

Glensalloch Wind Farm

Scoping Report

Date of report: August 2025

PREPARED FOR



BayWa r.e.

savills

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1. Introduction

- 1.1.1. Glensalloch Wind Farm Ltd (“the Applicant”) proposes to submit an application for consent to construct and operate a wind farm, with a generating capacity in excess of 50 Megawatts (MW), to be known as Glensalloch Wind Farm (“the Proposed Development”). The location of the Proposed Development is shown on **Figure 1.1 ‘Site Location Plan’**, which shows the site boundary within the local geographic context. The Site is situated entirely within Dumfries and Galloway administrative area, and borders the South Lanarkshire administrative area.
- 1.1.2. **Figure 1.2 ‘Proposed Turbine Layout’** illustrates the indicative layout of turbines within the red line boundary. The indicative layout shows a 15 turbine scheme each with a maximum tip height of 220 metres (m). The turbine layout design is at an early stage and will be further developed to take account of technical and environmental constraints on any consultation feedback.
- 1.1.3. Given that the installed capacity is greater than 50MW, an application will be made to the Scottish Ministers for consent under Section 36 of the Electricity Act 1989 and deemed planning permission under section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended).
- 1.1.4. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations) apply to the Proposed Development, which is of a type listed in Schedule 2, item (1) ‘a generating station’. In such cases, if it is considered that ‘the development is likely to have significant effects on the environment by virtue of factors such as nature, size or location’ an Environmental Impact Assessment (EIA) may be required. This Scoping Report has been prepared as part of the Applicant’s formal request, in accordance with the EIA Regulations, for an EIA Scoping Opinion that will form the basis of the EIA Report to be submitted with an application for Section 36 consent.
- 1.1.5. The Onshore Wind Sector Deal for Scotland¹ (the Sector Deal) published in September 2023 aims to streamline the approach to decision-making for onshore wind projects thus speeding up the process for consenting decisions. The Sector Deal aims at improving the approach to the scoping of environmental information required for EIA Reports with an emphasis on providing brief, sufficient information and scoping topics out where appropriate. This is the approach taken by the Applicant in this Scoping Report.
- 1.1.6. The Applicant will seek to arrange a joint meeting with the Energy Consents Unit (ECU) and Dumfries and Galloway Council (DGC) imminently, in order to discuss the key elements of the Proposed Development and the anticipated timeline for submission of a Section 36 Application.
- 1.1.7. Glensalloch Wind Farm Ltd is a wholly owned by BayWa r.e. UK Limited (BayWa r.e. UK). BayWa r.e. UK is led by an experienced team of professionals with decades of collective experience across various sectors of the energy industry. The UK business is a key focus, with offices in Edinburgh, Glasgow and Milton Keynes. BayWa r.e. UK has been active in the UK since 2011, being directly involved in the energy transition through its activities and innovations. The UK development pipeline currently stands at over 600 megawatts (MW) of onshore wind, 1.4 gigawatt-peak (GWp) of solar, and 1.3 gigawatts (GW) of battery energy storage projects.
- 1.1.8. In addition to onshore technologies, BayWa r.e. UK is part of Buchan Offshore Wind, which secured rights via the ScotWind leasing round to develop a 960 MW floating offshore wind farm off the northeast coast of Scotland. BayWa r.e.’s services business in the UK is based in Milton Keynes and Edinburgh and manages over 1.8 GW of solar, onshore wind and BESS sites across the UK and Ireland.

2. Scoping Report Purpose and Structure

2.1. Introduction

- 2.1.1. This report has been prepared under Regulation 12 of the EIA Regulations to provide information to the ECU and other stakeholders to inform a Scoping Opinion, which will form the basis of the EIA Report to be submitted with the Section 36 Application.
- 2.1.2. This report seeks to provide environmental and technical information which will lead to agreement with stakeholders on the likely significant effects associated with the Proposed Development as well as agreement on matters where effects are likely to be non-significant and can therefore be excluded from assessment. The various elements of the report are structured around providing topic-based information. Focused questions for consultees are provided for each topic area.
- 2.1.3. **Table 2.1** below identifies the technical sections included in the report along with the various members of the EIA project team, instructed by the Applicant to provide professional advice and reporting on their various subject areas.

Table 2.1 – EIA Project Team

Number	Section	Author
1	Introduction	Savills
2	Scoping Report Purpose and Structure	Savills
3	Glensalloch Wind Farm Background, Design and Infrastructure	Savills
4	The Study Area	Savills
5	Pre Application Consultation	Savills/BayWa
6	Planning & Energy Policy	Savills
7	EIA Methodology & Approach	Savills
8	Landscape & Visual Impact Assessment	SLR
9	Cultural Heritage	SLR
10	Ornithology	SLR
11	Ecology	SLR
12	Hydrology, Geology, Soils and Hydrogeology	SLR
13	Access, Traffic & Transport	SLR
14	Noise	SLR
15	Aviation	Coleman Aviation
16	Shadow Flicker	SLR
17	Other Issues	LUC
18	Feedback	Savills

