detailed assessment:

- B797 Users;
- B797 Residents;
- A702 Users;
- A702 Residents;
- Lettershaws Residents / Visitors;
- C16 Crawfordjohn Users; and
- Core Path / Path Users.

9.5.25 The significance of the potential effects on the above receptors has been determined using the rules and thresholds previously outlined above. **Table 9.14** summarises the significance of the effect on the receptors for the construction phase.

9.5.26 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 9.14: Construction Phase Traffic Effects Summary							
Receptor	**Severance**	**Driver Delay**	**Pedestrian Delay**	**Non-motorised user Amenity**	**Fear & Intimidation**	**Road Safety**	**Large Loads**
B797 Users / Residents	Moderate	Moderate / Minor	Moderate / Minor	Moderate	Moderate	Moderate / Minor	Minor
A702 Users / Residents	Minor	Minor	Minor	Moderate	Minor	Minor	Negligible
Lettershaws Residents / Visitors	Moderate	Moderate / Minor	Moderate / Minor	Moderate	Moderate	Moderate / Minor	Minor
C16 Crawfordjohn Users	Major	Major / Moderate	Major / Moderate	Major	Major	Major / Moderate	Major
Core Path / Path Users	Major	N/A	Major / moderate	Major	Major	Major / moderate	Major

9.5.27 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:

- B797 Users / Residents;
- A702 Users / Residents;
- Lettershaw Residents / Visitors;
- C16 Crawfordjohn Users; and
- Core Path/Path Users.

9.5.28 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

9.5.29 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.

9.5.30 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.

9.5.31 It should be noted that the use of low Tempro growth assumptions has provided a basis for general local development growth within the Study Area.

9.5.32 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 (TMMP) and by introducing a phased delivery plan which would be agreed with SLC, TS and the Police.

9.6 Additional Mitigation and Enhancement Measures

9.6.1 Additional mitigation comprises Site-specific mitigation which has been included to further reduce the magnitude of impact / significance of effect identified through the EIA. Preparation of a CTMP is standard practice for this type of development and further details of the specific measures to be included in this CTMP are detailed below.

Construction

Construction Traffic Management Plan (CTMP)

9.6.2 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, which is presented in **Annex B** of **Technical Appendix 9.1 (EIAR 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 B797 and A702, 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 B797 and A702 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 the potential presence of pedestrians on paths on Site and cyclists on NCN Route 74 located along the A702;
- 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

9.6.3 As part of the CTMP which would be provided post consent and secured by condition, 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.

9.6.4 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.

9.6.5 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

9.6.6 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.

9.6.7 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.

9.6.8 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.

9.6.9 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 B797;
- 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.

9.6.10 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).

9.6.11 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

9.6.12 The AIL Transport Management Plan would be prepared to cater for all AIL movements to and from the 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

9.6.13 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.

9.6.14 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

9.6.15 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.

9.6.16 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.

9.6.17 The times in which the convoys will travel would be agreed with Police Scotland who have sole discretion on when loads can be transported.

Staff Travel Plan

9.6.18 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)

9.6.19 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.

9.6.20 A detailed OAMP would be developed and would be secured via a planning condition.

9.6.21 A framework for the preparation of the detailed OAMP is provided in **Technical Appendix 9.2 (EIAR Volume 4)**.

9.7 Assessment of Residual Effects

Construction

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 9.15**, 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 would be **Minor** and **Not Significant**. Traffic effects would be 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.

Cumulative

9.7.3 No residual cumulative effects are predicted as part of the Proposed Development.

9.8 Monitoring

Construction

9.8.1 The Site entrance roads would be maintained and monitored during the construction phase and during the 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 condition surveys, which would likely be required as part of the planning conditions attached to the consent.

9.9 Summary

9.9.1 **Table 9.15** summarises the potential significant effects identified in the assessment of impacts on traffic and transport within the study area.

Table 9.15: Summary of Potential Significant Effects			
Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
Construction			
B797 Users / Residents			
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	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.	Minor (Not Significant)
A702 Users / Residents			
Non-motorised user amenity and Large loads	The implementation of a comprehensive CTMP and an AIL TMP.	Through appropriately worded planning conditions.	Minor (Not Significant)
Lettershaw Residents / Visitors			
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	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.	Minor (Not Significant)
Crawfordjohn Users			
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	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.	Minor (Not Significant)
Core Path/Path Users			
Severance, Driver delay, Pedestrian Delay, Non-motorised user amenity, Fear and intimidation, Road safety and Large loads.	The implementation of a comprehensive CTMP, together with, an AIL TMP, a staff travel plan and an OAMP	Through appropriately worded planning conditions.	Minor (Not Significant)

10 Noise and Vibration

10.1 Introduction

10.1.1 This chapter considers the likely significant effects on the Noise and Vibration 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 and vibration 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 assessment has been carried out by Bilal Ahmed, Principal Acoustics Engineer in Hoare Lea. Bilal has over 8 years of experience in undertaking environmental noise assessment for renewable energy developments including wind farms and has supported several planning application and Section 36 consent application wind development applications in Scotland. The assessment was reviewed by Matthew Cand, Associate Director in Hoare Lea, with experience in wind farm applications spanning over 20 years and more than 100 wind farm schemes assessed.

10.1.4 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures:
  - Figure 10.1: Noise Assessment Locations and Cumulative Schemes
- Volume 4: Technical Appendices
  - Technical Appendix 10.1: Environmental Noise Assessment

10.1.5 Figures and technical appendices are referenced in the text where relevant.

10.2 Assessment Methodology

Overview

10.2.1 The noise and vibration methodology is detailed in **Technical Appendix 10.1: Environmental Noise Assessment (EIAR Volume 4)** and follows the principles set out in the following policy documents and legislation:

- Scottish Government (2023), Scottish National Planning Framework 4, Scottish Government. Adopted 13 February 2023.
- Scottish Government (2022) - Onshore wind - policy statement 2022, December 2022.
- The Control of Pollution Act (CoPA) 1974 c.40.
- The South Lanarkshire Council (SLC), Local Development Plan 2 Volume 1 (LDP), April 2021 incorporating Supporting Planning Guidance (SPG) Renewable Energy, January 2021.

10.2.2 More detail on policy and guidance is provided in Section 2 of Technical Appendix 10.1: Environmental Noise Assessment (EIAR Volume 4)

10.2.3 The assessment is presented with reference to specific 'areas' of the Site within the application boundary. These areas comprise the western and eastern areas of the Site and associated access routes, as described in **Chapter 2: Description of the Development**.

10.2.4 Effects considered to be significant for the purposes of the EIA Regulations are those classified as being 'Major' or 'Moderate'.

Consultation

10.2.5 Prior to undertaking the background survey, a consultation letter detailing the survey approach and proposed noise monitoring locations was sent via email on 10th April 2025[1] to South Lanarkshire Council's (SLC) Environmental Health Department. The proposed monitoring locations of Snar Farm and Dentercleuch were outlined, along with a summary of the proposed assessment approach, use of historic background data, and proposed cumulative limits also detailed. No response was received from the Environmental Health Department. Thereafter, due to access restrictions at Dentercleuch, noise monitoring was only undertaken at Snar Farm and available historic background data was used as representative for Dentercelecuch and other receptors (see **Table 4** of **Technical Appendix 10.1 (EIAR Volume 4).**

10.2.6 No response was received to the consultation however, a response to the scoping report was received on 17th June 2025[2], SLC expressed agreement with the suggested approach in the noise and vibration scoping chapter and the use of historic background data for the assessment.

Scope of Assessment

Potential Impacts Scoped In

10.2.7 The scope of the assessment has been informed by consultation responses detailed in **Technical Appendix 1.1: Consultation Register (EIAR Volume 4)** and the following guidance:

- Scottish Government (2011) Planning Advice Note (PAN) 1/2011: Planning & Noise and accompanying Technical Advice Note[i].
- ETSU-R-97 'The Assessment and Rating of Noise from Windfarms, Final Report for the Department of Trade & Industry' (ETSU-R-97)[ii];
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, Institute of Acoustics (IOA GPG)[iii];
- British Standards institute (2014) BS 5228-1:2009+A:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise[iv].'
- British Standards institute (2014) BS 5228-2:2009+A:2014 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration[v].'

