

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('Habitats Directive');
- Environmental Impact Assessment Directive 85/337/EEC, as amended ('EIA Directive') (as subsequently codified by Directive 2011/92/EU, as amended by Directive 2014/52/EU);
- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ('Water Framework Directive');
- The Electricity Act 1989;
- The Conservation (Natural Habitats &c.) Regulations 1994 ('the Habitats Regulations');
- The Conservation of Habitats and Species Regulations 2017 ('the 2017 Regulations');
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- Wildlife and Countryside Act 1981; and,
- Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- Nature Conservation (Scotland) Act 2004;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- Protection of Badgers Act 1992.

The assessment will be carried out in accordance with the principles contained within the following policy documents:

- National Planning Framework 4 (NPF4⁶⁵) (February 2023);
- Draft Planning Guidance: Biodiversity (November 2023);
- Joint Nature Conservation Committee (JNCC) and Department for Environment, Food and Rural Affairs (DEFRA) (2012). UK Post-2010 Biodiversity Framework.
- Scottish Executive (2004). Scottish Biodiversity Strategy: It's in Your Hands.
- Scottish Government (2000). Planning Advice Note (PAN)60: Planning for Natural Heritage;
- Draft Planning Guidance: Biodiversity⁶⁶;
- Scottish Government (2017b) Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017⁶⁷;
- Scottish Government (2022a⁶⁸). Onshore Wind Policy Statement 2022;
- Scottish Biodiversity Strategy to 2045⁶⁹. Tackling the Nature Emergency in Scotland; and

The assessment will be carried out in accordance with the following guidance:

- Chartered Institute for Ecology and Environmental Management (CIEEM) (2024)⁷⁰ Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (version 1.3);

⁶⁵ Scottish Government (2023) National Planning Framework 4. Available at: <https://www.gov.scot/publications/national-planning-framework-4/>. Accessed on: 3 February 2025

⁶⁶ Scottish Government (2000). Planning Advice Note (PAN) 60: Planning for Natural Heritage.

⁶⁷ Scottish Government (2017b). Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/>. Accessed on: 3 February 2025

⁶⁸ Scottish Government (2022a). Onshore Wind Policy statement – available at Onshore wind: policy statement 2022 - gov.scot (www.gov.scot)

⁶⁹ Scottish Government (2022b). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland. Scottish Government, Edinburgh.

⁷⁰ CIEEM (2024). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine Version 1.3*. Chartered Institute of Ecology and Environmental Management, Winchester.

- Collins, J. (2023⁷¹). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition);
- European Commission (2020⁷²) Guidance document on wind energy developments and EU nature legislation.
- JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012⁷³) UK Post-2010 Biodiversity Framework.
- Joint Nature Conservation Committee (JNCC) (2013⁷⁴) Guidelines for selection of biological Sites of Special Scientific Interest (SSSI).
- NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021⁷⁵). Bats and Onshore Wind Turbines - Survey, Assessment and Mitigation.
- NatureScot (2024⁷⁶) General Pre-application and Scoping Advice to Developers of Onshore Wind Farms.
- Scottish Badgers (2018⁷⁷) Surveying for Badgers: Good Practice Guidelines. Version 1.
- Scottish Executive (2000) Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995;
- Scottish Environment Protection Agency (SEPA) (2024⁷⁸) Guidance on Assessing the Impacts of Developments on Groundwater Terrestrial Ecosystems;
- Scottish Government (2001⁷⁹). European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements;
- Scottish Government (2006⁸⁰). European Protected Species - terms of guidance: Chief Planner letter; and

⁷¹ Collins, J. (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition)*. Bat Conservation Trust.

⁷² European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Available at: https://ec.europa.eu/environment/nature/natura2000/management/docs/wind_farms_en.pdf. Accessed: 3 February 2025

⁷³ Joint Nature Conservation Committee and DEFRA (on behalf of the Four Countries' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework (July 2012). Available at: <https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/>. Accessed on: 3 February 2025

⁷⁴ Joint Nature Conservation Committee (2013). Guidelines for selection of biological Sites of Special Scientific Interest (SSSI). Available at: <https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/>. Accessed on: 3 February 2025

⁷⁵ NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, updated 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation:

⁷⁶ NatureScot (2024). General Pre-application and Scoping Advice to Developers of Onshore Wind Farms. NatureScot pre-application guidance for onshore wind farms | NatureScot. Accessed on: 3 February 2025

⁷⁷ Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1. Available at: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf. Accessed on: 3 February 2025

⁷⁸ Scottish Environment Protection Agency (2024). Guidance on Assessing the Impacts of Developments on Groundwater Terrestrial Ecosystems. Available

at: <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.sepa.org.uk%2Fmedia%2Fa1yh0blq%2Fguidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx&wdOrigin=BROWSELINK>. Accessed on: 3 February 2025

⁷⁹ Scottish Government (2001). European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements. Available at:

<https://www.webarchive.org.uk/wayback/archive/20150220012946/http://www.gov.scot/Publications/2001/10/10122/File-1>. Accessed on: 3 February 2025

⁸⁰ Scottish Government (2006). European Protected Species – terms of guidance: Chief Planner letter. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/correspondence/2006/05/european-protected-species-chief-planner-letter/documents/ec-directive-92_43_eec-conservation-natural-habitats-wild-flora-fauna-pdf/ec-directive-92_43_eec-conservation-natural-habitats-wild-flora-fauna-pdf/govscot%3Adocument/EC%2BDirective%2B92_43_EEC%2BOn%2Bthe%2BConservation%2Bof%2BNatural%2BHabitats%2BAnd%2Bof%2BWild%2BFlora%2BAnd%2BFauna.pdf Accessed on: 3 February 2025

- South Lanarkshire Council (2024) South Lanarkshire Biodiversity Strategy 2024 - 2030⁸¹.
- Scottish Government (2013⁸²) Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity.
- Scottish Government (2016⁸³) Draft Peatland and Energy Policy Statement.
- Scottish Government (2017a⁸⁴) Planning Advice Note 1/2013 - Environmental Impact Assessment, Revision 1.0.
- Scottish Government (2017b⁸⁵) Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.
- Scottish Government (2018⁸⁶) Climate Change Plan: Third Report on Policies and Proposals 2018-2032.
- Scottish Government (2020⁸⁷) Scottish biodiversity strategy post-2020: statement of intent.
- SNH (2015⁸⁸) Scotland's National Peatland Plan.
- SNH (2016a⁸⁹) Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2).
- SNH (2016b⁹⁰) Planning for Development: What to consider and include in Habitat Management Plans. Version 2.
- NatureScot (2023⁹¹). Advising on carbon-rich soils, deep peat and priority peatland habitat in development management.
- SNH (2018⁹²) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

⁸¹ South Lanarkshire Council (2024) South Lanarkshire Biodiversity Strategy 2024 - 2030. Available at:

https://www.southlanarkshire.gov.uk/downloads/file/16574/biodiversity_strategy_2024_-_2030. Accessed on: 3 February 2025.

⁸² Scottish Government (2013). Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity (2013). Available at: <https://www.gov.scot/publications/scotlands-biodiversity---its-in-your-hands/>. Accessed on: 6 May 2024

⁸³ Scottish Government (2016). Draft Peatland and Energy Policy Statement. Available at:

<https://www.gov.scot/publications/peatland-and-energy-draft-policy-statement/>. Accessed on: 3 February 2025

⁸⁴ Scottish Government (2017a). Planning Advice Note 1/2013 – Environmental Impact Assessment, Revision 1.0. Available at:

<https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/>. Accessed on: 6 May 2024

⁸⁵ Scottish Government (2017b). Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/>. Accessed on: 3 February 2025

⁸⁶ Scottish Government (2018). Climate Change Plan: Third Report on Policies and Proposals 2018-2032. Available at:

<https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/>. Accessed on: 3 February 2025

⁸⁷ Scottish Government (2020). Scottish biodiversity strategy post-2020: statement of intent. Available at:

<https://www.gov.scot/publications/scottish-biodiversity-strategy-post-2020-statement-intent/>. Accessed on: 3 February 2025

⁸⁸ SNH (2015). Scotland's National Peatland Plan. Available at: <https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future>. Accessed on: 3 February 2025

⁸⁹ SNH (2016a). Planning for Development: What to consider and including in deer assessments and management at development sites (Version 2). Available at: <https://www.nature.scot/doc/guidance-planning-development-what-consider-and-include-habitat-management-plans>. Accessed on: 3 February 2025

⁹⁰ SNH (2016b). Planning for Development: What to considered and including in Habitat Management Plans. (Version 2). Available at: <https://www.nature.scot/doc/guidance-planning-development-what-consider-and-include-habitat-management-plans>. Accessed on: 3 February 2025

⁹¹ NatureScot (2023). Advising on carbon-rich soils, deep peat and priority peatland habitat in development management. Available at: <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management>. Accessed on: 3 February 2025

⁹² SNH (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Scottish Natural Heritage. Available at: <https://www.nature.scot/doc/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others>. Accessed on: 3 February 2025

- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), HES, AEECoW (2019⁹³) Good Practice During Windfarm Construction (4th Edition).
- Scottish Government (2021)⁹⁴. Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines.

Assessment Methodology

The EIAR will include and Ecological Impact Assessment (EcIA). This will consider the potential direct, indirect and cumulative impacts that the construction, operation and decommissioning of the Proposed Development could have on IEFs, as per CIEEM (2024⁷²) guidance. The assessment will be supported by appendices that will include details of survey methodologies and all survey data.

The assessment will include the following elements:

- baseline conditions;
- scoping in/out of ecological features and impacts;
- assessment of potential impacts and effects on IEFs during construction and operational phases;
- cumulative effects;
- mitigation; and
- summary of significant residual effects.

Effects on IEFs will be assessed in relation to the species' reference population or habitat extent, conservation status, range and distribution. The assessment of potential effects will be informed by guidelines published by CIEEM (2024⁷²) and Scottish Government (2017b⁶⁹).