3. Glensalloch Wind Farm Background, Design and Infrastructure

3.1. Site Description and Surroundings

- 3.1.1. The Site is located approximately 4.6km northeast of Sanquhar, around 3.2km west of Wanlockhead and 5km west of Leadhills.
- 3.1.2. In 2017, an application to the Scottish Ministers under Section 36 of the Electricity Act 1989 to construct and operate a 35 wind turbine development, known as the 'North Lowther Energy Initiative' (referred to as the NLEI scheme) was submitted for a larger area (including the Site), with Further Environmental Information (FEI) submitted thereafter in 2018. The proposal was subsequently refused in 2020. The Applicant is committed to addressing matters raised in the previous reasons for refusal and within the context of the current planning policy setting. The planning history of the Site has informed the progress on layout development and engagement to date.
- 3.1.3. **Figure 1.1** shows the boundary of the Proposed Development. **Figure 1.2** shows the indicative wind turbine layout within the red line boundary. Site access will be from the B740.
- 3.1.4. The Site comprises a mix of agricultural land and pockets of conifer plantation. The Section 36 Application will include supporting information detailing any implications for forestry on site as a result of the Proposed Development along with appropriate mitigation measures where relevant.
- 3.1.5. The Site is not subject to any international or national landscape or ecological designations.
- 3.1.6. The closest operational wind farms are TwentyShilling Wind Farm approximately nine km to the south of the Site and Andershaw Wind Farm approximately nine km to the north of the Site, as shown in **Figure 8.6**.

3.2. Glensalloch Wind Farm

- 3.2.1. The key elements of the Proposed Development are summarised as follows:
- Up to 15 wind turbines, each up to a maximum tip height of 220m, with associated transformers and switchgear;
 - Foundations at each turbine;
 - Areas of hardstanding at each turbine to facilitate turbine erection and component replacement during the operational life if required;
 - A network of onsite tracks including water crossings. The Applicant will seek to make use of existing tracks where possible and to minimise the number of watercourse crossings;
 - Access points from the B740 – subject to a detailed access review to confirm the preferred access routes into the Site for construction traffic and turbine component delivery;
 - Up to four borrow pits;
 - A substation and control building which would house switchgear and metering equipment as well as welfare facilities for employees;
 - A network of buried cables linking the wind turbines with the onsite substation which would then link to the wider electricity transmission network. The connection of the substation to the grid would be subject to a future and separate application for consent;
 - Biodiversity Enhancement Areas – the Applicant is exploring opportunities for environmental enhancement as an integral part of the Proposed Development from the outset, to ensure it helps address both the climate emergency and nature crisis; and

- Temporary construction compounds and storage – subject to detailed design and further work, it is expected that more than one construction compound would be required to ease the movement of vehicles around the Site during construction and provide welfare facilities close to the areas of working. There would likely be a main compound area close to the site access to monitor traffic entering and leaving the Site as well as 'satellite' compounds which would be used to store construction materials, provide car parking, welfare facilities etc.

3.2.2. The Proposed Development is planned to have an operational life of 40 years and the Applicant expects a grid connection offer date for 2030.

4. The Study Area

- 4.1.1. The various technical and environmental elements of the EIA require different study areas in order to properly assess each element. The topic specific sections of this report provide details of the relevant study areas and figures have been prepared for various topic areas to illustrate these.
- 4.1.2. This report seeks comments from stakeholders as to the extent of the various study areas to ensure that a proportionate approach is taken to the EIA.

5. Pre Application Consultation

5.1. Community Consultation

- 5.1.1. Pre-application consultation will comply with requirements of meaningful engagement as outlined in Scottish Government Planning Advice Note 3/2010, and while the application for consent will be submitted under Section 36 of the Electricity Act, DGC's Pre-Application Consultation Guidance and Advice as well as Circular 3/2022 'Development Management Procedures' will also be used to design the consultation process. This also aligns with the 'Energy Consent Unit's Good Practice Guidance for Applications under Section 36 and 37 of the Electricity Act 1989' (updated July 2022), which confirms that, although not a statutory requirement, applicants are encouraged to engage meaningfully with communities at an early stage.
- 5.1.2. The Applicant is committed to carrying out an extensive engagement process in respect of the Proposed Development. As an initial step, the Applicant appointed external stakeholder specialists to prepare a bespoke engagement strategy, working closely with the Applicant's project team.
- 5.1.3. The Applicant has already initiated pre-scoping engagement with local stakeholders regarding the Proposed Development, providing some early contact points, providing details about the likely nature and scale of the Proposed Development and establishing anticipated project timescales. This pre-scoping engagement has included the creation of a Proposed Development information website and hosting the first in a series of Collaboration Events with the community. Collaboration events are an innovative form of public engagement, which ensure the preliminary feedback of the local community are taken on board at the earliest stage of project development.
- 5.1.4. These efforts are important to ensure that consultation listens to initial concerns and influences the design process from the outset, optimising environmental and social benefits of the Proposed Development. This dialogue will be kept open during the design evolution phase and further consultation activity will include:
- Community consultation (ongoing from January 2025)
 - First Community Collaboration Event (June 2025)
 - Second Community Collaboration Event (Post-scoping)
 - Post-Scoping Public Exhibition
 - Second Public Exhibition
- 5.1.5. The purpose of community engagement and consultation is to afford opportunities for local people and businesses, elected and community representatives to meet the project team, ask questions, and:
- Introduce the Proposed Development – number of turbines, size, location and details of the construction and operational phases.
 - Detail the potential benefits, including community benefit of the Proposed Development; and
 - Gather and consider views and comments of all stakeholders in finalising the layout of the Proposed Development ahead of an application being submitted.
- 5.1.6. All of the feedback received will be considered during the development process and a Pre-Application Consultation Report will be included as part of the Section 36 Application documentation.