[1] Email sent on 10/04/2025 by Hoare Lea to South Lanarkshire Council Environmental Health Department

[2] Scoping response received 17/06/2025: Point NV1 and nv1 shows SLC agreement for proposed approach and use of historic data as outlined in scoping chapter.

- Scottish Government (1996) Planning Advice Note 50: 'Controlling the Environmental Effects of Surface Mineral Workings[vi].'
- British Standard institute (2019) BS 4142-1:2014+A1:2019 'Methods for rating and assessing sound from industrial and commercial sites[vii].'
- British Standards institute (2008) BS 6472 2:2008: 'Guide to evaluation of human exposure to vibration in buildings - Part 2: Blast-induced vibration[viii].'
- HMSO Department of Transport (1988) 'Calculation of Road Traffic Noise' (CRTN)[ix].
- The Highways Agency, Transport Scotland, Transport Wales and The Department for Regional Development (Northern Ireland) (2020) Design Manual for Roads and Bridges (DMRB), LA 111 Noise and vibration, revision 2[x].

10.2.8 The following effects have been assessed:

- The potential effect of noise and vibration during construction and decommissioning of the Proposed Development (including construction traffic noise and potential cumulative effects); and
- The potential effect of noise during operation of the Proposed Development, including cumulative effects.

CONSTRUCTION NOISE

10.2.9 Noise and vibration which arises from the construction of a wind farm is a factor which should be taken into account when considering the combined effects from the Proposed Development. However, in assessing the effects of construction noise, it is accepted that the associated works are of a temporary nature. The main work locations for construction of the proposed turbines are distant from the nearest noise sensitive receptors and are unlikely to cause significant effects. The construction and use of access tracks and some of the required infrastructure would, however, occur at lesser separation distances. Assessment of the temporary effects of construction noise is primarily aimed at understanding the need for dedicated management measures and, if so, the types of measures that are required. Further details of construction traffic routes and proposed working hours are described in **Chapter 2: Description of the Development**.

OPERATIONAL NOISE

10.2.10 Once constructed and operating, wind turbines may emit two types of noise: aerodynamic noise from the blades, and mechanical noise from other components. Aerodynamic noise tends to be perceived when the wind speeds are low, although at very low wind speeds the blades do not rotate or rotate very slowly and so, at these wind speeds, negligible aerodynamic noise is generated. In higher winds, aerodynamic noise is generally masked by the normal sound of wind blowing through trees and around buildings. The level of this natural 'masking' noise relative to the level of wind turbine noise determines the subjective audibility of the wind farm. The relationship between wind turbine noise and the naturally occurring masking noise at residential dwellings around the Site will therefore generally form the basis of the assessment of the levels of noise against accepted standards.

10.2.11 The Proposed Development will also include a substation and battery energy storage system (BESS) facility which would emit some noise during operation. Based on professional judgement, it is considered that noise from the substation and BESS compound is likely to have negligible effects at the nearest receptor due to the large separation distance of approximately 1 km, even accounting for the potential characteristics of the noise; however, for completeness, a simplified noise assessment has been undertaken based on assumed emission levels to demonstrate the likely low noise levels at nearest receptor (see **Section 5.9** in **Technical Appendix 10.1: Environmental Noise Assessment).**

CUMULATIVE NOISE

10.2.12 The chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments. Operational, under construction and consented developments, as well as developments that that are the subject of a valid planning application, have been considered in the cumulative noise assessment.

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

Potential Impacts Scoped Out

10.2.14 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 10.1.

10.2.15 On the basis of the desk-based work undertaken, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, the following effects have been 'scoped out':

Table 10.1: Impacts Scoped Out of the Assessment

Impact	**Reasoning**
Vibration effects from operation of the Proposed Development	The results of previous research detailed in **Annex A** of **Technical Appendix 10.1: Environmental Noise Assessment (EIAR Volume 4)** has demonstrated that vibration resulting from the operation of wind farms is imperceptible at typical separation distances. Therefore, vibration effects during operation do not warrant detailed assessment and have not been considered further as part of this chapter.
Traffic Noise during operation of the Proposed Development	Light traffic and activities which are part of routine maintenance of the Proposed Development would be very limited (e.g. two vehicles per week) and unlikely to be associated with any significant effects (see **Section 6.2** in **Technical Appendix 9.1: Transport Assessment**).
Noise and vibration effects from blasting.	No blasting is proposed for rock extraction from borrow pits (see **Technical Appendix 2.2: Borrow Pit Assessment**), as such assessment of noise and vibration effects from blasting is scoped out.

Method of Baseline Characterisation

Extent of the Study Area

10.2.16 The study area for the assessment of operational noise comprises noise-sensitive residential properties within approximately 3 km of the proposed turbines. The locations of relevant properties are shown on **Figure 10.1 (EIAR Volume 3a)**. A cumulative study area of 10 km from the Proposed Development was used to screen other wind developments (operational, consented or in planning) that are expected to contribute cumulatively depending on development size and distance. The cumulative assessment considers residential properties within the 3 km area from the proposed turbines that lie closer to the operational Clyde, Middle

Muir, and Andershaw wind farms included in the cumulative assessment (see **Figure 10.1 (EIAR Volume 3a)**, showing the location of the nearby wind developments included in the assessment).

10.2.17 The assessment of construction noise has considered the same residential properties as the operational assessment, which include dwellings located alongside the construction traffic route and near the Site boundary.

Desk Study

10.2.18 Historical background noise data was previously measured at seven locations as presented in **Table 3** of **Technical Appendix 10.1 (EIAR Volume 4)**. The assessment of operational noise from the Proposed Development also considers other representative assessment locations, listed in **Table 4** of **Technical Appendix 10.1 (EIAR Volume 4)**, for sensitive receptors in the area.

10.2.19 The historic background measurement data, acquired and analysed in line with IOA GPG guidance, was used for relevant receptors. Where this data has been used, the measured data was adjusted to account for the difference in wind shear calculations between the differing hub heights of the proposed Development and the respective wind farm for which the measurement was originally undertaken. This adjustment consisted of a wind speed shift of 1 m/s to applied to the reference for the measured background levels, effectively presenting conservative limits for the respective wind speeds, as detailed in **Annex C** of **Technical Appendix 10.1 (EIAR Volume 4)**.

10.2.20 The following data sources have informed the assessment:

- Ordnance Survey (OS) information concerning the locations of all noise sensitive receptors in the vicinity of the Site;
- British Standard (BS) reference material for the sound emission characteristics of various construction activities associated with Proposed Development;
- Manufacturer data for the candidate and proposed turbines considered, as set out in **Annex B** of **Technical Appendix 10.1 (EIAR Volume 4)**; and
- EIA Reports and associated consent documents for the existing Clyde, Middle Muir and Andershaw Windfarms, and the proposed M74 West Energy Park considered in the cumulative assessment.

Field Survey

10.2.21 A survey was undertaken at one noise monitoring location, to help characterise the baseline background noise environment to the west of the Site. This location, Snar Farm (286310/620077), was identified as the closest noise-sensitive receptor west of the Proposed Development (where historical baseline data was not available). The choice of this monitoring location, supplemented by use of historic background measured data at other locations surrounding the Site, was set out in a consultation letter to SLC. No response was received to the consultation, however, a scoping response from SLC (June 2025) (included in **Technical Appendix 1.4** and summarised in **Technical Appendix 1.1 (EIAR Volume 4)**) confirmed they were in agreement with the proposed approach to the assessment of baseline noise conditions, including reference to historical data.

10.2.22 The background noise monitoring exercise at Snar Farm was conducted from May to July 2025, over a period of four weeks, with full details in **Technical Appendix 10.1 (EIAR**

Volume 4). The data were measured and analysed in accordance with the guidance of the IOA GPG.