The assessment involves the following process:

- identifying potential impacts of the Proposed Development;
- considering the likelihood of occurrence of potential impacts;
- defining the nature conservation value (NCV) and conservation status of relevant populations for each IEF to determine overall sensitivity;
- establishing the magnitude of the likely impact (both spatial and temporal) on each IEF);
- making a judgement based on the above information as to whether or not the consequent potential effect would be significant with respect to the EIA Regulations;
- if a potential effect is determined to be significant, measures to avoid or reduce the significance of effects are considered;
- considering opportunities for enhancement where appropriate; and
- concluding residual potential effects after considering mitigation, compensation and enhancement.

An assessment of relevant cumulative impacts will be undertaken following published guidance⁷⁴. Where it is determined that a cumulative assessment is necessary, impacts will be assessed in combination with other wind farm projects subject to the EIA process within 5 km, and their effects on a relevant reference population; for example, at a watercourse, watershed or Natural

⁹³ Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), HES, AEECoW (2019). Good Practice During Windfarm Construction (4th Edition). Available at: <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction>. Accessed on: 3 February 2025.

⁹⁴ <https://www.gov.scot/publications/freshwater-and-diadromous-fish-and-fisheries-associated-with-onshore-wind-farm-and-transmission-line-developments-generic-scoping-guidelines/> [Accessed February 2025]

Heritage Zone (NHZ) level. The scope of the cumulative assessment will be agreed in consultation with NatureScot.

3.5.6 Questions for Consultees

Table 3.5.3: Questions to Consultees (Ecology)

ECO1	Are there any other relevant consultees who should be consulted, or other sources of information that should be considered?
ECO2	Do consultees agree that the suite of field surveys undertaken in 2024 and to be undertaken in 2025, in addition to a desk study are sufficient to inform a robust impact assessment?
ECO3	Do consultees agree that the methodology and scope of assessment is appropriate?
ECO4	Do you consultees agree that the evidence provided is suitable to scope out the need for a detailed Peat Condition Assessment, in accordance with NatureScot guidance?
ECO5	Do consultees agree with the features proposed to be scoped out from further assessment?

3.6 Ornithology

3.6.1 Overview

This section details the approach to baseline ornithological information gathering and the proposed scope and methodology of the assessment of potentially significant effects upon Important Ornithological Features (IOFs).

Potential impacts upon ornithology will be considered throughout the design process for the Proposed Development, and where possible will either be avoided completely through design or will be prevented/minimised via good practice embedded mitigation measures.

The EIAR Ornithology chapter will provide a summary of the baseline ornithological conditions and will detail all those measures required to avoid, minimise or offset any potentially significant adverse effects on IOFs. Furthermore, an outline of biodiversity enhancement opportunities will be provided in the Outline Biodiversity Environmental Management Plan (OBEMP; refer to Section 3.5, Ecology of the Scoping Report).

3.6.2 Study Area

The EIAR Ornithology chapter will consider the following ornithological Study Areas (note that the buffers will be created from the finalised design):

- Designated sites: 20 km Study Area (based on NatureScot guidance, SNH 2016a⁹⁵) from the proposed turbines;
- Collision risk modelling: the results of the flight activity surveys will be used to inform collision risk modelling. A Collision Risk Analysis Area (CRAA) will be created by buffering proposed outer turbine locations by 500 m (as per SNH 2017⁹⁶);
- Scarce⁹⁷ breeding birds: 2 km Study Area from the proposed turbines (800 m for access tracks) (SNH 2017⁹⁶);

⁹⁵ SNH (2016a) Assessing connectivity with Special Protection Areas [Online]. Available at: <https://www.nature.scot/doc/assessing-connectivity-special-protection-areas>

⁹⁶ SNH (2017) Recommended bird survey methods to inform impact assessment of onshore Windfarms.

⁹⁷ Scarce breeding birds are those listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and in the case of the Development consists of any raptor and owl species listed on either Annex 1 or Schedule 1.

- Black grouse: 1.5 km Study Area from the proposed turbines (750 m for access tracks) (SNH 2017⁹⁶);
- Breeding upland waders and wintering waders, raptors, owls and wildfowl – 500 m Study Area from the proposed turbines/access tracks (SNH 2017⁹⁶); and
- Cumulative assessment: as per SNH (2018a⁹⁸), the Natural Heritage Zone (NHZ, Wilson *et al.* 2015⁹⁹) level is considered practical and appropriate for breeding species not connected to designated sites. The Site is on the boundary of NHZ 19 (Western Southern Uplands and Inner Solway) and NHZ 20 (Border Hills) and the appropriate NHZ will be selected on a species-by-species case based on the location of breeding activity.

3.6.3 Baseline Conditions

Baseline ornithology conditions have been/will be established from the following sources:

- NatureScot Sitelink¹⁰⁰;
- RSPB Scotland data unit;
- South Strathclyde Raptor Study Group (SSRSG) / Dumfries and Galloway Raptor Study Group (DGRSG); and
- South of Scotland Golden Eagle Partnership (SSGEP).

EIA documentation and/or operational monitoring data from relevant nearby wind farm developments together with peer-reviewed literature will also be referred to where relevant and made available and referenced within the EIAR.

Baseline Surveys

The following surveys have been undertaken to date (February 2025) or will be completed by the end of August 2025. All surveys are undertaken in line with the appropriate guidance (SNH 2017⁹⁶, Hardey *et al.* 2013¹⁰¹, Gilbert *et al.* 1998¹⁰²) and survey areas are detailed below. All survey areas were created using survey-specific buffers based on the Proposed Development provided at the time of survey commencement as detailed below.

Target species for surveys and recording were identified in accordance with NatureScot guidance (SNH 2017⁹⁶, 2018b¹⁰³), knowledge of bird-habitat associations at the local and across Scotland and preliminary survey visits.

- Flight activity surveys (monthly from September 2023 to August 2025 allowing for coverage of the 2024 and 2025 breeding seasons and 2023/2024 and 2024/2025 non-breeding seasons; minimum of 36 hours per vantage point (VP) per season, as per SNH 2017⁹⁶);
 - September 2023 to August 2024 – ten VP locations¹⁰⁴ (**Figure 3.6.1** and **Figure 3.6.2**);
 - September 2024 to August 2025 – 12 VP locations¹⁰⁵ (**Figure 3.6.3**);
- Scarce breeding bird surveys (2024 and 2025 breeding seasons, **Figure 3.6.4**);

⁹⁸ Scottish Natural Heritage (2018a). Assessing the cumulative impacts of onshore wind farms on birds.

⁹⁹ Wilson, M. W., Austin, G. E., Gillings S., & Wernham, C. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72.

¹⁰⁰ Available at: <https://sitelink.nature.scot/home>

¹⁰¹ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh.

¹⁰² Gilbert, G., Gibbons, D. W. and Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy.

¹⁰³ Scottish Natural Heritage (2018b). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.

¹⁰⁴ It should be noted that VP 6 was relocated (and became VP 12) early in the 2024 breeding season due to a potential hen harrier breeding attempt in proximity to the original VP 6 location.

¹⁰⁵ Two additional viewsheds were added (VPs 13 and 14) to extend viewshed coverage along the Dun Law to Louise Wood Law hill line at the south east extent of the site following the inclusion of another land parcel in September 2024.

- Black grouse surveys (2024 and 2025 breeding seasons, **Figure 3.6.4**);
- Breeding wader surveys (2024 and 2025 breeding seasons, **Figure 3.6.4**); and
- Winter walkover surveys (2023/2024 and 2024/2025 non-breeding seasons **Figure 3.6.4**).

When surveys commenced at the Site in September 2023, the parcel of land that forms the south east area of the Site (the area on which turbines 28 to 32 are situated (**Figure 3.6.3**)) was not included. This area was included at the start of the year 2 surveys in September 2024 and the viewsheds and survey areas were revised to include this area (**Figure 3.6.3** and **Figure 3.6.4**). Year 1 surveys did provide some coverage of this area with the black grouse and scarce breeding birds survey areas extending over this area (**Figure 3.6.4**).

Guidance from NatureScot (SNH 2017⁹⁶) generally recommends a baseline survey programme of two years in order to ensure any interannual variation is recorded to allow for a robust assessment of effects on ornithology. This will be completed for the majority of the Site; however, it is proposed to only undertake one year of baseline surveys for the additional area added in September 2024. Considering the relatively small size of this additional area (in wind turbines are proposed) and the similarity of the habitats (and therefore similar bird distribution and abundance) present on this additional area to those present within the year 1 survey areas, one year of baseline surveys on the additional area (comprising the 2024/2025 non-breeding season and 2025 breeding season) is considered sufficient and representative to allow for a robust assessment on the potential impacts to ornithology. With regards to viewshed coverage, it is acknowledged that T28, T30, T31 and T32 are outwith the 2023/24 viewshed coverage/T28, T31 and T32 are outwith the 2024 viewshed coverage¹⁰⁶ (**Figure 3.6.1** and **Figure 3.6.2** respectively). Whether this would affect the robustness of the collision risk modelling depends on how similar the flight activity rates in the un-surveyed areas around these three turbine locations are to the flight activity rates recorded in the viewshed areas surveyed. In this case it is considered that the recorded flight activity rates in year 1 would be sufficiently representative as the three turbines are located in similar habitat and on similar gradients to the remaining 29 turbines covered by the viewsheds. It is therefore likely that flight activity would be similar around the three turbines as recorded across the Site. Therefore, the mean flight activity rates per unit area (hectare) used in the collision model inputs are considered to be appropriate and unlikely to result in inaccurate collision rates.

Confirmation of this approach is sought from NatureScot as part of this Scoping request.

Designated Sites

There are no statutory designations with ornithological features within the Site. However, the Site is within 20 km of one Special Protection Area (SPA) and three Sites of Scientific Special Interest (SSSIs) with ornithological features, as listed below and shown on **Figure 3.6.5** (note that all distances are from the nearest point of the designation site boundary to the nearest turbine).

- Muirkirk and North Lowther Uplands SPA (underpinned by the Muirkirk Uplands SSSI and North Lowther Uplands SSSI), approximately 3.6 km from the Site and designated for non-breeding hen harrier, breeding golden plover, hen harrier, merlin, peregrine falcon, short-eared owl and a breeding bird assemblage¹⁰⁷; and
- Tweedsmuir Hills SSSI, approximately 18.9 km from the Site and designated for a breeding bird assemblage¹⁰⁸.