6. Planning and Energy Policy

6.1. Introduction

- 6.1.1. The Planning and Energy Policy Chapter of the EIA Report will consider the Proposed Development in the context of adopted and emerging planning and energy related policy documents. The EIA Report Chapter will not undertake a detailed assessment of the Proposed Development against the relevant planning policies and other material considerations, rather it will identify those documents considered to be material to determination of the application, identifying and briefly discussing individual plans, policies, aims and objectives considered to be pertinent to the Proposed Development. The policy context has changed significantly since the previous NLEI scheme was considered. In particular the introduction of National Planning Framework 4 marked a major change in tone for national policy with significant weight to be given to the climate emergency and nature crisis in decision-making.
- 6.1.2. The EIA Report will be accompanied by a Planning Statement in support of the Proposed Development. The Planning Statement will draw upon the contents of the Planning and Energy Policy EIA Report Chapter and will consider the Proposed Development against identified planning and other policy objectives, concluding with substantiated comments about the extent to which the Proposed Development complies with the aims and objectives of identified plans and policies material to determination of the application.
- 6.1.3. The purpose of this section of the report is to establish agreement on the planning and energy related policy documents that should be considered by the Applicant in the EIA process.

6.2. Planning Policy and Guidance

- 6.2.1. National Planning Policy Framework 4² (NPF4) was adopted by Scottish Ministers on 13th February 2023. It replaces both NPF3 and Scottish Planning Policy in their entirety. NPF4 comprises part of the Development Plan and represents an updated expression of the Scottish Government Policy on land use matters.
- 6.2.2. NPF4 sets out a list of national planning policies to assess applications, alongside national developments and spatial priorities for different regions within Scotland.
- 6.2.3. There are two central themes running through NPF4 namely (1) addressing the climate emergency and (2) the nature crisis. These key themes are reflected in the detailed wording of many policies, as well as their stated Intent and Outcomes.
- 6.2.4. NPF4 comprises three parts, as follows: -
- Part 1 – A National Spatial Strategy for Scotland 2045;
 - Part 2 – National Planning Policy; and
 - Part 3 – Annexes, including National Developments.

² <https://www.gov.scot/publications/national-planning-framework-4/documents/>

- 6.2.5. Each Part of NPF4 will be considered where relevant to the Proposed Development.
- 6.2.6. Part 1 of NPF4 sets out the national spatial strategy and regional spatial priorities for different parts of Scotland. Six spatial principles are identified which will influence all plans and decisions as follows:-
- Just Transition;
 - Conserving and Recycling Assets;
 - Local Living;
 - Compact Urban Growth;
 - Rebalanced Development; and
 - Rural Revitalisation.
- 6.2.7. Part 1 of NPF4 sets out the National Spatial Strategy which is supported by commentary on five Regional Spatial Strategies, each of which will contribute in their own different ways to achievement of the National Spatial Strategy. The Site is located within the 'South' Regional Area. NPF4 identifies three priorities to deliver the spatial strategy for the area, including the need to 'protect environmental assets and stimulate investment in natural and engineered solutions to climate change and nature restoration'.
- 6.2.8. Part 2 of NPF4 sets out the national planning policies, of which there are 33 set out under three headings of:-
- Sustainable places;
 - Liveable places; and
 - Productive places.
- 6.2.9. For each policy, NPF4 provides commentary on Policy Intent, Policy Outcomes, and then discusses implications of the policy for Local Development Plans. Following the policy wording, NPF4 then sets out statements on Policy Impact and cross references to other Key Policy Connections.
- 6.2.10. The narrative and policies under the heading 'Sustainable Places' are likely to be of most relevance to the Proposed Development, with commentary on all forms of renewable, low carbon and zero emission technology. Policy 11 'Energy' will be the primary policy relating to the Proposed Development which focuses on encouraging and promoting renewable energy development. The Planning and Energy Policy Chapter of the EIA Report will consider the Proposed Development in the context of relevant policies of NPF4.
- 6.2.11. Part 3 of NPF4 identifies eighteen national developments which are described as '*significant developments of national importance that will help to deliver our spatial strategy*'. Of relevance to the Proposed Development is National Development 3 '*Strategic Renewable Electricity Generation and Transmission Infrastructure*'. NPF4 confirms that this class of national development '*supports renewable electricity generation, repowering, and expansion of the electricity grid*'. It incorporates three types of development, including '*on and off shore electricity generation, including electricity storage, from renewables exceeding 50 megawatts capacity*'. The Proposed Development therefore falls within National Development 3.