10.2.23 The noise levels measured were related to standardised ten metre height wind speeds, derived from measurements extrapolated to a height of 134 m, which was considered to be representative of the highest hub height which could be used at the Site, in accordance with the preferred methodology of the IOA GPG, with full details provided in **Annex F** of **Technical Appendix 10.1 (EIAR Volume 4)**.

Method of Assessment

Overview

10.2.24 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 10.1 (EIAR Volume 4)**. An overview of the assessment methodology is also provided in this chapter.

Methodology for Assessing Construction Noise and Vibration Impacts

10.2.25 Detailed guidance on construction noise and its control is provided by British Standard BS 5228-1:2009. Analysis of construction noise impacts has been undertaken in accordance with the methodologies outlined in this standard, which provides methods for predicting construction noise levels based on reference data for the emissions of typical construction plant and activities. These methods include the calculation of construction traffic along access tracks and haul routes to the Proposed Development, and construction activities at fixed locations including the bases of turbines, temporary construction compounds, and the substation. The construction noise assessment has been based on indicative data for the types of plant likely to be used during the construction works, as presented in BS 5228-1.

10.2.26 Changes in the predicted traffic noise level on existing roads were calculated using the Calculation of Road Traffic Noise (CRTN) methodology[3].

10.2.27 Based on the range of guidance values set out in BS 5228-1 Annex E, and other relevant guidance, the significance criteria for construction noise presented in Table 10.2 have been derived. The values have been chosen in recognition of the relatively low ambient noise typically observed in rural environments. The presented criteria have been normalised to free-field day-time noise levels occurring over a time-period T, equal to the duration of a working day on site. Specifically, the criteria relate to daytime hours from 07:00 to 19:00 on weekdays, and 07:00 to 13:00 on Saturdays and that construction working is limited to these times.

Table 10.2: Impact Criteria for Construction Noise

Impact magnitude	**Definition**
Major	Construction noise is generally greater than 75 dB $L_{Aeq,T}$ during the construction period, or with periods of more than 85 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12-month period.
Moderate	Construction noise is generally less than or equal to 75 dB $L_{Aeq,T}$ during the construction period, with periods of up to 85 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12-month period.

[3] Department of Transport (1988). 'Calculation of Road Traffic Noise'

Minor	Construction noise is generally less than or equal to 65 dB $L_{Aeq,T}$ during the construction period, with periods of up to 75 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12-month period.
Negligible	Construction noise is generally less than or equal to 55 dB $L_{Aeq,T}$, with periods of up to 65 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12-month period.

10.2.28 When considering the impact of short-term changes in traffic, associated with the construction activities, on existing roads in the vicinity of the Proposed Development, reference can be made to the criteria set out in the Design Manual for Roads and Bridges (DMRB). A classification of magnitudes of changes in the predicted traffic noise level for short-term changes, such as those associated with construction activities, is set out in Table 10.3. This classification can be considered in addition to the criteria of Table 10.2.

Table 10.3: Impact Criteria for Construction Traffic Noise

Impact magnitude	**Increase in traffic noise levels**
Major	More than 5 dB
Moderate	3 to 5 dB
Minor	1 to 3 dB
Negligible	Less than 1 dB

10.2.29 BS 5228-2 provides general guidance on legislation, prediction, control and assessment criteria for construction vibration. The nature of most of the works and distances involved in the construction of the Proposed Development are such that the risk of significant effects relating to ground borne vibration are very low ; however, some work such as the new track construction to the north of the Site, will be undertaken close to receptors and may generate vibration effects perceptible to the nearby residents. Therefore, criteria for the assessment of the magnitude of construction vibration are presented in Table 10.4 below, based on the guidance in Section B.2 of BS 5228-2 which provides advice on human response to vibration.

Table 10.4: Impact Criteria for Construction Vibration

Impact magnitude	**Peak Particle Velocity**
Major	>10 mm/s
Moderate	>1 mm/s and <10 mm/s
Minor	>0.3 mm/s and <1 mm/s
Negligible	<0.3 mm/s

10.2.30 BS 5228-2 advises that any risk of building damage, even for sensitive buildings, would only occur at much stronger vibration levels than the above 10 mm/s, therefore the proposed criteria would also provide protection in this regard.

10.2.31 Occasional momentary vibration can arise when heavy vehicles pass dwellings at very short separation distances, as is the case with the existing traffic in the area, but again this is not sufficient to constitute a risk of significant effects in this instance.

Methodology for Assessing Operational Noise Impacts

10.2.32 The assessment of wind turbine operational noise impacts has been carried out in accordance with the methodology set out in ETSU-R-97, which is described in more detail in **Section 3.2** in **Technical Appendix 10.1 EIAR Volume 4**). .

10.2.33 Technical guidance on current good practice in the application of the ETSU-R-97 methodology, as described in the Institute of Acoustics (IOA) Good Practice Guide (GPG, 2013) has also been referenced, as is recommended in the Scottish Government's Planning Advice[4].

10.2.34 To undertake the assessment of noise impact in accordance with the methodology in ETSU-R-97, the following steps are required:

- specify the number and locations of the wind turbines and other wind farms to be included in the assessment;
- identify the locations of the nearest, or most noise sensitive, neighbours;
- determine the background noise levels as a function of site wind speed at the nearest neighbours, or at least at a representative sample of the nearest neighbours, either through direct measurement or by reference to data already obtained during previous surveys in the area;
- determine the daytime and night-time noise limits from the measured background noise levels at the nearest neighbours;
- specify the type and noise emission characteristics of the wind turbines;
- calculate noise immission levels from the operation of the turbines associated with the proposed wind farm as well as the contribution to cumulative noise immission levels from other nearby wind farms as a function of site wind speed at the nearest neighbours; and
- compare the calculated wind farm noise immission levels with the derived noise limits and assess in the light of planning requirements in consultation with the local planning authority.

10.2.35 Full details of the operational noise assessment, including details of the noise output of the candidate turbine for this scheme and the calculation parameters on which predictions have been based, can be found in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.2.36 The acceptable limits for wind turbine operational noise are clearly defined in ETSU-R-97. Consequently, the test applied to operational noise is whether the calculated wind farm noise immission levels (cumulative from all wind turbines) at nearby noise sensitive properties lie below the noise limits derived in accordance with ETSU-R-97. The assessment will therefore need to consider the combined operational noise of the Proposed Development with other wind farms in the area to be satisfied that the combined cumulative noise levels are within the relevant ETSU-R-97 criteria.

10.2.37 In summary, ETSU-R-97 noise limits are defined in relation to measured background noise levels during quiet periods and their variation with wind speeds:

- For daytime periods, the limit is either a fixed level between 35 and 40 dB(A), or 5 dB above the derived background noise level, whichever is the higher; and
- For night-time periods, the limit is either a fixed level of 43 dB(A), or 5 dB above the derived background noise level, whichever is the higher.

10.2.38 For daytime periods, the precise choice of fixed limit within the range 35 dB(A) to 40 dB(A) according to ETSU-R-97 depends on a number of factors: the number of noise-affected properties, the likely duration and level of exposure and the consequences of the choice on the potential power generating capability of the wind farm.

[4] Scottish Government (2011) Planning Advice Note (PAN) 1/2011: Planning & Noise and accompanying Technical Advice Note

10.2.39 Where a property occupier has a financial involvement in the wind farm development, the lower fixed portion of the noise limit at that property may be increased to 45 dB(A) during both the daytime and the night-time periods.

10.2.40 Noise from operation of the substation and BESS has been assessed using the methodology in BS 4142, detailed in **Section 3.3** in **Technical Appendix 10.1 (EIAR Volume 4)** which compares noise from the specific source with typical baseline background noise levels, accounting for contextual factors. The criteria for operational noise impact from non-turbine sources is outlined in **Table 2** of **Technical Appendix 10.1 (EIAR Volume 4)**

10.2.41 Potential in-combination operational noise effects from the substation and BESS when added to the turbine noise have been assessed on the basis of professional judgment as part of the cumulative assessment.