¹⁰⁶ Note that T28, T31 and T32 are covered by the year 2 viewshed coverage, **Figure 3.6.3**.

¹⁰⁷ The citation lists red grouse, raven, dunlin, snipe, teal, curlew, redshank, whinchat and wheatear.

¹⁰⁸ 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.

Based on the guidance from NatureScot (SNH 2016a⁹⁵) 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 SPA populations. Due to the Site being within 5 km of the SPA, there is some potential for there to be connectivity between the Site and the SPA merlin population. However, on the basis of evidence gathered to date, it is likely that the assessment would conclude no adverse effects on integrity of the SPA for all species. Information to inform an Appropriate Assessment will be provided in the ornithology chapter.

Ornithological Activity

This section provides a summary of baseline studies that have been completed between September 2023 and January 2025. Full details of all baseline studies including ornithological survey methods and survey conditions will be presented within the EIAR and associated Technical Appendices. Information pertaining to the locations of breeding sites of birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) will be restricted to a Confidential Volume¹⁰⁹ of the EIAR in accordance with NatureScot guidance (SNH 2016b¹¹⁰).

Flight activity surveys to date (January 2025) have recorded 15 target species (black grouse, curlew, golden eagle, golden plover, goshawk, greylag goose, hen harrier, herring gull, lapwing, merlin, peregrine falcon, pink-footed goose, red kite, short-eared owl and whooper swan). This flight activity data may be included in the Collision Risk Model (CRM), depending on the flight location in relation to the final turbine layout.

Surveys during the 2024 breeding season identified the following confirmed/potential scarce breeding bird breeding activity.

- Red kite: one confirmed breeding location and an associated potential roost area (both over 500 m from the nearest proposed turbine location);
- Hen harrier: two potential breeding attempts identified (both over 500 m from the nearest proposed turbine location); and
- Short-eared owl: one potential breeding attempt identified.

Golden eagle, goshawk, merlin and peregrine falcon were also recorded but no evidence of breeding within the 2 km survey area was identified.

Breeding wader surveys during the 2024 breeding season recorded breeding activity for common sandpiper, curlew, golden plover, lapwing, oystercatcher, redshank, ringed plover and snipe within the 500 m survey area.

Limited black grouse activity has been recorded to date. A single black grouse was recorded on two occasions in March 2024 early during the 2024 breeding season surveys, but no subsequent black grouse were seen during the breeding season and no leks were found (despite targeted surveys).

Winter walkovers undertaken over the 2023/2024 non-breeding season identified that the open moorland habitats within the Site are unsuitable for foraging migratory swans and geese. Limited ornithology activity was recorded on the Site during the non-breeding season with occasional

¹⁰⁹ This Volume of the EIAR will not be made publicly available but will be provided to NatureScot and Royal Society for the Protection of Birds (RSPB) Scotland to inform their own appraisal of the Proposed Development.

¹¹⁰ SNH (2016b). Environmental Statements and Annexes of environmentally sensitive bird information: Guidance for developers, consultants and consultees [Online]. Available at: <https://www.nature.scot/doc/environmental-statements-and-annexes-environmentally-sensitive-bird-information>.

records of golden plover, goshawk, hen harrier, lapwing, peregrine falcon, pink-footed goose (overflying the Site) and red kite.

3.6.4 Potential Significant Effects

The assessment will consider the potential for significant effects upon IOFs, during the construction, operation and decommissioning of the Proposed Development as set out below. Where appropriate, these construction/decommissioning and operational impacts will also be considered in a cumulative assessment.

Construction Impacts

During the construction of the Proposed Development, in the absence of specific mitigation, it is anticipated that potentially significant effects upon IOFs could arise from:

- nesting and foraging habitat loss, fragmentation or alteration associated with the Proposed Development infrastructure; and
- disturbance to and loss of nest sites, eggs and/ or dependent young.

In general, construction activities may be predicted to result in a temporary increase in noise, vibration and human presence within construction areas. This has the potential to displace breeding, foraging or roosting birds from the vicinity of construction areas for the duration of construction works.

Impacts would likely to be greatest during the breeding season (generally between March and August, depending upon the species), but are considerably variable between locations and species. The potential for disturbances to occur to breeding sites of specific species will therefore be assessed on the basis of best available species guidance, including Goodship and Furness (2022¹¹¹) which will be referred to within the EIAR.

Overall construction disturbance would however, be considered temporary and would occur only when construction activities are taking place. Furthermore, construction would be not expected to take place across the whole of the Site at once but phased within smaller defined working areas across the Site.

Operational Impacts

The operation of the Proposed Development, including maintenance activities, has the potential to cause disturbance and displacement of birds from nesting or foraging habitats throughout the Proposed Development's operational lifetime. The extent of displacement is, however, highly variable between species and species-group and therefore a species-specific assessment will take place on the basis of baseline studies.

The potential for disturbances to occur to specific species, will therefore be assessed on the basis of best available species guidance, including Goodship and Furness (2022¹¹¹) and which will be referred to within the EIAR.

The operation of the Proposed Development also has the potential to result in the risk of collisions with operational wind turbine blades or any other permanent infrastructure. Where the

¹¹¹ Goodship, N. M., & Furness, R. W. (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283 [Online]. Available at: <https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance>.

level of flight activity data justifies it, the NatureScot collision risk model (Band *et al.* 2007¹¹², Band 2024¹¹³) will be used to provide an estimate of collision rates of target species.

Decommissioning Impacts

The potential for impacts upon IOFs resulting from the decommissioning are considered to be similar to those identified for the construction phase. Associated effects will therefore not be assessed exclusively within the EIAR but assessed with reference to construction phase effects.

Matters to be Scoped Out

On the basis of baseline data, experience from other relevant projects and policy guidance or standards (e.g., CIEEM 2022¹¹⁴; SNH 2018c¹¹⁵, NatureScot 2024a¹¹⁶), it is proposed that the following species will be 'scoped out' since significant impacts are unlikely:

- Common and/or low conservation species not recognised in statute as requiring special conservation measures (i.e., not listed as Annex 1/ Schedule 1 species);
- Common and/or low conservation species not included in non-statutory lists (i.e., not listed as a Red-listed Birds of Conservation Concern species as per Stanbury *et al.*, 2021¹¹⁷), showing birds whose populations are at some risk either generally or in parts of their range; and
- Passerine species, not generally considered to be at risk from wind farm developments (SNH 2017⁹⁶), unless being particularly rare or vulnerable at a national level.

Subject to the results of the collision risk modelling, it is proposed that effects relating to any target species not identified to be breeding within the relevant Study Area would be scoped out of the assessment.

Following the review of designated sites containing ornithological features within 20 km of the Site (**section 3.6.3**), there is considered to be no connectivity between the Site and the following qualifying interests of the Muirkirk and North Lowther Uplands SPA: golden plover, hen harrier, peregrine falcon and short-eared owl. Impacts upon these species will therefore be considered as necessary against the species' wider countryside populations (e.g. Natural Heritage Zone (NHZ) populations as per Wilson *et al.* 2015⁹⁹).

Baseline studies have not identified the importance of the Site for species susceptible to elevated risk of collision with lit turbines (as per NatureScot 2020¹¹⁸) and as such impacts upon ornithological features relating to turbine, or any other infrastructure, lighting where this is proposed would not be assessed within the EIAR.

¹¹² Band, W., Madders, M. and Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at Windfarms. In: de Lucas, M., Janss, G.F.E. and Ferrer, M. (eds.) Birds and Windfarms: Risk Assessment and Mitigation. Pp. 259-275. Quercus, Madrid.

¹¹³ Band, W. 2024. Using a collision risk model to assess bird collision risks for onshore wind farms. NatureScot Research Report 906.

¹¹⁴ CIEEM (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management (CIEEM), Winchester.

¹¹⁵ Scottish Natural Heritage (2018c). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

¹¹⁶ NatureScot (November 2024a). General pre-application and scoping advice for onshore Windfarms.

<https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms>

¹¹⁷ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., & Win I. (2021).

The status of our bird populations: 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, 114, pp. 723-747.

¹¹⁸ NatureScot (2020). The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communications Towers and Other Structures. NatureScot Information Note [Online]. Available at: <https://www.nature.scot/doc/information-note-effect-aviation-obstruction-lighting-birds-wind-turbines-communication-towers-and>

Scoped In Features

Whilst it is not possible to definitively scope out/in specific target species from/to the assessment prior to undertaking collision modelling and a review of the ornithological baseline against the final design, considering the information available regarding the species assemblage and distribution at the Proposed Development and on the basis of professional experience, it is considered that curlew, lapwing, golden plover, golden eagle (in the wider context of the South Scotland Golden Eagle Project¹¹⁹), hen harrier and red kite are likely to be the species considered as IOFs and therefore scoped into the assessment. Opportunities to provide positive management for breeding/foraging waders, raptors and black grouse will also be identified within the Site and wider area as part of the Proposed Development, in consultation with relevant landowners and stakeholders as necessary.

Information to inform an Appropriate Assessment in relation to the Muirkirk and North Lowther Uplands and merlin will be provided in the ornithology chapter.

Approach to Mitigation

Significant effects on birds will be avoided/minimised where possible during the design process, based on the locations of any established nest, roost and lek sites (where identified in previous or remaining surveys), key foraging areas, likely sensitivities of species identified and the adoption of suitable bird disturbance distances, as set out in Goodship and Furness (2022¹¹¹).

Good practice measures, as set out in NatureScot guidance (NatureScot 2024b¹²⁰) during construction/ decommissioning and operation of the Proposed Development will also be implemented (and the assessment undertaken on this basis). This will include the following:

- A Bird Disturbance Management Plan (BDMP) would be implemented as part of a Construction Environmental Management Plan (CEMP) or similar during the construction phase, to ensure that all reasonable precautions are taken to enable legislative compliance with regards the protection afforded to wild birds;
- Pre- and during-construction surveys carried out by an Ecological Clerk of Works (ECoW) or suitably qualified ornithologist would take place as part of the BDMP; and
- An outline Biodiversity Enhancement Management Plan (OBEMP) would be developed for the operational phase and agreed with consultees, to mitigate or enhance habitat for IOFs and to provide wider biodiversity improvements.