Dumfries and Galloway Local Development Plan

- 6.2.12. The Dumfries and Galloway Local Development Plan 2 (LDP2) was adopted in October 2019³ and contains planning policy and land use allocations for the area.
- 6.2.13. At the time of writing, DGC anticipate adopting LDP3 between February and April 2028. If there are any relevant policy updates in relation to LDP3 at the time of submission, these will be considered where appropriate in the EIA Report and supporting documentation.

Supplementary Guidance

- 6.2.14. Dumfries and Galloway adopted Supplementary Guidance (SG) relating to Wind Energy Development – Management Considerations in February 2020⁴ and Wind Energy – Landscape Sensitivity Study in February 2025⁵. As the Supplementary Guidance is adopted it forms part of the current LDP. Any new Supplementary Guidance prepared as part of the new LDP will be considered as relevant in the EIA Report Chapters.

South Lanarkshire Local Development Plan

- 6.2.15. Given the proximity of the Site to the South Lanarkshire Council area it will also be prudent to consider some elements of planning policy within the South Lanarkshire Local Development Plan 2⁶. In addition the South Lanarkshire Local Development Plan 3 is currently under preparation. Any relevant elements of policy will be considered where appropriate in the EIA Report and supporting documentation.

Planning Advice Notes

- 6.2.16. The Scottish Government provides technical advice on specific land use planning matters through a series of Planning Advice Notes (PANs). Several of the PANs are potentially relevant to the Proposed Development and these will be discussed in each of the relevant technical chapters of the EIA Report. At this stage, it is envisaged that the following PANs may be of relevance:
- PAN 1/2011: Planning and Noise (2011)⁷;
 - PAN 1/2013: Environmental Impact Assessment, Revision 1.0 (2017)⁸;
 - PAN 2/2011: Planning and Archaeology (2011)⁹;

³ Dumfries and Galloway Council (2019), Local Development Plan 2. Available at: <https://www.dumfriesandgalloway.gov.uk/planning-building/planning/planning-policy/local-development-plan/local-development-plan-2-ldp2>

⁴ Dumfries and Galloway Council (2020), Wind Energy Development – Management Considerations. Available at: https://www.dumfriesandgalloway.gov.uk/sites/default/files/2025-05/Wind-Energy-SG-Final-PDF-2025-Version_0.pdf

⁵ Dumfries and Galloway Council (2025), Wind Energy – Landscape Sensitivity Study: Assessment of Larger Wind Turbines. Available at: https://www.dumfriesandgalloway.gov.uk/sites/default/files/2025-03/Dumfries%20%26%20Galloway%20Wind%20Energy%20Landscape%20Sensitivity%20Study_0.pdf

⁶ https://www.southlanarkshire.gov.uk/info/200305/development_plans/2253/local_development_plan_2_ldp2

⁷ Scottish Government (2011), Planning Advice Note 1/2011: Planning and Noise. Available at: <https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/>

⁸ Scottish Government (2013), Planning Advice Note 1/2013: Environmental Impact Assessment. Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/>

⁹ Scottish Government (2011), Planning Advice Note 2/2011: Planning and Archaeology. Available at: <https://www.gov.scot/publications/pan-2-2011-planning-archaeology/>

- PAN 3/2010: Planning Advice on Community Engagement (2010)¹⁰;
- PAN 50: Annex B The Control of Dust at Surface Mineral Workings (1996)¹¹;
- PAN 51: Planning, Environmental Protection and Regulation (2006)¹²;
- PAN 60: Planning for Natural Heritage (2000)¹³;
- PAN 61: Planning and Sustainable Urban Drainage Systems (2001)¹⁴;
- PAN 68: Design Statements (2003)¹⁵;
- PAN 75: Planning for Transport (2005)¹⁶; and
- PAN 79: Water and Drainage (2006)¹⁷.

International and National Energy Policy

- 6.2.17. Most of the energy policy documents of relevance to the Proposed Development are concerned with the objective of reducing the amount of Greenhouse Gasses (GHG) that are emitted as a result of energy production and a related objective of increasing the proportion of energy derived from renewable sources. The Planning and Energy Policy Chapter will identify and discuss the key aims and objectives of the most pertinent energy policy documents to the Proposed Development, as at the time of EIA Report preparation.
- 6.2.18. The discussion will include relevant international, national (UK) and Scottish energy related legislation and policy. Amongst others, it is anticipated that the commentary on energy policy will focus on the following publications:
- Clean Power 2030 Action Plan: A New Era of Clean Electricity (2024)¹⁸;
 - Onshore Wind Policy Statement (OWPS) (2022)¹⁹;
 - Draft Energy Strategy and Just Transition Plan (2023)²⁰;