Low Frequency Noise, Vibration and Amplitude Modulation

10.2.42 Low-frequency noise and vibration resulting from the operation of wind farms are all issues that have been discussed in detail over the past 20 years, as detailed in **Annex A** of **Technical Appendix 10.1 (EIAR Volume 4)**. In summary of the information provided therein, the current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms.

10.2.43 **Annex A** of **Technical Appendix 10.1 (EIAR Volume 4)** also discusses the most recently published research on the subject of wind turbine blade swish or Amplitude Modulation (or AM). The IOA has recently published an objective technique developed for quantifying AM noise. The UK Government also commissioned a review of subjective responses to AM noise which outlines considerations for the control of this feature based on the IOA methodology. The Scottish Government is currently reviewing this recommendation in the context of the Scottish planning system. Until this is completed, ETSU-R-97 should continue to be used.

Wind Turbine Noise Limits

10.2.44 ETSU-R-97 noise limits were determined on the basis of these background levels at all properties: this results in the limits set out in **Tables 7** and **8** of **Annex A** of **Technical Appendix 10.1 (EIAR Volume 4)** for the Proposed Development in isolation. For the avoidance of doubt, these limits have been derived as follows:

- the ETSU-R-97 daytime limit of 37 dB(A), or 5 dB above the prevailing background noise level, whichever is the higher; and
- the minimum ETSU-R-97 night-time fixed lower limit (cumulative) of 43 dB(A), or 5 dB above the prevailing background noise level, whichever is the higher.

10.2.45 The derivation of the 37 dB(A) fixed limit for daytime periods, based on the criteria specified in ETSU-R-97, is considered in detail in **Section 5.7** of **Technical Appendix 10.1 (EIAR Volume 4)**. The factors considered include the relatively large generating capacity of the Proposed Development, the low number of dwellings potentially affected relative to the scale of the Proposed Development, and the limited level of exposure of turbine noise above baseline noise levels. These factors indicate that it would be considered wholly appropriate to set the limit towards the middle to upper end of the range of 35 to 40 dB(A) specified in ETSU-R-97. Nonetheless, on a precautionary basis, a limit of 37 dB(A) has been chosen to provide a robust assessment. This is consistent with a previous application[5] at the Site which adopted

[5] Harryburn Windfarm, application Reference ECU00005277.

limits on this basis in agreement with SLC at the time. For context, the existing consent for Clyde Windfarm adopted a 40 dB(A) lower fixed limit[6].

Statement of Significance

10.2.46 For construction noise and vibration, as well as operational noise from the substation and BESS, the magnitudes of impact translate directly to their significance, given all residential receptors considered are of high sensitivity, with a scale of significance from negligible, through minor to moderate and major.

10.2.47 'Major' or 'Moderate' construction impacts are considered 'significant' in the context of the EIA Regulations.

10.2.48 For operational wind turbine noise, if predicted cumulative noise levels are within the ETSU-R-97 derived noise limits, operational noise is considered acceptable, and therefore 'not significant' in EIA terms. If predicted noise levels are above the ETSU-R-97 noise limits, operational noise is considered unacceptable and 'significant' in EIA terms.

Limitations and Assumptions

10.2.49 Baseline noise monitoring was undertaken at the nearest receptor to the Proposed Development; the monitoring location and use of historic data was outlined to the SLC in consultation. The measured data was filtered to exclude periods of rainfall and any atypical events to obtain conservative background levels for the assessment. Other wind farm developments were at sufficiently large separation distances and would have negligible noise contribution at the measurement location.

10.2.50 The assessment was undertaken with uncertainty factors incorporated into the assumed noise emission levels, as well as further uplifts to account for consented noise levels where relevant: the predicted levels therefore represent a worst-case emission level in downwind conditions which would not necessarily be the case in practice.

10.2.51 The Vestas V172-7.2 MW candidate turbine model was selected as representative (on a robust worst-case basis for the purpose of this noise assessment) of the type and size of turbine that would be used for the Proposed Development. Therefore, the assessment is likely to result in noise immission levels representing the upper end for the range of turbines of the dimensions proposed, i.e. noise immissions higher than other models of turbine with similar dimensions.

10.2.52 Assessment of the operational noise from the proposed turbines assume 'low noise' operation modes for the following Vestas V172-7.2 MW turbines (emission levels of low noise modes detailed in **Table B3** of **Annex B** in **Technical Appendix 10.1 (EIAR Volume 4)**.:

- T2 operating in SO3 Mode;
- T20 operating in SO2 Mode; and
- T21 operating at SO1 Mode;

10.2.53 For the substation and BESS operational noise, although the final equipment selection and installation arrangements are not known, robust assumptions have been made, as outlined in **Section 5.8** of **Technical Appendix 10.1 (EIAR Volume 4)**, in terms of potential emission levels and, in particular, screening effects have been neglected.

[6] Clyde Wind Farm information site: https://www.sserenewables.com/onshore-wind/great-britain/clyde

10.2.54 The conservative measures implemented in the assessment mean that any inherent uncertainties do not affect the overall level of effects determined in this assessment.

10.3 Baseline Conditions

Current Baseline

10.3.1 The baseline noise environment at the survey location at Snar Farm comprised a mix of 'natural' noise sources such as wind disturbed vegetation, trees, and a water course. The receptors in the area around Snar Farm are mainly scattered at some distance along a water course, therefore, the measured baseline noise levels at Snar Farm are considered consistent with the nearby receptors, such as Glendouran Farm and Strancleugh Farm (see **Table 4** of **Technical Appendix 10.1 (EIAR Volume 4)**.

10.3.2 The noise environment at the historic measurement locations show similar trends and range of sound levels with some locations located in residential areas and along the A702, such as, 76 Dumfries Road, Douglas Lodge, 3 Symington Street and Glencaple Cottage, showing slightly higher noise levels during day and night-time.

10.3.3 Existing noise conditions at the survey location, presented as a function of site wind speeds, during quiet periods, are represented in **Figures E1** to **E16** of **Annex E** of **Technical Appendix 10.1 (EIAR Volume 4)**. These show the results of the survey at Snar Farm as well as the other historical measurement locations referenced in the analysis. These measured baseline noise levels are consistent with the requirements of ETSU-R-97 and the IOA GPG. In particular, the measurements were not considered to have been substantially influenced by existing wind turbine noise levels.

10.3.4 The background levels at the measurement location typically varied, during quiet daytime periods, between 30 to 40 dB $L_{A90,10min}$ at low wind speeds (up to 5 m/s) and 35-55 dB $L_{A90,10min}$ at the highest wind speeds in the range of up to 12 m/s considered under ETSU-R-97. For night-time periods, a similar range of levels was generally observed between low and high wind speeds.

Future Baseline

10.3.5 Future baseline in absence of the Proposed Development is unlikely to change significantly from the current baseline given the rural nature of the scattered receptors in proximity to the Proposed Development and the number of operational wind farms in the area.

Summary of Sensitive Receptors

10.3.6 All receptors considered in this assessment were residential dwellings. A list 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** of **Technical Appendix 10.1 (EIAR Volume 4)** and are illustrated in **Figure 10.1: Noise Assessment Locations and Cumulative Schemes**. Table 10.5 below presents the assessment receptors with their coordinates, approximate distance to nearest proposed turbines, and nearest turbine ID.