Where unmitigated significant effects on IOFs are identified, additional measures to prevent, reduce and where possible offset these adverse effects would be proposed.

3.6.5 Assessment Methodology

Legislation, Policy and Guidance

The following national legislation, which was amended as a consequence of EU exit (Scottish Government 2019¹²¹, 2020¹²²), is also considered as part of the ornithology assessment:

- The Wildlife and Countryside Act 1981;

¹¹⁹ <https://www.goldeneaglessouthofscotland.co.uk/>

¹²⁰ NatureScot (September 2024b). Dealing with construction and birds. <https://www.nature.scot/doc/good-practice-during-wind-farm-construction>

¹²¹ Scottish Government (2019). The Town and Country Planning and Electricity Works (EU Exit) (Scotland) (Miscellaneous Amendments) Regulations 2019. Available at: <https://www.legislation.gov.uk/ssi/2019/80/introduction/made>

¹²² Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland. Available at: <https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/>

- The Conservation (Natural Habitats &c.) Regulations 1994 and the Conservation of Habitats and Species Regulations 2017 (hereafter the 'Habitat Regulations');
- The Nature Conservation (Scotland) Act 2004;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations).

This assessment will consider the following relevant aspects of Scottish Government Policy, Planning Advice Notes and other relevant documentation:

- National Planning Framework 4 (NPF4) (February 2023);
- The Scottish Biodiversity List;
- Draft Planning Guidance: Biodiversity. Scottish Government (2023);
- Scottish Biodiversity Strategy to 2045: Tackling the Nature Emergency in Scotland (2023);
- Scottish Government (2000) Planning Advice Note 60: Planning for Natural Heritage;
- Scottish Government (2017) Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0;
- Onshore Wind Turbines: Planning Advice (May 2014);
- South Lanarkshire Council (2024) South Lanarkshire Biodiversity Strategy 2024-2030; and
- The Scottish Biodiversity List (2020).

Guidance on the following topics will also be considered:

- Environmental impact assessment: NatureScot (SNH 2016b¹¹⁰, 2018b¹⁰³, 2018c¹¹⁵; NatureScot 2024a¹¹⁶), CIEEM (2022¹¹⁴), SERAD (2000¹²³);
- Designated sites: NatureScot (SNH 2016a⁹⁵);
- Collision modelling: NatureScot (SNH 2000¹²⁴, 2018d¹²⁵), Band *et al.* (2007¹¹², 2024¹¹³);
- Cumulative assessments: NatureScot (SNH 2018a⁹⁸);
- Bird populations/species specific guidance: Starbury *et al.* (2021¹¹⁷), NatureScot (SNH 2017⁹⁶), Wilson *et al.* (2015⁹⁹), Pearce-Higgins (2021¹²⁶); and
- Construction and birds: NatureScot (2024b¹²⁰), Goodship & Furness (2022¹¹¹).

Assessment Methodology

The assessment will be undertaken adopting an established approach to the assessment of onshore wind farm developments in Scotland, as recommended in NatureScot guidance (SNH 2018b¹¹⁵) and impact assessment guidance published by the Chartered Institute of Environmental and Ecological Management (CIEEM 2022¹¹⁴).

The assessment will consider in detail only those impacts upon IOFs considered sensitive to wind farm developments, as set out in Annex 1 of NatureScot guidance (SNH 2018b¹⁰³), and upon which potentially significant effects may occur.

The assessment will consider the following three main potential impacts to birds:

- direct displacement/ habitat loss through wind farm construction;
- morality through collision with operational turbines/ other infrastructure; and,

¹²³ SERAD (Scottish Executive Rural Affairs Department) (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("the Habitats and Birds Directives"). Revised Guidance Updating Scottish Office Circular No 5/1995.

¹²⁴ Scottish Natural Heritage (2000). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action.

¹²⁵ Scottish Natural Heritage (2018d). Avoidance Rates for the onshore SNH Windfarm Collision Model. Version 2.

¹²⁶ Pearce-Higgins, J.W. (2021). Climate Change and the UK's Birds. British Trust for Ornithology Report, Thetford, Norfolk.

- indirect displacement/ habitat loss through the avoidance of operational wind farm infrastructure.

The assessment will be supported by technical appendices and figures as appropriate and will include the following stages:

- description of the ornithological baseline;
- scoping in/ out of IOFs and associated impacts;
- identification and characterisation of potentially significant effects;
- outline of mitigation measures to avoid and reduce significant effects;
- assessment of the significance of any residual effects after such measures;
- identification of appropriate compensation measures to offset significant residual effects;
- identification of opportunities for enhancement; and
- where required, cumulative assessments.

The approach to assessment will take account of existing guidance and published scientific literature in relation to birds and windfarms, together with professional judgement and experience of wind farm EIAs.

Impacts upon IOFs will be assessed in relation to the species’ relevant reference population, conservation status, range and distribution, based on best available evidence.

Cumulative Impacts

The assessment will include a cumulative impact assessment, in accordance with NatureScot guidance (SNH 2018a⁹⁸) concerning the potential for significant:

- operational collision mortality risks; and
- operational displacement.

For cumulative assessments the NHZ level is considered practical and appropriate for breeding species not connected to designated sites and where sufficient information is available. In this case, the cumulative assessment for IOFs is proposed to be primarily undertaken at the NHZ 19 Western Southern Uplands and Inner Solway, within which the Site is located and where this is considered to provide a meaningful assessment. Where an alternative population level is considered more appropriate, e.g. a defined regional population, this will be set out with sufficient justification with the EIAR.

NatureScot will be consulted prior to the completion of the cumulative assessment for its record of cumulative impacts to ornithological features arising from onshore wind farm proposals at the NHZ scale.

3.6.6 Questions for Consultees

Table 3.6.1: Question to Consultees (Ornithology)

OR1	Do consultees agree that the desk study and the field surveys (September 2023 to August 2025) will provide sufficient data to inform a robust impact assessment?
OR2	Do consultees agree that, subject to further information becoming available from the field surveys and desk study, the scope of IOFs to be included in the assessment is appropriate, or at this stage, should any other species be included?
OR3	Do consultees agree that all designated sites, with the exception of the Muirkirk and North Lowther Uplands SPA in the context of breeding merlin, can be scoped out from detailed assessment within an Habitat Regulations Assessment (HRA) or EIA context, due to it not being likely that significant effects would arise?

OR1	Do consultees agree that the desk study and the field surveys (September 2023 to August 2025) will provide sufficient data to inform a robust impact assessment?
OR4	Do consultees agree with the proposal to scope out effects relating to lighting/decommissioning and ornithology?
OR5	Do consultees agree that the methodology and scope of the assessment is appropriate?
OR6	Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ornithology assessment?

3.7 Hydrology, Hydrogeology and Geology

3.7.1 Overview

This section outlines the preliminary hydrology, hydrogeology, and geology baseline applicable to the Site. It also provides an overview of potential impacts to be addressed within the EIAR and the proposed method for evaluation of effects in relation to hydrology, hydrogeology and geology.

The scope of the assessment is based on a high-level review of baseline information and findings, which will be confirmed through a review of additional data sources, site visits, and consultation with appropriate stakeholders.

3.7.2 Study Area

The Study Area, in respect of potential impacts on water resources, will include the Site plus a 2 km buffer. Additionally, the assessment will take into account potential hydrological downstream connectivity to areas extending beyond this buffer.

The Study Area, in respect of potential impacts on geological receptors including peat and carbon-rich soils, considers land within the Site itself, on the basis that whilst there is potential for connectivity with adjacent peatlands and soils, the effects are largely localised. However, this will be reviewed and updated, if necessary, during the assessment.

3.7.3 Baseline Conditions

Hydrology

Snar Water passes through the western portion of the Site, Glengonnar Water flows through the northern section of the Site, and Elvan Water/Shortcleuch Water passes through the eastern portion of the site.

The western side of the Site all drains generally to Snar Water or smaller tributaries, which flows onward to the north where it meets with Duneaton Water.

The northern area of the Site drains to Glengonnar Water which also flows in a northerly direction and eventually joins with the River Clyde. Glengonnar Water is located in the same valley as the B797 road which bisects the western and northern portions of the Site, and thus it is anticipated that this catchment is served by surface water drainage assets.

The eastern portion of the Site drains to the Elvan Water/Shortcleuch Water, which is central to the Site and flows eastward, and Portrail Water and the River Clyde which follow the eastern boundary of the Site flowing northward. Elvan Water/Shortcleuch Water sits in the same valley as the B7040 road which bisects the northern and eastern portions of the Site and is also anticipated to be served by surface water drainage assets.

Snar Water is assessed by SEPA to be of 'Good' overall condition under the Water Framework Directive classification scheme¹²⁷. Glengonnar Water is assessed to be of Moderate overall condition. Elvan Water/Shortcleuch Water are assessed to be of Good overall condition. The Site is within the wider catchments of Duneaton Water and the River Clyde, which are assessed as Good and Moderate condition respectively.

The surface water features in relation to the Site are shown on **Figure 3.7.1**.

Flood Risk

SEPA Flood Risk maps¹²⁸ show that land in close proximity to Snar Water, Glengonnar Water, Elvan Water/Shortcleuch Water, and the River Clyde are within areas assessed to be at risk of flooding from rivers, including areas at a high risk of flooding (1 in 10 (10%) annual probability). Some marginal areas of the Site in connection to tributaries of the watercourses identified above are also within SEPA high risk flood areas. These areas are near to Glencaple in the north of the Site, South Shortcleugh which is centrally located on the Site, Glenochar which is along the eastern boundary of the Site, and Peden Burn in the south-east of the Site. Areas of the site assessed to be at risk of flooding from rivers are therefore in close proximity to watercourses themselves.

SEPA also publish Future Flood Maps which assess the Medium likelihood that by the 2080's an area may have a 0.5% annual probability of flooding. Snar Water, Glengonnar Water and Elvan Water/Shortcleuch Water within the Site all are shown to be within the future flood extents for this scenario. As with present day flood mapping, the future flood risk posed to the Site is concentrated around the watercourses and does not extend much further into the Site.