¹⁰ Scottish Government (2010), Planning Advice Note 3/2010: Community Engagement. Available at: <https://www.gov.scot/publications/planning-advice-note-3-2010-community-engagement/>

¹¹ Scottish Government (1998), Planning Advice Note 50: Controlling the environmental effects of surface mineral workings. Available at: <https://www.gov.scot/publications/dust-surface-mineral/>

¹² Scottish Government (2006), Planning Advice Note 51: Planning, environmental protection and regulation. Available at: [https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/#:~:text=Planning%20Advice%20Note%2051%3A%20planning%2C%20environmental%20protection%20and%20regulation,-Published%2020%20October&text=Planning%20Advice%20Note%20\(PAN\)%2051,to%20the%20environmental%20protection%20regimes.](https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/#:~:text=Planning%20Advice%20Note%2051%3A%20planning%2C%20environmental%20protection%20and%20regulation,-Published%2020%20October&text=Planning%20Advice%20Note%20(PAN)%2051,to%20the%20environmental%20protection%20regimes.)

¹³ Scottish Government (2000), Planning Advice Note 60: Natural Heritage. Available at: <https://www.gov.scot/publications/pan-60-natural-heritage/>

¹⁴ Scottish Government (2001), Planning Advice Note 61: Sustainable urban drainage systems. Available at: <https://www.gov.scot/publications/pan-61-sustainable-urban-drainage-systems/>

¹⁵ Scottish Government (2003), Planning Advice Note 68: Design Statements. Available at: <https://www.gov.scot/publications/planning-advice-note-68-design-statements/>

¹⁶ Scottish Government (2005), Planning Advice Note: PAN 75- Planning for Transport. Available at: <https://www.gov.scot/publications/planning-advice-note-pan-75-planning-transport/>

¹⁷ Scottish Government (2006), Planning Advice Note 79: water and drainage. Available at: <https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/>

¹⁸ <https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf>

¹⁹ Scottish Government (2022), Onshore Wind Policy Statement 2022. Available at: <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/>

²⁰ Scottish Government (2023), Draft Energy Strategy and Just Transition Plan. Available at: <https://www.gov.scot/publications/draft-energy-strategy-transition-plan/>

- Scottish Emissions Targets - First Five-yearly Review & Progress in Reducing Emissions in Scotland – 2022 Report to Parliament (2022)²¹;
- Building the Best Future for Scotland - The Programme for Government 2025-26 (2025)²²;
- Progress in Reducing Emissions in Scotland – 2023 Progress Report to Parliament²³;
- Update to the Climate Change Plan 2018 - 2032: Securing a Green Recovery on a Path to Net Zero (2020)²⁴;
- Climate Change (Scotland) Act 2009²⁵ and Climate Change (Emissions Reduction Targets) (Scotland) Act 2019²⁶; and Climate Change Plan: The Third Report on Proposals and Policies 2018 – 2032 (2018)²⁷.

6.2.19. These are some of the documents that will be considered in the Planning and Energy Policy Chapter, with any other publications and/ or updates to these documents considered on a case by case basis.

²¹ Climate Change Committee (2022), Progress in reducing emissions in Scotland. Available at: <https://www.theccc.org.uk/publication/scottish-emission-targets-progress-in-reducing-emissions-in-scotland-2022-report-to-parliament/>

²² <https://www.gov.scot/programme-for-government/>

²³ <https://www.theccc.org.uk/publication/progress-in-reducing-emissions-in-scotland-2023-report-to-parliament/>

²⁴ Scottish Government (2020), Securing a green recovery on a path to net zero: Climate change plan 2018-2032 – update. Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/pages/2/>

²⁵ Scottish Government, The Climate Change (Scotland) Act 2009. Available at: <https://www.legislation.gov.uk/asp/2009/12/contents>

²⁶ Scottish Government, The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. Available at: <https://www.legislation.gov.uk/asp/2019/15/enacted>

²⁷ Scottish Government (2018), Climate Change Plan: The Third Report on Proposals and Policies 2018 – 2032. Available at: [https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/#:~:text=Publication%20%2D%20Corporate%20report-Climate%20Change%20Plan%3A%20third%20report%20on%20proposals,policies%202018%2D2032%20\(RPP3\)&text=This%20plan%20sets%20out%20the,and%20healthier%20Scotland%20in%202032.](https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/#:~:text=Publication%20%2D%20Corporate%20report-Climate%20Change%20Plan%3A%20third%20report%20on%20proposals,policies%202018%2D2032%20(RPP3)&text=This%20plan%20sets%20out%20the,and%20healthier%20Scotland%20in%202032.)

7. EIA Methodology and Approach

7.1. Scope

- 7.1.1. The EIA Report will be prepared to meet the requirements of the EIA Regulations as well as the Institute of Environmental Management and Assessment (IEMA) Quality Mark commitments. The EIA Report will consider the various phases of the Proposed Development including construction, operation, and decommissioning.
- 7.1.2. The EIA Report will contain introductory chapters providing a description of the Proposed Development, including the physical characteristics of the Site, a full description of each of the elements proposed and a description of the characteristics of the operational phase of the Proposed Development. A description of the reasonable alternatives considered by the Applicant and mitigation by design will also be included.