Table 10.5: Representative Receptors Included in the Assessment				
Property	**Easting**	**Northing**	**Approximate Distance to nearest Proposed Turbine (m)**	**Nearest Proposed Turbine (ID)**
Lettershaws Farm	290245	620613	1800	T13
Kirkton	293303	620959	1550	T10
Glencaple Farm House	292048	621176	1650	T9
Glencaple	292118	621296	1780	T9
Boghead	294490	620593	2100	T10
Carlisle Road North	294878	620663	2450	T11
Hurlieburn Lodge	295436	620450	2780	T11
Carlisle Road South	295915	620033	3040	T11
Stoneyburn	296221	619519	3220	T11
Elvanfoot Farm	295097	617828	2390	T11
Lodge Cottages	295292	617598	2680	T11
Leadhills Road	294978	617344	2580	T11
North Shortcleugh	292805	617366	920	T16
South Shortcleugh	292830	616761	1360	T16
Hass	290008	615252	2180	T21
Waterhead Toll Cottage	288884	618129	670	T2
New Glendorch	288813	617747	830	T2
Glengeith	295230	616909	3060	T11
Leadhills	288736	615412	1990	T8
Leadhills (south)	288386	614587	2230	T8
Dentercleuch	284867	615397	2220	T7
Snar Farm	286311	620077	2000	T1
Glendouran Farm	287493	620975	2060	T1
Strancleugh Farm	286799	621094	2430	T1

10.3.7 Residential receptors are considered as 'High' sensitivity, as such all impacts correspond to 'High' sensitivity receptors when determining the significance of effects.

10.4 Embedded Mitigation

Design Considerations

10.4.1 Embedded mitigation includes design/standard best practice measures as described in **Chapter 2** and **Chapter 3 (EIAR Volume 2)**.

10.4.2 The design of the turbine layout of the Proposed Development has been iteratively developed through evolution of the number of turbines, their locations and increasing separation distances where possible to avoid potentially significant operational noise effects, based on a representative candidate turbine model, whilst maintaining, as far as possible, the generation capacity of the Proposed Development (in addition to other design considerations). This included consideration of the cumulative effects with neighbouring wind farms, where relevant.

10.4.3 It is assumed that the final choice of turbine model would be operated such that compliance with applicable noise limits would be achieved. For the candidate wind turbine model assumed, this is achieved using operation of selected turbines in reduced noise operation, as set out above in paragraph 10.3.52.

10.4.4 Details of the operating modes and associated noise emission levels are detailed in **Annex B** of **Technical Appendix 10.1 (EIAR Volume 4).**

Micro-siting

10.4.5 The locations of the turbines and other infrastructure would be subject to 'micro-siting'. 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 immediately prior to construction. It is anticipated that the agreed 'tolerance' micro-siting distance of 100 m would form a condition accompanying any consent. A change of 100 m in turbine position would result in <0.5 dB change in predicted noise levels which is an acoustically negligible change in terms of turbine noise levels and as such the results of this assessment would remain valid with consideration of a micro-siting tolerance of up to 100 m.

Best Practice Measures

10.4.6 The good practice measures detailed below will be implemented to manage the effects of noise and vibration during construction activities, and will be required of all contractors:

- As proposed in **Chapter 2: Description of the Development (EIAR Volume 2)**, those activities that may give rise to audible noise at the surrounding properties and heavy goods vehicle deliveries to the site would be limited to the hours 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays unless otherwise approved in advance by SLC (except in case of an emergency). Those activities that are unlikely to give rise to noise audible at the Site boundary, or light vehicle traffic accessing the Site such as that involved with staff mobilisation, may continue outside of the stated hours.
- Construction noise would be managed via a site-specific Noise Management Plan (NMP) provided to SLC, as part of the outline Construction Environmental Management Plan (CEMP). The embedded mitigation contained in the NMP would include the commitment to liaise directly with local residents, and the wider community.
- Where practicable, night-time working would not be carried out. Local residents shall be notified in advance of any night-time construction activities likely to generate notable noise levels, e.g., abnormal load movement;
- All equipment used would be maintained in good working order and associated noise attenuation such as engine casing and exhaust silencers shall remain fitted at all times.
- A Construction Traffic Management Plan (CTMP) would be developed and secured through planning condition to control the movement of vehicles to and from the Site;
- The site contractors shall be required to employ the best practicable means of reducing noise emissions from plant, machinery, and construction activities, as advocated in BS 5228-1;

- All sub-contractors appointed by the main contractor will be formally and legally obliged, and required through contract, to comply with all environmental noise conditions;
- Any plant and equipment normally required for operation at night (23:00 - 07:00), e.g. generators or dewatering pumps, shall be silenced or suitably shielded to ensure that the night-time lower threshold of 45 dB L_{Aeq} shall not be exceeded at the nearest noise-sensitive receptors; and

10.4.7 Site-specific mitigation measures are outlined in Section 10.7.

10.4.8 As the embedded mitigation and standard best practice measures would form an integral part of the Proposed Development and will be outlined in the CEMP, 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.

10.5 Assessment of Likely Effects

Potential Construction Noise and Vibration Effects

10.5.1 Predicted noise levels at the closest noise sensitive receptor for each of the key activities during construction of the Proposed Development are presented in **Table 9** of **Technical Appendix 10.1 (EIAR Volume 4).**

10.5.2 Most of the proposed construction activities within the Site would be around the turbine locations and would occur at relatively large distances from nearby residential properties, such that the resulting predicted noise levels would not exceed 65 dB L_{Aeq} for more than 4 weeks in any 12-month period and are at or below 55 dB(A) for most of the work duration. With reference to the derived criteria of Table 10.2, the noise impact from these activities would therefore be of negligible' magnitude on high-sensitive receptor, resulting in a 'Negligible' effect (not significant).

10.5.3 For the activities closest to northern receptors i.e. Lettershaws Farm and Lettershaws Farm Cottage properties, works including the Site access track and road verge reinstatement works are predicted to result in noise levels of up to 82 dB and 77 dB respectively, based on worst-case assumptions. However, it should be noted that the period when the road verge activity is closest to the respective receptor would represent a very short-term duration (of a few days), and noise levels would diminish as track work progresses, moving the activity further from the respective property. Therefore, although the Site access track construction activity may be of longer duration overall, the predicted noise levels greater than 75 dB are unlikely to be experienced for more than 4 weeks, corresponding to the track works undertaken along part of the access track within 65 m of the receptors only; as such the impact without mitigation is categorised to be of 'moderate' magnitude on high-sensitive receptors, according to Table 10.2, resulting in a 'Moderate' effect (significant in EIA terms).

10.5.4 In terms of vibration, the new access track works would likely involve vibratory ground compaction at a distance as close as 30 m from receptor properties to the closest point of the proposed access track. Using guidance in BS 5228-2, based on worst-case assumptions (0.8 mm drum vibration amplitude and a 1.5 m drum width), vibration levels at 30 m distance (closest point) would likely be less than 1 mm/s, with predicted levels of 0.9 mm/s at start-up/run-down of the compactor operation. It is difficult to estimate what vibration could be produced by the groundworks associated with this activity as this would depend on the ground/rock conditions; however, based on the conservative assumptions above, levels are likely to be below 1 mm/s. Based on BS 5228-2 guidance, these levels can be perceptible but are unlikely to cause complaints, therefore, in accordance with the criteria of Table 10.4, impacts associated with construction vibration are of 'minor' magnitude on high-sensitive receptors, and would result in a 'Minor' effect (not significant in EIA terms).

10.5.5 In addition to on-site activities, construction traffic passing to and from the Site would also represent a potential source of noise to surrounding properties. Based on the prediction methodology in BS 5288, the worst-case predicted noise level, i.e., all traffic during the daytime working hours, no screening, and full angle of view, due to heavy vehicles moving on the nearest segment of the new site access track, at the closest dwelling is 62 dB L_{Aeq}. This corresponds to a 'minor' impact on high-sensitive receptor.

10.5.6 The effect of traffic on existing roads was assessed using the CRTN methodology with a maximum predicted increase of 0.2 dB in the daytime average noise level for the roads considered in the assessment. Based on the criteria set out in the DMRB (Table 10.3), this predicted short-term change in traffic noise levels corresponds to a 'negligible' impact in high-sensitive receptors.

10.5.7 In conclusion, noise and vibration from construction activities excluding the site track and road verge construction, are predicted to result in a temporary 'negligible to minor' impact on highly sensitive receptors in most cases, which represents 'negligible to minor' effects which are **not significant** in EIA terms. Traffic noise is predicted to have 'minor to negligible' impact on high-sensitive receptors which translates to 'minor to negligible' effects that are **not significant** in EIA terms. Predicted vibration impacts for site track activities are 'minor' as a worst-case which are also **not significant**. However, predicted noise impact from site track activities to the north without additional mitigation measures represent a 'moderate' impact on highly sensitive receptors, and therefore a moderate temporary adverse effect which is **significant** in EIA terms.