SEPA fluvial flood maps do not provide modelled flood extents for watercourses with a catchment area <10 km². Therefore, parts of the Site may still be at risk of flooding from the small watercourses not modelled by SEPA. SEPA mapping identifies some very limited areas of elevated surface water flood risk on the Site, the majority of which are within the flood risk areas identified above. Generally, the Site is at a very low risk of surface water flooding (less than a 1 in 1,000 (0.1%) annual probability).

*Flood risk in relation to the Site is shown on **Figure 3.7.2**. GWDTE*

National Vegetation Classification (NVC) habitat surveys may identify areas of the Site that support habitat that is classified as potentially groundwater dependent. The presence of NVC communities potentially representative of groundwater dependent terrestrial ecosystems (GWDTE) would be established through ecological surveying and where such habitats are identified, hydrological assessment would be carried out to determine the actual likelihood of groundwater dependency and the sensitivity of such habitats.

Geology and Soils

According to the British Geological Survey (BGS) Geology Map Viewer¹²⁹, 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 3.7.4.

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

¹²⁷ <https://www.sepa.org.uk/data-visualisation/water-environment-hub/> (Accessed February 2025)

¹²⁸ <https://www.sepa.org.uk/environment/water/flooding/flood-maps/> (Accessed: February 2025)

¹²⁹ BGS, 2025. BGS Geology Map Viewer. [Online] Available at: https://geologyviewer.bgs.ac.uk/?_ga=2.13362802.432518653.1737479126-890190900.1737475126

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 3.7.5**.

A review of the NatureScot Carbon and Peatland 2016 map¹³⁰, an extract of which is shown on **Figure 3.7.6**, confirms 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 discrete areas of 'Class 1' peatland are also identified across the Site. Class 1 is 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.

A Stage 1 peat depth survey has been undertaken in order to inform the scoping layout. The results of the peat survey show that peat depths across the majority of the Site are shallow with a depth of between 0 to 1 m, with some instances of slightly deeper peat of between 1 to 1.5 m depth. Isolated areas of deeper peat (up to 4.5 m depth) were identified in the area known as Peat Hill to the north of Turbine 15, to the northeast of South Shortcleugh, southeast of Harry Burn, and to the north of Bulmer Moss. The Stage 1 peat survey results are shown in **Figure 3.7.7**.

The Scotland's Environment Map online viewer¹³⁰ 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. This is shown in **Figure 3.7.5** in Appendix A. 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 would encroach within this area.

A review of aerial imagery¹³² and online historical maps indicate that areas of the Site have been used for lead mining.

The Mining Remediation Authority Map Viewer¹³³ indicates that there are Abandoned Mines Catalogue sites present which are coal and other mineral abandonment plans, 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.

A mining risk assessment¹³⁴ 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.

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

¹³⁰ Scottish Government, 2025. Scottish Environment Web Map. [Online] Available at: <https://map.environment.gov.scot/sewebmap/>

¹³¹ JNCC, 2025. Arenig-Llanvirn. [Online] Available at: <https://data.jncc.gov.uk/data/bdd086fd-5c0f-450b-b00b-bb7f16a760b4/gcr-block-description-05-are-llv.pdf>

¹³² Google, 2025. Google Earth. [Online] Available at: https://earth.google.com/web/@51.13214917,-1.67830945,106.46210804a,2289.36496629d,35y,0h,0t,0r/data=CgRCaggBQgIIAeNCP_____wEQAA

¹³³ Mining Remediation Authority, 2025. Map Viewer. [Online] Available at: <https://datamine-cauk.hub.arcgis.com/>

¹³⁴ Wardell Armstrong, 2022. Leadhills – Mining Desktop Study.

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. Other historical mining may however have taken place.

Water Resources

According to BGS 1:625,000 hydrogeological mapping¹³⁵, almost the entirety of the Site is underlain by a Low productivity aquifer. The geological groups noted above all contribute to the low productivity classification. There is a very small portion of the western boundary that is classified as a High productivity aquifer of the Stewartry Group geology.

Private water supply (PWS) registers held by SLC indicate that there are four private water supplies located within the Site boundary. Additionally, further PWS are recorded outside of the Site boundary within the 2 km Study Area (**Figure 3.7.3**).

3.7.4 The Site is not located within a Scottish Water Drinking Water Protected Area (DWPA) for surface water, and is not in hydrological connection with a DWPA. Potential Significant Effects

Based on baseline conditions described above, it is anticipated that the following potentially significant effects could occur as a result of the Proposed Development:

- There is the potential to alter in-channel and overland flow regimes through excavations, disruption to artificial drains, exposure of bare earth or rock, alteration to field drains and the construction of watercourse crossings, which could result in changes to the hydrology and hydrogeology, and subsequently affect the condition of the peat at the Site;
- There is the potential to increase erosion and transport of sediment to watercourses as a result of constructing watercourse crossings, vegetation and soil stripping, excavations and dewatering activities. Potential effects include indirect effects on aquatic ecology, fluvial morphology and PWS;
- In the event that PWS are found to be in hydrological or hydrogeological connection to the Proposed Development, there is the potential that the quality or quantity of water supply could be affected. There is the potential for water supply at groundwater or surface water abstraction locations to be impacted;
- 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 those on water quality and indirect effects on aquatic ecology;
- There is potential to permanently alter or disrupt shallow groundwater flow, in particular through the construction of tracks, drainage measures and turbine foundations;
- Peat erosion potential of any peat disturbed may also be exacerbated as a consequence of localised drying of the peat and resultant oxidation, due to any alteration in surface water runoff flow paths;
- Potential for loss/disturbance to peat and carbon-rich soils as a result of the excavations for wind farm infrastructure, and construction activities;
- Excavation of soil and bedrock during the construction phase of the Proposed Development could cause localised disruption and interruption to groundwater flow. Interruption of

¹³⁵ <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> (Accessed February 2025)

groundwater flow would potentially reduce the supply of groundwater to GWDTE thereby causing an alteration/ change in the quality or quantity of and/ or the physical or biological characteristics of the GWDTE. Contamination of groundwater may also cause physical or chemical contamination to the GWDTE; and,

- Potential impacts on geological receptors and contaminated land during the excavations for wind farm infrastructure and construction activities as a consequence of mining activities in the area.

Issues Scoped Out

Based on a review of SEPA Flood Maps, it is noted that flood risk is highly unlikely to increase as a result of the Proposed Development, either through development taking place on areas considered to be at risk of flooding or through an increase in flood risk downstream. It is therefore proposed that the assessment of flood risk would form part of the EIA chapter, and no separate detailed technical reporting would be completed, including conceptual description of Sustainable Drainage System (SuDS) measures to be employed at the Site to ensure runoff rates from the Site are not increased.

A detailed assessment of potential flow rates at proposed watercourse crossing locations would be carried out by the contractor at the detailed design stage, such that all of the watercourse crossings identified for the Proposed Development would be designed in compliance with the requirements of The Water Environment (Controlled Activities) (Scotland) Regulations 2011. The design of watercourse crossings would also take account of the future 'with climate change' baseline and (to avoid altering the flow regime) would be sized for a 1:200 year plus climate change flood event. As such, while a schedule of watercourse crossings would be provided, detailed flow rate calculations would not be provided within the EIAR.

According to the BGS digital map and Hydrogeological and Groundwater Vulnerability Maps of Scotland (1:625,000), the Site predominantly overlies a Low productivity aquifer. There is a very small portion of the western boundary that is classified as a High productivity aquifer, associated with Stewartry Group bedrock geology. If it is identified that potentially groundwater dependent vegetation communities (as identified by ecological surveying and classification of NVC communities) are not supported by groundwater supplies, it would be sought to scope out this assessment from the EIAR prior to submission, in consultation with SEPA. The EIAR would provide a detailed assessment of potential effects of the Proposed Development on surface water conditions supporting sensitive, non-groundwater dependent habitats.

It is proposed that potential impacts on the operation of the Proposed Development on the basis of a geological standpoint would be scoped out of the EIAR on the basis that they are unlikely to give rise to significant effects.

3.7.5 Assessment Methodology

Additional Baseline Information Collection

Consultation with Scottish Water will be undertaken to confirm if there are public water supplies for potable water that are located within 2 km of the Site.

A Site walkover will be carried out to hydrologically characterise areas of proposed infrastructure. The Site walkover will incorporate:

- A review of locations of PWS, as identified by desktop assessment and inspection of any further potential PWS locations as noted during the walkover;
- Identification of smaller watercourses and hydrological features not identified through desktop assessment, where there is the potential for interaction with proposed infrastructure;

- Surveying of potential watercourse crossing locations in line with SEPA Guidance¹³⁶. This survey will provide information on crossing locations, Controlled Activities Regulations (CAR) requirements, channel dimensions and likely crossing types; and

A higher resolution peat probing survey will be undertaken once the design of the Proposed Development has been advanced to include other proposed infrastructure, such as along proposed tracks, at 50 m intervals, and 10 m crosshairs at turbine locations. Further peat probing will ensure that all infrastructure locations have sufficient peat depth information to support relevant studies on peat instability, peat excavation and reuse, and carbon calculations.

A desk-top review of available information will also be undertaken to inform the baseline, including a review of peatland habitat data.

Method of Assessment

The assessment of the significance of hydrological and hydrogeological and soils and geology impacts will be undertaken by determining the sensitivity of the specific attribute and the magnitude of the impact upon the attribute. Impacts will be assessed for all phases of the Proposed Development. Following the determination of impacts, mitigation measures will be identified, and residual impacts identified.

It is anticipated that as the assessment of potential impacts would inform the design of the Proposed Development and best practice measures would be implemented during the construction, operation and decommissioning of the Proposed Development, that significant residual effects to the water and geological environment would be avoided. However, if potential significant residual effects to the water and geological environment are identified through the assessment process, suitable mitigation measures will be set out in the EIAR.

An outline CEMP will be included as a technical appendix to the EIAR which will include mitigation measures, environmental management requirements, outline method statements and environmental monitoring requirements.