7.2. Design

- 7.2.1. The scoping layout shown in **Figure 1.2** has been prepared in accordance with constraints known in the early stages of the project design, and with consideration of the planning history of the Site. The completion of the baseline landscape and visual assessment will establish over-arching design objectives that will be used in the design iteration process. An optimised layout will be produced which takes account of planning history, key viewpoints and landform considerations as well as other technical and environmental constraints that emerge following further baseline work and consultation including feedback set out in the Scoping Opinion. The layout will then be subject to further refinement through an iterative process which will include presenting the layout publicly at exhibitions for feedback from the local community.
- 7.2.2. The EIA Report will provide commentary on the design iteration process and details as to why the final design has been chosen, clearly setting out how each design iteration has sought to avoid or minimise the potential for significant environmental effects from arising.

7.3. Impact Assessment

- 7.3.1. The EIA Report will describe the likely significant direct effects, along with any indirect, cumulative, short, medium and long-term, permanent and temporary, beneficial and adverse effects. Chapters will include impact assessments where required supported by Technical Appendices for topic areas as appropriate.
- 7.3.2. Cumulative effects will be addressed within each topic chapter, where necessary. Cumulative effects are defined as potential additional changes caused by a proposed development in combination with other similar developments or as the collective effect of a set of developments. Wind farms to be considered in the cumulative assessment will be agreed with stakeholders with a 'cut-off date' prior to the production of the various technical assessments contributing to the EIA Report. These will include operational, under-construction, consented and application/appeal stage wind farms. Scoping-stage wind farms are not included unless there are exceptional reasons for doing so.
- 7.3.3. The following sections of this report provide detail on the topics to be considered in the EIA and the relevant methodology for each. In addition, each section, where appropriate, contains some focused questions to consultees.

8. Landscape and Visual Impact Assessment

8.1. Introduction

- 8.1.1. This section outlines the likely effects of the Proposed Development on the landscape and visual resource and the proposed methodology for the identification, assessment, and reporting of effects.
- 8.1.2. In accordance with NatureScot guidance²⁸ for turbines with a 220 metre (m) blade tip, the Study Area will cover a radius of 45 kilometres (km) from the nearest turbine (see **Figure 8.1**). A focused Study Area of 20km radius will also be considered. The preliminary cumulative assessment Study Area will be 60km, and it is anticipated that this will subsequently be reduced to focus on a Study Area of 45km radius (as shown on **Figure 8.6**), also in accordance with the same NatureScot guidance.
- 8.1.3. The following figures are associated with this section:
- Figure 8.1: Landscape Character;
 - Figure 8.2: Landscape Designations;
 - Figure 8.3: Wild Land Areas;
 - Figure 8.4: Principal Visual Receptors;
 - Figure 8.5: Blade Tip Zone of Theoretical Visibility (ZTV) with Viewpoints; and
 - Figure 8.6: Cumulative Wind Farms.

8.2. Baseline

- 8.2.1. The existing conditions for the Proposed Development site and Study Area in terms of landscape character, landscape designations and visual receptors are described below. Establishing this information helps to gain an understanding of what makes the landscape distinctive and what its important components or characteristics are, and is instrumental in the identification of the landscape character receptors, visual receptors and viewpoints that are relevant to the Proposed Development.
- 8.2.2. It should be noted that where distances from the Proposed Development are indicated in the following text, these refer to the distance from the nearest turbine in the scoping layout of the Proposed Development.

²⁸ SNH (2017) Visual Representation of Wind Farms Version 2.2

Landscape Character

8.2.3. Landscape character for the 45km Study Area will be classified according to NatureScot's 2019 dataset²⁹, which identifies landscape character types (LCTs) across Scotland (as shown on **Figure 8.1**).

8.2.4. While parts of the Study Area are covered by various landscape sensitivity and capacity studies that relate specifically to wind energy development, Landscape Institute guidance³⁰ notes in Section 9(1) that:

'Capacity or sensitivity studies are undertaken at the strategic landscape planning level rather than the individual project proposal level (noting that there has been a general move away from capacity studies and towards sensitivity studies).'

GLVIA3 acknowledges that where there are existing landscape sensitivity and capacity studies 'they may provide useful preliminary background information for the assessment.' (paragraph 5.41).

Caution should also be exercised in using capacity studies (and some sensitivity studies) as they may consider aspects of potential effects arising from development (e.g. upon nearby visual receptors) which are not relevant to landscape sensitivity.'

8.2.5. In this case, it is considered that the criteria that are followed in landscape capacity and sensitivity studies do not completely align with the criteria for landscape assessment as outlined in GLVIA3, and the NatureScot dataset and descriptions are therefore used as the basis for the assessment.