Operation

10.5.8 The predictions of operational noise at the nearest sensitive receptors for the Proposed Development alone are detailed in **Table 12** of **Technical Appendix 10.1 (EIAR Volume 4)** and are also illustrated as contours in **Figure 10.1** (**EIAR Volume 3a**). These varied between 29 dB(A) at low wind speeds to 41 dB(A) at high wind speeds at the nearest property (Waterhead Toll Cottage), over the range of 3 m/s to 12 m/s over which predictions were made (in line with ETSU-R-97 guidance).

10.5.9 The ETSU-R-97 assessment, i.e. difference between predicted level and limits for the Proposed Development, are set out in **Table 18** and **Table 19** of **Technical Appendix 10.1 (EIAR Volume 4)** and demonstrate that these predictions comply with the derived noise limits at all wind speeds during daytime and night-time and therefore are **not significant** in EIA terms. These predictions were made with 'low noise' operational modes for some turbines (embedded mitigation outlined in paragraph 10.3.52).

10.5.10 Noise predictions from the substation and BESS equipment proposed for the Proposed Development have been made at the nearest noise-sensitive property, Lettershaws Farm, located at approximately 900 m distance from the nearest point of the substation compound (and 1050 m from the BESS). As set out in **Section 5.9** of **Technical Appendix 10.1 (EIAR Volume 4)**, noise from the electrical and cooling plant associated with the proposed substation and BESS plant is unlikely to exceed 27 dB L_{Aeq} at Lettershaws Farm. When including a potential +2 dB penalty for the character of the noise, the resulting 'rated noise level' would be less than 30 dB(A), which is considered very low in absolute terms. According to the criteria in **Table 2** in **Technical Appendix 10.1 (EIAR Volume 4)** derived from BS 4142 guidance, this would correspond to a 'negligible' noise impact on the nearest highly sensitive receptor, therefore representing a negligible effect which is **not significant**.

Decommissioning

10.5.11 Provided that the same management process and best practices as construction would be employed for the decommissioning phase, decommissioning would likely result in less noise than during construction of the Proposed Development. The construction phase has been considered to generally have 'moderate' noise effects; however, activities which were associated with these effects, i.e., site access track and road verge works, would not be required for the decommissioning phase and so this is not relevant to this assessment. Therefore, most decommissioning activities would, in the worst case, have 'minor to negligible' temporary adverse noise effects at all high-sensitive receptors, which are **not significant** in EIA terms.

Cumulative

10.5.12 ETSU-R-97 requires consideration of cumulative noise levels. The Proposed Development noise levels were added to predictions from the operational and consented wind farms in the area and compared with the applicable noise limits based on a lower day time limit of 37 dB(A) and a lower night-time limit of 43 dB(A).

10.5.13 ETSU-R-97 also requires consideration of cumulative operational wind turbine noise levels. The comparison between cumulative predicted levels and the derived limits are also shown in **Table 20** and **Table 21** of **Technical Appendix 10.1 (EIAR Volume 4)**. This demonstrates that the predictions comply with the noise limits in all cases, with some negligible exceptions, particularly when considering the conservative nature of the predictions which assume downwind propagation from all turbines simultaneously. The operational cumulative effects are therefore, considered acceptable and **not significant** in EIA terms.

10.5.14 The assessment shows that the predicted operational noise levels from the Proposed Development are considered acceptable in line with relevant noise limits cumulatively as set out in ETSU-R-97. Therefore, operational noise levels from the proposed wind turbines are considered to be **not significant**.

10.5.15 Based on the above conclusions, the nature of the sources and the different guidance documents applicable in each case, it is considered based on professional judgement that there would be no additional in-combination operational noise impacts from the (cumulative) wind turbine noise in addition to that from the proposed substation and BESS (which was considered to be negligible).

10.5.16 The assessment of noise from onsite construction activities is based on the period when each potential activity would occur closest to each of the nearest noise-sensitive locations. Therefore, on-site construction activities from other sites are considered unlikely to produce any additional noise impacts, even if the construction periods were to coincide, given the conservative nature of this approach.

10.5.17 As stated in **Section 5.7** in **Technical Appendix 9.1 (EIAR Volume 4),** no other development (consented or in planning) is expected to result in construction traffic generation, as such no cumulative construction traffic noise effects are expected.

10.5.18 In conclusion, no additional cumulative significant effects in relation to noise have been identified.

10.6 Additional Mitigation and Enhancement Measures

Additional mitigation comprises site-specific mitigation which has been included to further reduce the significance of effect identified through the EIA. The additional mitigation measures have been outlined in this section below.

Construction

10.6.1 To reduce the potential effects of construction noise, specifically for site track and road verge construction activities near the residential properties at Lettershaws Farm Cottage to the north of the Site, the following mitigation measures are proposed:

- Direct engagement with the residents would be undertaken to inform them beforehand of the nature and duration of the construction works in proximity to their property and discuss potential mitigation and management measures such as the timing of the works.
- The use of solid screening or temporary acoustic barriers, of a sufficient height to screen the track activities at the property where construction activity is up to 65 m from the receptor boundary (Lettershaw Farm) would be investigated. The final design and specification of such screening would be determined as part of the detailed design of the access track following ground investigations.
- Where practicable, quieter equipment models and construction methods would be used for the activity.
- Construction plant capable of generating high noise and vibration levels would be operated in a manner to restrict the duration of the higher magnitude levels.
- Noise monitoring during this phase of construction activities would be undertaken at the most affected properties to assist in managing the noise impacts from the access track and road verge works.
- Where noise impact (after above measures and noise monitoring) at Lettershaws Farm is expected to likely remain above 75 dB L_{Aeq}, for a period of 10 or more days of working in any 15 consecutive days, reduced levels of activity or reduced construction hours would be investigated, although this may extend the duration of the works.

10.6.2 The above additional mitigation measures will be outlined in the Noise Management Plan as part of the CEMP and provided to SLC to be secured via a condition attached to any consent granted for the Proposed Development.

Operation

10.6.3 The selection of the final turbine to be installed for the Proposed Development would be made on the basis of enabling the relevant derived noise limits, as set out in **Tables 7 and 8,** of **Technical Appendix 10.1 (EIAR Volume 4)**, to be achieved at the neighbouring properties, including any relevant tonality corrections.

10.6.4 This could be secured through conditions attached to the planning consent, including the requirement that, in the event of a noise complaint, noise levels resulting from the operation of the Proposed Development are measured to demonstrate compliance with the conditioned noise limits. Such monitoring should be done in full accordance with ETSU-R-97.

Decommissioning

10.6.5 No additional mitigation required.

10.7 Assessment of Residual Effects

Construction

10.7.1 Application of the above mitigation measures specific to access track construction activities within the stated construction working hours (see 10.5.1), and best practice measures to manage construction noise, would minimise effects as far as is reasonably practicable. With the implementation of the mitigation measures outlined above, it is expected that noise levels at the closest and worst-affected residential properties to the Site access track and road construction works would be minimised and suitably managed, with noise exposure not exceeding 75 dB(A) for a period of more than 4 weeks, and therefore representing a 'minor' short-term impact on these high-sensitive receptors based on the criteria in Table 10.2.

10.7.2 The residual construction noise and vibration effects are therefore considered to be at most '**minor**' temporary adverse on **high-sensitive** receptors, which is **not significant** in EIA terms.

10.7.3 Construction noise and traffic effects are temporary and would only be in effect over the period of the construction programme; therefore, no residual effects are anticipated after completion.

Operation

10.7.4 At some locations under some wind conditions and for a certain proportion of the time, the wind turbine noise may be audible; however, operational turbine noise immission levels comply with the criteria of the ETSU-R-97 guidance recommended in Scottish planning policy (Onshore Wind Policy Statement 2022) for the assessment of wind farm noise. The operational noise effect is therefore considered to be not significant.