The EIAR will consist of a baseline assessment (both desk-based and from fieldwork), the development of hydrological constraints, associated guidance and mitigation, and an assessment of the impacts. Distinct and separate reports shall be provided, suitable for incorporation as Technical Appendices to the EIAR (as appropriate) covering:

- PWS Assessment (if required)
- Watercourse crossings description¹³⁷;
- GWDTE construction impact review¹³⁸;
- Peat survey results;
- Peat landslide hazard and risk assessment;
- Outline Peat Management Plan¹³⁹; and
- Carbon Balance Report, based on the Scottish Government Carbon Calculator.

¹³⁶ <https://www.sepa.org.uk/media/151036/wat-sg-25.pdf> (Last accessed May 2025)
¹³⁷ Assessment will be carried out in line with Scottish Government (2011, 2013, 2017) Water Environment (Controlled Activities) (Regulations) Scotland 2011 (CAR) and their further amendments of 2013 and 2017 Available at: <https://www.sepa.org.uk/regulations/water/>
¹³⁸ LUPS-GU31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3 (September 2017).
¹³⁹ An outline Peat Management Plan will be prepared in accordance with SEPA guidance Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and Minimisation of Waste, Version 1 (2012). Scottish Renewables & SEPA

Cumulative Impacts

Potential cumulative environmental impacts to water, soils and geological resources will be assessed where concurrent proposed wind farm sites or construction activity may be in hydrological connection with the Proposed Development, or water resource receptors. Where potential cumulative impacts are identified, the same criteria as used for assessment of the Proposed Development will be employed.

Questions to Consultees

Table 3.7.3.3 Questions to Consultees

HYD1	Is the proposed assessment methodology, including proposed Study Areas, accepted?
HYD2	Do consultees agree with the features proposed to be scoped out from further assessment?
HVD3	Do consultees agree with the approach taken for the proposed assessment of geology and soils, particularly with regard to impacts on peat and carbon-rich soils?

3.8 Traffic and Transport

3.8.1 Overview

This section provides an overview of the traffic and transport context for the Proposed Development and sets out the proposed approach to the assessment of potential effects associated with the Proposed Development on access, traffic and transport.

A Transport Assessment (TA) will be provided to review the impact of transport related matters associated with the Proposed Development. This will be appended to the EIAR and will be summarised into a traffic and transport chapter within the EIAR.

3.8.2 Study Area

The traffic, transport and access Study Area will be defined by the preferred AIL and general construction traffic routes to the Site.

The exact locations for the proposed site access junctions (for construction and AIL traffic) have yet to be finalised and as such, the proposed Study Area covers all potential access options.

General construction traffic will access the Site from the M74 corridor, with the Study Area covering the M74 motorway to the north of Junction 13 and south of Junction 14. The A702 between Junction 14 through to Watermeetings, the B797 between Abington and Leadhills and the B7040 between Elvanfoot and Leadhills will form the general Study Area.

All road links within the Study Area would be considered, along with active travel routes and core path routes directly affected by construction traffic movements.

3.8.3 Baseline Conditions

Traffic survey data for use in the assessment would be obtained from historic data sources that will include the UK Department of Transport (DfT) traffic survey database, Traffic Scotland database and other public datasets that are available.

Data for the M74 would be obtained from the Transport Scotland database, whilst new Automatic Traffic Count (ATC) survey data from the A702, B797 and B7040 would be obtained.

Future traffic flows will be factored from surveyed data using Low Growth factors estimated from National Road Traffic Forecasts.

Further traffic data would be obtained from Crashmap UK for the A702, B797 and B7040 to inform the accident review for the immediate road Study Area for a five year period.

3.8.4 Potential Significant Effects

Potential impacts that may arise during the assessment for users of the road and those residents along the delivery routes may include the following: severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation and road safety

The impacts on receptors within the Study Area will be reviewed during the construction phase, with a peak construction period assessment undertaken. This will review the maximum impact and presents a robust assessment of the effects of construction traffic on the local and trunk road networks.

The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above.

Issues Scoped Out

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 an HGV to access the wind farm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed.

The traffic generation levels associated with the decommissioning phase will be less than those associated with the development phase as some elements such as access roads would be left in place on the site. As such, the construction phase is considered the worst case assessment to review the impact on the Study Area. An assessment of the decommissioning phase would therefore not be undertaken, although a commitment to reviewing the impact of this phase immediately prior to decommissioning works proceeding would be made.

3.8.5 Assessment Methodology

Legislation, Policy and Guidance

The assessment will be carried out in accordance with the following guidance with reference to relevant legislation and policy:

- Transport Assessment Guidance (Transport Scotland, 2012)¹⁴⁰; and
- Environmental Assessment of Traffic and Movement (IEMA, 2023)¹⁴¹.

A detailed list of all relevant guidance, legislation and policy will be included in the EIAR.

Method of Assessment

The Environmental Assessment of Traffic and Movement (IEMA, 2023) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on:

- potential impacts (of changes in traffic flows) on local roads and the users of those roads; and

¹⁴⁰ 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 [Accessed May 2025]

¹⁴¹ IEMA (2023): Environmental Assessment of Traffic and Movement. Available at: <https://www.iema.net/resources/blogs/2023/07/12/iema-guidance-ea-of-traffic-and-movement/> [Accessed May 2025]

- potential impacts (of changes in traffic flows) on land uses and environmental resources fronting these roads, including the relevant occupiers and users.

The main transport impacts will be associated with the movement of general HGV traffic travelling to and from the Site during the construction phase of the Proposed Development.

The following rules taken from the guidance would be used as a screening process to define the scale and extent of 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 traffic flows are predicted to increase by 10% or more.

Increases below these thresholds are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level predicted as a consequence of the Proposed Development will therefore be assumed to result in no discernible environmental impact and as such no further consideration will be given to the associated environment effects.

The estimated traffic generation of the Proposed Development will be compared with baseline traffic flows, obtained from new and existing traffic survey data, in order to determine the percentage increase in traffic.

Potentially significant environmental effects will then be assessed where the thresholds as defined above are exceeded. Suitable mitigation measures will be proposed, where appropriate.

Standard mitigation measures that are likely to be included in the assessment are:

- production of a Construction Traffic Management Plan (CTMP);
- the design of suitable access arrangements with full consideration given to the road safety of all road users;
- a Staff Sustainable Access Plan; and
- a Framework Abnormal Load Transport Management Plan.

It is not anticipated that a formal TA will be required as these are not generally considered necessary for temporary construction works. Instead, a reduced scope TA would be provided. This will include a Route Survey Report for Abnormal Indivisible Loads (AIL).

Detailed swept path analysis will be undertaken for the main constraint points on the route from the port of entry (likely to be King George V Docks, Glasgow) through to the Site access junction to demonstrate that the turbine components can be delivered to Site and to identify any temporary road works which may be necessary.

Each turbine is likely to require between 11 and 13 abnormal loads to deliver the components to Site. The components will be delivered on extendable trailers which will then be retracted to the size of a standard HGV for the return journey.

Cumulative Impacts

A cumulative assessment will take place where a development has planning consent and would have a significant impact on the study network (i.e. over 10% increase in traffic flows). These traffic flows would be included into the baseline flows used within the assessment.

Planning proposals that are at application stage and do not have planning consent are not committed developments and as such would not be included in the cumulative assessment.

3.8.6 Questions to Consultees

Table 3.8.1: Questions to Consultees (Traffic and Transport)

TT1	Do consultees agree with the proposed Study Area?
TT2	Do consultees agree that operational and decommissioning impacts can be scoped out of the EIA?L

3.9 Noise and Vibration

3.9.1 Overview

During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise would be caused by the interaction of the turbine blades with the air. Mechanically generated noise would be caused by the operation of internal components, such as the gearbox and generator which are housed within the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level.

During construction and decommissioning, noise and vibration could arise from both onsite activities, such as the construction of onsite access tracks, turbine foundations, the control building (substation), BESS etc, and from the movement of construction related traffic both on the Site and travelling on public roads to and from the Site.

This section sets out the proposed approach to the assessment of potential effects of noise and vibration on nearby noise-sensitive receptors.

3.9.2 Study Area

The assessment will consider noise sensitive residential locations in the vicinity of the Proposed Development. Specifically, ETSU-R-97¹⁴² states that noise levels will be considered acceptable, even in the absence of measured baseline data, if predicted noise levels (including cumulative contributions from all wind farms) do not exceed 35 dB LA90. This is often referred to as the simplified ETSU-R-97 noise assessment methodology.

There are a number of operational wind farm developments near to the Proposed Development, including Clyde, Middle Muir and Andershaw wind farms. In addition, there are a number of proposed wind farm developments in the area including Priestgill, which is consented but not yet built, and M74 West, Daer and Rivox wind farms which are currently in planning.

The Study Area will encompass dwellings where cumulative predicted levels exceed, approach or are likely to approach this 35 dB LA90 threshold, provided the specific contribution of the Proposed Development is not acoustically negligible relative to that of the other nearby wind developments including those wind turbines built and operating and those which are proposed within the planning system as listed above.

Some of these noise-sensitive residential locations will also be potentially affected by noise or vibration effects from the construction activities of the Proposed Development. In addition, dwellings located along site access tracks or transport routes will also be considered in relation to construction traffic.

¹⁴² The Working Group on Noise from Wind Turbines, (1996). ETSU-R-97, the Assessment and Rating of Noise from Windfarms, Final Report for the Department of Trade & Industry.

3.9.3 Baseline Conditions

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 disturbed vegetation, birds and farm animals. In addition, road traffic noise will have a strong influence in some areas, in particular next to the M74 motorway to the northeast and east of the Site, and to a lesser extent the A702 road and local roads such as the B7040 and the B797, although this will tend to reduce at night.

The baseline environment will be assessed by measuring background noise levels as a function of wind speed at the nearest neighbours (or at a representative sample of the nearest neighbours), as required under ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms'. ETSU-R-97 also requires that any such measurements are not significantly influenced by existing operational turbines, to prevent unreasonable cumulative increases. Reference will also be made, where relevant, to the baseline measurements previously made as part of the application for the neighbouring Clyde Wind Farm and Harryburn Wind Farm¹⁴³. Seven previously measured historical baseline locations, surveyed in June 2016, are available and, in the absence of substantial changes in the background noise characteristics of the area since the time of survey, this historical data (acquired in consultation with the local authority and used in the Harryburn Wind Farm assessment) remains representative of the properties surveyed and was not influenced by noise from operational wind turbines.