8.2.6. The NatureScot dataset classifies the Site as lying within Southern Uplands - Dumfries & Galloway LCT (LCT 177). This is an extensive upland landscape that is found in nine separate areas and has the following key characteristics as noted in the NatureScot description.

- *'Large, smooth dome/conical shaped hills, predominantly grass-covered.*
- *Open and exposed character except within incised valleys.*
- *Dramatically sculpted landforms and awe-inspiring scale.*
- *Distinctive dark brown/purple colour of heather on some of the higher areas.*
- *Pockets of woodland in incised valleys.*
- *Stone dykes occasionally define the lower limit.*
- *Legacy of lead and other mining activity, with extensive archaeological remains around the former mining village of Wanlockhead.*
- *Wind farms locally characteristic, away from the more dramatic, scenic and sculptural slopes and skylines.'*

8.2.7. The final key characteristic, which relates to wind energy development, is not directly applicable to the area of this LCT within which the Site lies. The full description of this characteristic notes that *'Large-scale wind farms are locally characteristic of the open Southern Uplands - Dumfries and Galloway in upper Nithsdale and around Carsphairn and Langholm, away from the more dramatic, scenic and sculptural slopes and skylines'*. There is, however, extensive visibility and influence of wind energy development from within this area of the LCT.

²⁹ NatureScot (2023) Scottish Landscape Character Types Map and Descriptions [Online] Available from <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions>

³⁰ Landscape Institute (2024). Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3) Technical Guidance Note LITGN-2024-01

- 8.2.8. The eastern edge of the host unit of LCT 177 extends into the very similar Southern Uplands - Glasgow & Clyde Valley LCT (LCT 217), while the northwestern edge abuts Southern Uplands with Forest - Dumfries & Galloway LCT (LCT 178), the south-western edge abuts the Upper Dale - Dumfries & Galloway LCT (LCT 165) of Nithsdale, and the southern edge is formed by the distinctive Dalveen Pass (Upland Glens - Dumfries & Galloway (LCT 166)), beyond which LCT 177 continues further to the east. A further area of LCT 166 – the Menzies Pass - protrudes into the host LCT to the south of Wanlockhead.
- 8.2.9. The landscape and visual impact assessment (LVIA) will include an assessment of the effects of the Proposed Development on the relevant LCTs within the Study Area.

Landscape Designations

- 8.2.10. The Site itself is not covered by any known international or national landscape-related planning designations. The southern part of the Site is, however, within the Thornhill Uplands Regional Scenic Area (RSA) as designated by Dumfries and Galloway Council (D&GC). Additional designated areas are found elsewhere in the Study Area, as shown on **Figure 8.2**. Landscape designations found in the Study Area are described below.

National Scenic Areas

- 8.2.11. National Scenic Areas (NSAs) are considered to be important at a national level. Policy 4 of NPF4 states that:

'c) Development proposals that will affect a National Park, National Scenic Area, Site of Special Scientific Interest or a National Nature Reserve will only be supported where:

i. The objectives of designation and the overall integrity of the areas will not be compromised; or

ii. Any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance.'

- 8.2.12. There are two NSAs in the 45km Study Area; the Upper Tweeddale NSA, which lies a minimum of approximately 31km to the northeast of the Proposed Development, and the Nith Estuary NSA, a minimum of approximately 42km to the south of the Proposed Development. It is proposed that effects on NSAs are scoped out of the assessment due to distance and the resultant lack of potential for a significant effect to arise on the NSAs.

Gardens and Designed Landscapes

- 8.2.13. Gardens and Designed Landscapes (GDLs) are considered in Policy 7 of NPF4, which is concerned with 'Historic assets and places'. Policy 7 states that:

'i) Development proposals affecting nationally important Gardens and Designed Landscapes will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact on important views to, from and within the site, or its setting.'

- 8.2.14. As GDLs are considered as historic assets rather than landscape designations, effects on GDLs and their settings are considered in **Section 9 Archaeology Cultural Heritage**. However, GDLs may be referenced in the LVIA where they are also covered by scenic designations or are visitor attractions, and if elements within them might be relevant as visual receptors or viewpoints.

Local Landscape Designations

- 8.2.15. There are a number of local landscape designations in the Study Area. Policy 4(d) of NPF4 states that:

'd) Development proposals that affect a site designated as a local nature conservation site or landscape area in the LDP will only be supported where:

i. Development will not have significant adverse effects on the integrity of the area or the qualities for which it has been identified; or

ii. Any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits of at least local importance.'

- 8.2.16. In the D&GC local authority area, local landscape designations are referred to as RSAs, while elsewhere in the Study Area they are referred to as Special Landscape Areas (SLAs) (Scottish Borders Council (SBC) and South Lanarkshire Council (SLC)) or Local Landscape Areas (LLAs) (East Ayrshire Council (EAC) and South Ayrshire Council (SAC)). As noted above, the southern part of the Site is within the Thornhill Uplands RSA, and an assessment of effects on this RSA will be included in the LVIA.