10.7.5 The residual noise effects from the operation of the proposed substation and BESS would remain **negligible** and therefore **not significant.**

Decommissioning

10.7.6 The residual operational effects are the same as the Decommissioning effects identified as **minor to negligible** and **not significant** in EIA terms in this assessment.

Cumulative

10.7.7 The residual cumulative effects are the same as the cumulative effects with embedded mitigation, identified as **not significant** in EIA terms in this assessment.

10.8 Monitoring

Construction

10.8.1 Noise monitoring during construction activities of the Site access track and road works closest to Lettershaws Farm, as proposed under the additional measures outlined above at paragraph 10.7.1, would be undertaken to assist in managing the noise impacts from the access track and road verge works. Final construction noise monitoring proposals would be determined and implemented as part of the CEMP.

Operation

10.8.2 In the event of a noise complaint, noise monitoring should be undertaken to measure noise levels resulting from the operation of the wind farm in order to demonstrate compliance with the applicable noise limits. Such monitoring should be done by an independent consultant and in full accordance with ETSU-R-97.

Decommissioning

10.8.3 No monitoring required for Decommissioning phase.

Cumulative

10.8.4 No monitoring is required relating to cumulative effects.

10.9 Summary

10.9.1 The following provides a summary of the conclusions of the impact assessment taking into consideration embedded and any additional mitigation measures.

10.9.2 The adoption of the identified mitigation measures would reduce the potential noise and vibration effects during construction. In particular, mitigation measures outlined in section 10.7 for site track construction activities would reduce the potential for significant effects. The residual effects associated with construction activities would therefore be at most 'minor' adverse and temporary on all high-sensitive receptors, and therefore **not significant** in EIA terms.

10.9.3 Decommissioning is likely to result in less noise than during construction of the Proposed Development. Decommissioning would, in the worst-case, have 'minor' temporary adverse noise effects which are **not significant** in EIA terms.

10.9.4 Operational noise levels from the Proposed Development were predicted to be compliant with noise limits derived in accordance with the ETSU-R-97 guidance. The cumulative noise levels were also predicted to be compliant with the respective noise limits derived, with negligible exceptions, the effects are therefore **not significant** in EIA terms.

10.9.5 Depending on the levels of background noise, the satisfaction of the ETSU-R-97 derived limits could lead to a situation whereby, at some locations under some wind conditions and for a certain proportion of the time, noise from the wind turbines may be audible. However, noise levels at the properties in the vicinity of the Proposed Development would still be within levels considered acceptable under the ETSU-R-97 assessment method and therefore **not significant** in EIA terms.

10.9.6 Table 10.6 below presents a summary of effects.

Table 10.6: Summary of Potential Significant Effects

Likely Significant Effect	Additional Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Access Track and road verge	Construction management measures for access track construction activities in	CEMP	Not Significant

Table 10.6: Summary of Potential Significant Effects			
Likely Significant Effect	**Additional Mitigation Proposed**	**Means of Implementation**	**Outcome/Residual Effect**
construction near Lettershaws Farm – Moderate.	proximity to Lettershaws Farm, including screening and management, minimising noise emissions, liaison with residents and noise monitoring during activities at closest point.		
All other activities – minor to negligible.	None	Embedded	Not Significant
Operation			
All receptors – not significant.	None	Embedded	Not Significant
Decommissioning			
All receptors – minor to negligible.	None	Embedded	Not Significant
Cumulative construction			
All receptors – all activities – negligible.	None	Embedded	Not Significant
Cumulative operation			
All receptors – not significant.	None	Embedded	Not Significant

10.10 References

[i] Scottish Government (2011). Planning Advice Note 1/2011: Planning & Noise and accompanying Technical Advice Note; 2011

[ii] ETSU R 97, the Assessment and Rating of Noise from Wind Farms, Final ETSU-R-97 Report for the Department of Trade & Industry. The Working Group on Noise from Wind Turbines, 1996.

[iii] M. Cand et al (2013). 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'. Institute of Acoustics

[iv] British Standard BS 5228-1:2009-A:2014 (2009). 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'

[v] British Standard BS 5228-2:2009-A:2014 (2009). 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration'.

[vi] Scottish Government (1996) Planning Advice Note 50: 'Controlling the Environmental Effects of Surface Mineral Workings

[vii] British Standard institute (2019) BS 4142-1:2014+A1:2019 'Methods for rating and assessing sound from industrial and commercial sites.

[viii] British Standards institute (2008) BS 6472 2:2008: 'Guide to evaluation of human exposure to vibration in buildings - Part 2: Blast-induced vibration.

[ix] Department of Transport (1988). 'Calculation of Road Traffic Noise'.

[x] The Highways Agency, Transport Scotland, Transport Wales and The Department for Regional Development (Northern Ireland) (2020). 'Design Manual for Roads and Bridges, LA 111 Noise and vibration', revision 2

11 Schedule of Mitigation

11.1 Introduction

11.1.1 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.

11.1.2 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** (EIAR Volume 2), in particular in Table 3.1. As such, these measures have not been replicated here.

11.1.3 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.

11.1.4 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.

11.1.5 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 11.1. It is anticipated that the mitigation measures outlined in this table would be secured through appropriately worded planning conditions attached to any consent granted.

11.1.6 The environmental baseline adopted for the purposes of the EIA is stated in each of the technical assessment chapters provided in the EIAR. The baseline is normally taken as the current character and condition of the site and surrounds, and the likely significant environmental effects of the development are then assessed in the context of the current conditions. No change to the current baseline, comprising potential future baseline scenarios, is anticipated.

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
General Mitigation	Pre-construction Construction	An Outline CEMP (OCEMP) has been prepared as part of the EIA process for the Proposed Development (**Technical Appendix 2.1, EIAR Volume 4**). The appointed Contractor would prepare detailed method statements which would be incorporated into the final CEMP. The CEMP would 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 any 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.
General Mitigation	Construction	Locations of proposed turbines, other infrastructure and borrow pits to be subject to a micrositing allowance of 100 m forming a condition of consent. Any repositioning would not encroach into environmentally constrained areas and would 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.

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
Landscape and Visual	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 would be submitted to and approved by SLC, in consultation with relevant statutory bodies.
Landscape and Visual	Operation	Reduced lighting scheme (i.e. not all turbines lit) and reduced intensity of turbine aviation lighting. Proposed 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 for non-aviation receptors.	Reduced lighting scheme submitted to SLC for approval in consultation with the Civil Aviation Authority (CAA).
Cultural Heritage	Pre-construction	The Scheduled Monument within the Site (SM4714) would 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 would remain in place for the duration of the construction activities on Site.	To avoid any direct impacts on the Scheduled Monuments.	Stand-off buffers will be set out in the Written Scheme of Investigation (WSI), to be approved by SLC in consultation with Historic Environment Scotland (HES)/ West of Scotland Archaeology Service (WoSAS) in advance of development works commencing.
Cultural Heritage	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 mitigate potential adverse impact of up to moderate significance on Pyatshaw Brae House Platform (WoSAS 13299) To mitigate the potential accidental adverse impact of moderate significance on Kirk Gill (WoSAS 10505).	Archaeological monitoring and excavation (where required). This will be set out in a WSI, to be approved by SLC in consultation with WoSAS. CEMP to be approved by SLC in consultation with other statutory consultees. Appointment of Archaeological Clerk of Works (ACoW).