The existing baseline data represents most of the properties in the area surrounding the Northern and Southern turbine clusters, however, some properties to the west that are close to the Western turbine cluster are not represented by the historical baseline data. It is anticipated that a baseline survey will therefore be required at two or more locations to the west of the Proposed Development to supplement the historical data and establish the background environment at the nearest noise sensitive receptors (NSR) to the west.

The exact measurement locations and survey methodology will be discussed with the Environmental Health Department of South Lanarkshire Council.

3.9.4 Potential Significant Effects

Construction

During construction and decommissioning, noise and vibration could arise from both onsite activities, such as the construction of onsite access tracks, turbine foundations, the control building (substation), BESS etc, and from the movement of construction related traffic both on the Site and travelling on public roads to and from the Site.

In assessing the impact of noise and vibration from construction activities, it is usual to accept that the associated works are of a temporary nature.

Any blasting, if used, for rock extraction at borrow pits may also create vibration and air overpressure which would be considered in the assessment if applicable.

There is also potential for construction traffic noise to impact on sensitive receptors in the area.

Operation

During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise would be caused by the interaction of the turbine blades with the air. Mechanically generated noise would be caused by the operation of internal components, such as the gearbox and generator which are housed within

¹⁴³ The Scottish Government Energy Consent Unit - ECU Ref: EC00005277 – <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=EC00005277> – [Accessed: 19/02/2025]

the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level.

Matters Scoped Out

Decommissioning is likely to result in less noise than during construction of the Proposed Development and similar management measures can be employed and therefore it is proposed that this can be scoped out.

It is recognised that vibration resulting from the operation of wind farms is imperceptible even at short distances of 25 metres or more from a turbine, and separation distances from all receptors to the proposed turbines are well in excess of this. It is therefore proposed to scope out the assessment of vibration produced during the operation of the Proposed Development.

With regards to infrasound and low frequency noise, the above-referenced online planning advice note, Onshore wind turbines, refers to a report for the UK Government which concluded that *"there is no evidence of health effects arising from infrasound or low frequency noise generated by the wind turbines that were tested"*. The current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms. It is therefore not proposed to undertake specific assessments of infrasound and low frequency noise, but the noise chapter will consider the latest supporting information on these subjects and the topic of wind turbine blade swish or Amplitude Modulation (AM).

Traffic during the operational phase of the Proposed Development is likely to be very low and is considered unlikely to have any noise effects and so it is proposed would also be scoped out.

3.9.5 Assessment Methodology

Legislation, Policy and Guidance

The noise assessment will be undertaken with reference to the following documents:

- Scottish Government (2022) - Onshore wind - policy statement 2022, December 2022.
- Scottish Government (2011) Planning Advice Note 1/2011: Planning & Noise.
- Scottish Government (updated 28 May 2014) Online Renewables Planning Advice, Onshore Wind Turbines (<https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>).
- The Working Group on Noise from Wind Turbines (1996) ETSU-R-97, the Assessment and Rating of Noise from Windfarms, Final Report for the Department of Trade & Industry.
- M. Cand, R. Davis, C. Jordan, M. Hayes, R. Perkins (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, Institute of Acoustics.
- Bowdler et al (2016) Wind farms cumulative impact assessment, Institute of Acoustics Noise Bulletin Vol. 41 No. 1, Jan/Feb 2016.
- The South Lanarkshire Council, Local Development Plan 2 Volume 1 (LDP), April 2021 incorporating Supporting Planning Guidance (SPG) Renewable energy, January 2021.
- British Standards Institute (2019) BS 4142:2014+A:2019 'Method for rating and assessing industrial and commercial sound.'
- 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.'
- 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.'
- Scottish Government (1996) Planning Advice Note 50: 'Controlling the Environmental Effects of Surface Mineral Workings.'

- British Standards institute (2008) BS 6472 2:2008: 'Guide to evaluation of human exposure to vibration in buildings - Part 2: Blast-induced vibration.'
- HMSO Department of Transport (1988) 'Calculation of Road Traffic Noise'.
- 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.

NPF4 requires consideration of potential noise impacts for developments such as this but provides no specific advice on noise. Planning Advice Note PAN1/2011 provides general advice on preventing and limiting the adverse effects of noise without prejudicing economic development. It refers to noise associated with both construction activities and operational wind farms.

The web-based planning advice note on 'Onshore wind turbines' provides further advice on noise and confirms that the recommendations of ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms', "should be followed by applicants and consultees, and used by planning authorities to assess and rate noise from wind energy developments".

Good practice in the application of the ETSU-R-97 methodology will be referenced, as set out in Institute of Acoustics Good Practice Guide to the Application of ETSU-R-97 (IOA GPG). This includes guidance on the assessment of cumulative operational noise impacts from wind farms, and on this point, further guidance set out in a 2016 article in the Institute of Acoustics Noise Bulletin will also be considered.

Continued use of ETSU-R-97 was confirmed in the Scottish Government Onshore wind policy statement 2022 which confirms "ETSU-R-97 provides the framework for the measurement of wind turbine noise, and all applicants are required to follow the framework and use it to assess and rate noise from wind energy developments". Furthermore, the policy statement recognises the IOA GPG "as a useful tool which developers can use in conjunction with ETSU-R-97".

The South Lanarkshire Council LDP states that the council takes a positive approach to accommodating wind developments and refers to the Scottish guidance for onshore wind farms for the detailed assessment of the development and consideration against the full range of environmental, community, and cumulative impacts. The addendum SPG for Renewable Energy refers to the guidance provided in ETSU-R-97, that during the daytime the noise limit should be set between 35 dB(A) and 40 dB(A) L_{A90} or 5 dB above prevailing background, whichever is greater, as stated in ETSU-R-97. The expectations of The South Lanarkshire Council would be considered within the noise assessment.

PAN1/2011 and the Technical Advice Note accompanying PAN1/2011 provide further advice on construction noise and refers in particular to British Standard BS 5228.

Assessment Methodology

Construction

The assessment of potential impacts due to noise emissions during construction would be undertaken in accordance with the BS 5228 British Standard guidance 'Code of practice for noise and vibration control on construction and open sites.' Predictions of construction noise would be made referencing typical activity emission levels and likely variations in noise levels at surrounding receiver locations, using the methodology set out in BS 5228 Part 1. This standard is referenced in Technical Advice Note to PAN 1/2011: Planning and Noise and can be used to predict noise levels associated with the different construction activities used throughout the construction programme. Part 2 of the BS 5228 standard considers construction vibration, and this would also be referenced.

The impact of traffic noise along the Site access routes would be assessed on the basis of the methodology within BS 5228-1, and the 'Calculation of Road Traffic Noise' publication, where appropriate.

Operation

The methodology for the assessment of operational noise from wind farms in Scotland recommended in planning guidance is that documented in ETSU-R-97. In summary, the assessment shall:

- Identify the nearest noise sensitive receptors.
- Determine the quiet daytime and night-time noise limits from the background noise levels at the nearest neighbours.
- Specify the type and noise emission characteristics of the wind turbines proposed for the Proposed Development.
- Calculate noise emission levels which would be due to the operation of the wind turbines as a function of site wind speed at the nearest neighbours, including the cumulative effect of all turbines from other wind farms where relevant.
- Compare the calculated wind farm noise emission levels with the derived noise limits.
- The good practice guidance referenced above (IOA GPG) will be taken into account, including advice on baseline survey, wind shear calculations, and noise prediction methodology.

The calculated wind farm noise emission levels will be compared with the noise limits derived in accordance with ETSU-R-97. The noise limits derived according to the ETSU-R-97 guidance, for each noise-sensitive receptor, apply to the total noise produced by all wind farms. Therefore, potential cumulative operational noise levels in the area, including existing, consented and wind development applications in planning, must be assessed relative to these limits.

When considering neighbouring cumulative wind farm noise, the potential noise emissions from the adjacent wind farm sites will be considered by examining the potential level of noise emission allowed under the respective consent for each of the sites, in line with the IOA GPG current best practice. The assessment methodology, in particular with regards to cumulative impacts, will also be discussed with SLC.

The potential implication of wind shear effects due to the potential difference in heights of the turbines considered for the Proposed Development would be taken into account in line with best practice. This would consist of referencing a sufficiently high wind speed reference for any new measurement and/or through the application of correction factors to any historical data used (if necessary).

Noise from operation of the proposed substation and BESS would be assessed using the methodology in BS 4142, which compares noise from the specific source with typical baseline background noise levels taking into account a range of contextual factors. If, however, the proposed plant is located more than 2 km away from the nearest NSR, this would be considered unlikely to be associated with any significant effects and this may therefore not require a detailed BS 4142 assessment: this will be determined once the design of these components has sufficiently progressed.

Sensitivity of Receptors

All residential properties will be considered to be of high sensitivity to noise.

Magnitude of Impact

The assessment of construction noise and vibration will identify if and when predicted noise levels may be above standard guideline limits, taking into account the rural character of the area. The 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. In this respect, relevant working practices, traffic routes, and proposed working hours will be considered in the assessment. Table 3.9.1 below presents the criteria for impact significance from construction noise effects.

Table 3.9.1: Impact Significance Criteria for Construction Noise

Impact Significance	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.
Slight	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 55dB L _{Aeq,T} with periods of up to 65 dB L _{Aeq,T} lasting not more than 4 weeks in any 12 month period.

For construction traffic, the criteria set out in the Design Manual for Roads and Bridges are also likely to be referenced. Construction noise management procedures will also be determined.

For operational noise from the turbines, the calculated wind farm noise emission levels will be compared with the noise limits derived in accordance with ETSU-R-97 (as set out in section 3.9.5), including consideration of cumulative noise levels.

The magnitude of potential impacts from noise from operation of the substation/battery storage, unless considered negligible due to large separation distances, will be assessed using the guidance from BS 4142 and professional judgement.

Significance of Effect

For construction noise and operational noise from the substation/battery storage, the magnitude of impacts translates directly to effect significance, given that all receptors would be of high sensitivity, with a scale of significance from negligible, through minor to moderate and major. Major or moderate construction impacts are considered 'significant' in the context of the EIA Regulations.