Table 11.1: Summary of Mitigation Measures

Topic	**Timing of Mitigation Measures**	**Description**	**Purpose of Mitigation Measure**	**Means of Implementation**
Cultural Heritage	Construction	Works would_proceed in accordance with the measures set out in the Outline CEMP (**Technical Appendix 2.1, EIAR Volume 4**).	The purpose of this mitigation is 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	Construction	A qualified Archaeological Contractor to be appointed to act as an ACoW to provide advice to the appointed Contractor regarding micrositing 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 WSI.
Cultural Heritage	Construction	Construction machinery to operate only within defined working areas and access corridors, limiting ground disturbance.	To mitigate the potential adverse direct construction impact on previously undiscovered below-ground archaeological remains.	Archaeological monitoring and excavation (where required). Forms part of the CEMP which will be approved by SLC in consultation with HES and WoSAS and set out in a WSI.
Cultural Heritage	Construction	Archaeological monitoring (watching briefs) and set-piece excavation may be undertaken to record heritage assets (e.g. WoSAS 10505 and WoSAS 76804) 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	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.
Ecology	Pre-construction	A suitably qualified ECoW to be appointed prior to the commencement of construction to advise the appointed Contractor on all ecological matters.	To ensure the appropriate implementation of ecological mitigation measures.	ECoW secured via planning conditions.

Table 11.1: Summary of Mitigation Measures

Topic	**Timing of Mitigation Measures**	**Description**	**Purpose of Mitigation Measure**	**Means of Implementation**
		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.		
Ecology	Pre-Construction	Pre- and during-construction surveys to be carried out by an ECoW or suitably qualified ecologist. Requirement to form part of the Species Protection Plan (SPP).	To ensure the safeguarding of protected species known or likely to be in the area.	ECoW secured via planning condition. Forms part of SPP, and requirement of CEMP, which will be submitted to and approved by SLC in consultation with NatureScot.
Ecology	Pre-construction	Any micrositing 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 groundwater dependant terrestrial ecosystems (GWDTEs), or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micrositing to also take consideration of any buffer distances on protected features identified, as detailed within the SPP.	To ensure any micrositing does not adversely affect any sensitive ecological features.	ECoW secured via planning conditions to review all proposed micrositing.
Ecology	Pre-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. 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	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	Ensure the Proposed Development secures significant biodiversity enhancements.	The aims, objectives and prescriptions of management measures outlined in the BEMP to be submitted to and approved by SLC, in consultation with

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
		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).**		NatureScot, and the advisory of an appointed Biodiversity Advisory Committee (BAC).
Ecology	Construction	Standard and embedded mitigation includes presence of an ECoW, micrositing 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 OBEMP (**Technical Appendix 6.7, EIAR Volume 4**).	To mitigate Direct and Indirect Loss and/or Modification of Blanket Bog/Wet Modified Bog Habitat.	Planning conditions. Delivery of a BEMP; outline included as **Technical Appendix 6.7 (EIAR Volume 4)**.
Ecology	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. ▪ 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.	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 11.1: Summary of Mitigation Measures				
Topic	**Timing of Mitigation Measures**	**Description**	**Purpose of Mitigation Measure**	**Means of Implementation**
		Measures will be included as part of the CEMP and SPP.		
Ecology	Operation	Peatland restoration and enhancement within the application boundary is proposed as part of the OBEMP (**Technical Appendix 6.7, EIAR Volume 4**).	Restoration and Enhancement of Blanket Bog/Wet Modified Bog Habitat.	Planning conditions. Delivery of a BEMP; outline included as **Technical Appendix 6.7 (EIAR Volume 4)**.
Ecology	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	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
Ornithology	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.	BDMP submitted to SLC for approval in consultation with NatureScot.
Ornithology	Pre-construction Construction Operation	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	To oversee the implementation of the BDMP and ensure all reasonable precautions are taken to avoid disturbance to	ECoW secured via planning condition.

Table 11.1: Summary of Mitigation Measures				
Topic	**Timing of Mitigation Measures**	**Description**	**Purpose of Mitigation Measure**	**Means of Implementation**
	Decommissioning	with regards to ornithological sensitivities to the relevant staff of the appointed Contractor and sub-contractors	birds and comply with environmental legislation.	
Ornithology	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.
Ornithology	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.	To minimise collision mortality risk to golden eagle and red kite.	Submitted to SLC for approval in consultation with NatureScot.
Ornithology	Operation	BEMP 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 submitted to and approved by SLC, in consultation with NatureScot and the advisory of an appointed BAC.
Hydrology, Hydrogeology and Geology	Pre-construction	Targeted ground investigation to be undertaken pre-construction by the Appointed Contractor to include a detailed mining assessment for the Proposed Development, and micrositing undertaken where necessary.	To manage risks associated with historic mining activity.	The Appointed Contractor to undertake the ground investigation supported by an experienced mining professional to undertake mining assessment.
Hydrology, Hydrogeology and Geology	Pre-construction Construction	Implementation of water quality management plan and water monitoring during pre-construction and construction.	To manage water contamination.	Detailed CEMP to be submitted to and approved by the LPA, in consultation with Scottish Environment Protection Agency (SEPA).

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology, Hydrogeology and Geology	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 4)**.	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.
Hydrology, Hydrogeology and Geology	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 and Geology	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 and Geology	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 and Geology	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

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology, Hydrogeology and Geology	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.
Hydrology, Hydrogeology and Geology	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 and Geology	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 and Geology	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 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	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 and Geology	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 4)**.	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.
Hydrology, Hydrogeology and Geology	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.
Hydrology, Hydrogeology and Geology	Pre-Construction Construction Operation	The Principal 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 8.6 (EIAR Volume 4)**.	Mechanism for implementation of best working practices in relation to peat/carbon rich soils.	Tye PMP would be secured via planning condition and would be submitted to and approved by SLC in consultation with SEPA.
Hydrology, Hydrogeology and Geology	Pre-Construction Construction Operation	Measures to manage peat slide risk (as detailed in the peat landslide hazard risk assessment (PLHRA) **Technical Appendix 8.7, EIAR Volume 4**) to be included in the detailed PMP. 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.
Hydrology, Hydrogeology and Geology	Construction	Implementation of measures to minimise disturbance of contaminated soils. To be managed through preparation of a detailed soils plan in the CEMP.	To manage the risk of contamination.	Detailed CEMP to be submitted to and approved by the LPA, in consultation with SEPA.
Hydrology, Hydrogeology and Geology	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.	ECoW secured via planning condition. Requirement detailed in the CEMP to be approved by SLC in consultation with SEPA.

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
Hydrology, Hydrogeology and Geology	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 and Geology	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.
Hydrology, Hydrogeology and Geology	Operation	Water quality monitoring during operation phase to monitor presence of heavy metals.	To manage the risk of contamination.	Site maintenance works to be carried out under long-term operational management plan.
Hydrology, Hydrogeology and Geology	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.
Hydrology, Hydrogeology and Geology	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	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;	To reduce potential effects on road users.	To be submitted to SLC for approval in consultation with Transport Scotland.

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
		▪ 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.		
Traffic and Transport	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. 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.	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.
Traffic and Transport	Construction	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	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.

Table 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
		Development/public interface with the Applicant, the Contractor, the local community, and if appropriate, the police forming the committee.		
Traffic and Transport	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 secured as part of the Abnormal Load Route Assessment Report. Details would be approved by SLC in consultation with Transport Scotland.
Traffic and Transport	Construction	Police escort, supplemented with civilian pilot car, will facilitate the delivery of the AILs. 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.	To facilitate the delivery of the predicted AILs.	To be secured as part of the Abnormal Load Route Assessment Report. Details would be approved by SLC in consultation with Transport Scotland.
Traffic and Transport	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	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.

Table 11.1: Summary of Mitigation Measures

Topic	**Timing of Mitigation Measures**	**Description**	**Purpose of Mitigation Measure**	**Means of Implementation**
Noise	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. ▪ 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.	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 11.1: Summary of Mitigation Measures

Topic	Timing of Mitigation Measures	Description	Purpose of Mitigation Measure	Means of Implementation
		Measures to form part of the CEMP, with an outline CEMP provided in **Technical Appendix 2.1 (EIAR Volume 4)**.		
Noise	Construction	Construction management measures for access track construction activities in proximity to Lettershaws Farm, including screening and management, minimising noise emissions, liaison with residents and noise monitoring during activities at closest point.	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	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.
Noise	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.