If predicted (cumulative) noise levels from wind turbines are within the ETSU-R-97 derived noise limits, operational noise would be considered acceptable, and therefore not significant in EIA terms. If the predicted wind turbine noise levels are above the ETSU-R-97 noise limits, operational noise would be considered unacceptable and significant in EIA terms.

Cumulative Impacts

Cumulative wind farm developments (existing, consented, or in planning) within 10 km of the Proposed Development will be considered within the cumulative operational noise assessment; however, it may be possible to scope out some developments within that area if predicted noise levels at the nearest NSRs are low.

3.9.6 Questions for Consultees

Table 3.9.2: Questions to Consultees (Noise and Vibration)

NV1	Are the consultees happy with the suggested approach for the noise assessment, including elements scoped in and out?
NV2	Are consultees content for the assessment to reference previous background noise data acquired around the Site?

3.10 Aviation

3.10.1 Overview

Wind turbines have the potential to affect the performance of radars used for air traffic control, air defence and meteorological forecasting and of aeronautical radio navigation aids. They can also present an obstacle hazard to aircraft flying at low altitude. They may affect the specified minimum altitudes for aircraft using instrument flight procedures (IFPs) at airports.

This section sets out the proposed approach to the assessment of potential effects on aviation and radar during the construction and operation of the Proposed Development.

3.10.2 Study Area

It is proposed that Study Areas with the following radii from the Site boundary will be used to identify potentially affected aviation and defence facilities:

- 125 km radius for air traffic control (ATC) and air defence primary surveillance radars (PSRs);
- 60 km radius for IFPs at licensed or certificated aerodromes;
- 30 km radius for licensed and certificated aerodromes and Meteorological Office radars;
- 20 km radius for aeronautical radio navigation aids and secondary surveillance radars (SSRs);
- 15 km radius for unlicensed aerodromes and launching sites and specialist military low flying areas; and
- 10 km radius for aeronautical radio transmitter/receiver sites.

3.10.3 Baseline Conditions

The airspace above the Site is uncontrolled (Class G) from ground level up to 5,500 feet above sea mean level (asml). Above that level is the Class D controlled airspace of the Scottish Terminal Manoeuvring Area (TMA), under the control of the NATS En Route (NERL) Prestwick Centre. The key distinguishing feature between controlled airspace and uncontrolled airspace is that pilots require ATC clearance to enter controlled airspace and whilst in it must comply with ATC instructions.

The Site is located to the north – north-east of and within 20 km of the NERL PSR/SSR at Lowther Hill and NERL’s air-ground-air (AGA) communications infrastructure at Lowther Hill. A Distance Measuring Equipment (DME) facility on Green Lowther is also within 20 km radius of the Site.

The Site is within the IFP assessment areas for Edinburgh and Prestwick Airports and may be within the assessment area for future IFPs at Glasgow Airport. The Site is in the MoD’s Eskdalemuir Seismic Array 50 km Consultation Zone.

The Site is located within a specialist military low flying area known as Low Flying Area 20(T), which may be activated for daytime Operational Low Flying down to heights of 100 feet above

ground level (agl). For military low flying at night, the Site is within Allocated Region 2B which covers the western parts of central and southern Scotland.

There are no Meteorological Office radars within 30 km of the Site. Consequently, it is proposed that this consideration may be scoped out.

3.10.4 Potential Significant Effects

Preliminary radar modelling indicates that the Site’s turbines would be fully in radar line of sight of NERL’s PSR at Lowther Hill, and NATS PSR at Cumbernauld (58 km north of the Site). Preliminary radar modelling also indicates that two turbines, T30 and T31, may be in radar line of sight of Glasgow Prestwick Airport’s PSR. This preliminary radar modelling indicates that the Site would not be in radar line of sight of any of the other PSR within the study area (NERL’s Great Dun Fell PSR, Kincardine PSR, Edinburgh Airport PSR, MoD Dead Water Fell PSR and MoD Berry Hill PSR).

The turbines would also be within NERL’s safeguarding consultation zone for the Lowther Hill SSR and AGA infrastructure.

Turbines up to 220 m in height have the potential to pose a physical obstruction hazard to low flying aircraft, requiring them to avoid the turbines horizontally and/or vertically.

Turbines within 60 km of airports have the potential to impact the Minimum Surveillance Altitude (MSA) of the airport. However, preliminary MSA analysis indicates that none of the Site’s turbines would impact the MSA of Glasgow Prestwick Airport nor either the MSA of Glasgow Airport. All the Site’s turbines would be beyond the MSA plus buffer of Edinburgh Airport.

Turbines up to 220 m in height have the potential to pose a physical obstruction hazard and downwind turbulence effects to paragliders and hang-gliders operating from established sites on Tinto Hill, although the Site is over 14 km from Tinto Hill. CAP764 guidance indicates that turbulence effects from turbines should decay within 8-12 rotor diameters downwind of the turbine. Assuming a rotor diameter of 155 m for the Site’s turbines, turbulence impacts should decay within 2 km of the Site. This Site is also outwith the 10 km consultation zone recommended by the CAA for any charted glider launch site.

With regards to the MoD’s Eskdalemuir Seismic Array, the Applicant acknowledges that the finite seismic noise capacity of the Array and the Proposed Development’s impact will need to be addressed.

3.10.5 Assessment Methodology

The aviation assessment will be conducted in accordance with CAP 764, the Civil Aviation Authority (CAA) policy and guidance on wind turbines¹⁴⁴; and CAP 670, the CAA guidance on Air Traffic Services Safety Requirements¹⁴⁵.

Radar line of sight assessment will be conducted using proprietary software and digital terrain data with an appropriate resolution. For any radars found to have line of sight to the proposed turbines, an operational impact assessment will be carried out and options for mitigating any detrimental effects on the relevant aviation stakeholder’s ATC service considered.

Further analysis will be conducted with respect to any potential impacts on NERL’s SSR at Lowther Hill and its AGA infrastructure at Lowther Hill, including considering the impacts on the

¹⁴⁴ Civil Aviation Authority (2016). CAA Policy and Guidelines on Wind Turbines: CAP 764. Available at: <https://www.caa.co.uk/publication/download/14561> [Accessed May 2025].

¹⁴⁵ Civil Aviation Authority (2019). Air Traffic Services Safety Requirements: CAP 670. Available at: <https://www.caa.co.uk/publication/download/17362> [Accessed May 2025].

ATC service provided by NERL using this infrastructure, and options for mitigating any detrimental effects on NERL’s ATC service considered.

Effects on paragliding/hang gliding activity at Tinto Hill will be assessed by reviewing the location of the proposed turbines in relation to topography, other obstacles and terrain features used for soaring.

The proposed turbines will exceed 150 m in height and will therefore be subject to mandatory requirements for obstacle lighting in accordance with Article 222 of the Air Navigation Order 2016¹. An aeronautical study will be conducted of the potential for an alternative lighting scheme in which not every turbine is fitted with lights. Any aviation lighting scheme will be consulted upon with the CAA and other relevant consultees. MoD compliant infra-red lighting will also be included in the lighting configuration. The Site’s turbines will be notified to the CAA under the Air Navigation Order for civil and military charting.

With regards to the Eskdalemuir Seismic Array, the Applicant notes the work of DESNZ, the MoD and the Scottish Government on this topic as outline in the Clean Power 2030 Action Plan, published by the UK Government in December 2024.

Consultations will be carried out with NERL; the MoD; the CAA; Glasgow, Edinburgh and Glasgow Prestwick Airports; and the Lanarkshire and Lothian Soaring Club.

3.10.6 Questions for Consultees

Table 3.10.1: Questions to Consultees (Aviation)

AV1	Do consultees agree with the methods proposed to determine the aviation baseline?
AV2	Do consultees agree with the aviation assets / issues proposed to be scoped into the assessment?
AV3	Do consultees agree with the aviation assets / issues proposed to be scoped out of the assessment?

4. TOPICS PROPOSED TO BE SCOPED OUT OF THE EIA

4.1 Socio-Economics and Tourism

Socio-economic and tourism assessments of onshore windfarms over the last decade have found no adverse effects assessed as significant in terms of the EIA Regulations and there is no reason to expect significant effects for the Proposed Development which would require formal consideration in the EIA process.

It is therefore proposed to scope socio-economics, recreation and tourism out of the EIA Report.

However, it is recognised that socio-economic and tourism issues will be of interest to stakeholders and local authorities and so a separate Socio-Economics and Tourism Report will be provided to accompany the Application. This will include consideration of local tourism activity, direct effects such as employment generation and any indirect or induced effects from the Proposed Development.

The Socio-Economic and Tourism Report will focus on the following Study Areas:

- Socio-economics - South Lanarkshire and the UK, with a focus on the electoral ward of the Site, Clydesdale East.
- Tourism - 15 km radius of the Site, consistent with previous research of the relationship of tourism and onshore wind developments.

The socio-economics and tourism assessment would primarily be a desk-based study with consultation undertaken with the local community to further inform the baseline and inform any opportunities from the Proposed Development which arise therein.

The socio-economic and strategic baseline within the relevant Study Areas will be characterised in the report through a review of publicly available data sources, and will include:

- the population characteristics of the local area, including local and national demographic trends;
- fuel poverty statistics set within a national context;
- employment and economic activity in the local area within the context of the national economy;
- wage levels in the local area compared to the national levels;
- the industrial structure of the local economy compared to the national level; and
- the role of the tourism sector in the local economy.

The report will take into account the relevant local and national policy objectives for socio-economics and tourism, which are expected to be included in the following strategies:

- Scotland’s National Strategy for Transformation¹⁴⁶;
- Scotland’s National Performance Framework¹⁴⁷;

¹⁴⁶ Scottish Government (2022) Scotland’s National Strategy for Economic Transformation. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2022/03/sco:lands-national-strategy-economic-transformation/documents/delivering-economic-prosperity/delivering-economic-prosperity/govscot%3Adocument/delivering-economic-prosperity.pdf> [Accessed January 2025]

¹⁴⁷ Scottish Government (2023) National Performance Framework. Available at: <https://blogs.gov.scot/national-performance-framework/> [Accessed January 2025]