- 8.2.17. Approximately 2.5km away to the east and northeast of the Proposed Development is the Leadhills and Lowther Hills SLA, as designated by SLC, which abuts the Thornhill Uplands RSA. Other local landscape designations lie a minimum of over 11km away and are unlikely to have potential to undergo a significant effect as a result of the Proposed Development. Where there is potential for the Proposed Development to lead to a significant effect on any other locally designated areas, an assessment of effects will also be included in the LVIA.

Galloway Forest Dark Sky Park

- 8.2.18. The Galloway Forest Dark Sky Park has a core area and a buffer area which are a minimum of approximately 32km and 41km away from the Proposed Development respectively. It is proposed that the effect on the Dark Sky Park is scoped out of the assessment because the distance is greater than the buffer areas due to the distance of the Proposed Development from both the core area and buffer area and the resultant lack of potential for a significant effect to arise on the Dark Sky Park.

Wild Land Areas

- 8.2.19. Wild Land Areas (WLAs) are shown on NatureScot's 2014 wild land mapping and referred to in Policy 4(g) of NPF4, as below.

'g) Development proposals in areas identified as wild land in the Nature Scot Wild Land Areas map will only be supported where the proposal:

i. will support meeting renewable energy targets; or,

ii. is for small scale development directly linked to a rural business orcroft, or is required to support a fragile community in a rural area.

All such proposals must be accompanied by a wild land impact assessment which sets out how design, siting, or other mitigation measures have been and will be used to minimise significant impacts on the qualities of the wild land, as well as any management and monitoring arrangements where appropriate. Buffer zones around wild land will not be applied, and effects of development outwith wild land areas will not be a significant consideration.'

- 8.2.20. There are two WLAs in the 45km Study Area; Talla - Hart Fell (WLA 2), which lies a minimum of approximately 23.5km to the east of the Proposed Development, and Merrick (WLA 1), a minimum of approximately 42km to the southwest of the Proposed Development, see **Figure 8.3**. It is proposed that effects on WLAs are scoped out of the assessment due to distance and the resultant lack of potential for a significant effect to arise on the WLAs. s.

Visual Receptors

- 8.2.21. Visual receptors are features such as settlements and routes, from which views may be affected by the Proposed Development. These are shown on **Figure 8.4**.

Settlements

- 8.2.22. Settlements considered in the LVIA will be those within a 20km radius of the Proposed Development that are identified as settlements in adopted local development plan mapping. The closest settlement to the Proposed Development is the village of Wanlockhead, which lies a minimum of approximately 3.2km to the east of the nearest turbine. Also to the east of the Proposed Development is Leadhills, which lies to the north of Wanlockhead and is slightly further away from the nearest turbine at approximately 5km. Sanquhar is approximately 4.6km away to the south-west of the Proposed Development, while Kirkconnel/Kelloholm is just over 7km away, also to the south-west. Crawfordjohn is approximately 10km away to the north-east.

Routes

- 8.2.23. Routes considered in the LVIA include relevant classified roads, long distance walking routes, core paths, national cycle routes (NCR), and railway lines.
- 8.2.24. The closest classified road to the Site is the B740, which passes a minimum of approximately 1.3km to the northwest of the Proposed Development. The B797, which runs through the Mennock Pass, is a minimum of approximately 2km to the southeast of the Proposed Development. The closest A-road is the A76, which runs a minimum of approximately 5km away to the southwest of the Proposed Development. The A702 passes a minimum of approximately 7.5km to the southeast of the Proposed Development, where it runs through the Dalveen Pass, while the A70 is a minimum of approximately 13km away to the north. The M74/A74(M) runs to the northeast, a minimum of approximately 12km away from the Proposed Development.
- 8.2.25. The closest recognised vehicular tourist route to the Site is the South West Coastal 300, which follows the B797 and A76 to the south and southeast of the Proposed Development. The Clyde Valley Tourist Route passes a minimum of approximately 11.5km to the northeast of the Proposed Development while the Galloway Tourist Route is a minimum of approximately 32km away to the southwest.
- 8.2.26. The closest railway line to the Site is the Glasgow – Dumfries/Carlisle line, which passes through Sanquhar, to the southwest of the Proposed Development, a minimum of approximately 5km away. The West Coast Mainline passes a minimum of approximately 12km to the northeast of the Proposed Development.
- 8.2.27. There are a number of long-distance recreational routes in the 45km Study Area. The closest of these is the Southern Upland Way (SUW), which passes through the Site. Other routes are considerably further away, including the River Ayr Way (a minimum of approximately 16km to the northwest of the Proposed Development), the Romans and Reivers Route (a minimum of just over 20km away to the southeast), and the Annandale Way (a minimum of approximately 22km to the east). NCR 74 passes a minimum of approximately 11km to the northeast of the Proposed Development. There is a network of core paths in the Study Area, and effects on views from core paths in the vicinity of the Proposed Development will be considered in the LVIA.
- 8.2.28. The effect of the Proposed Development on views from relevant routes will be considered in the LVIA.

Viewpoints

- 8.2.29. The LVIA will be informed by a series of viewpoints which are selected to cover points of specific importance, including recognised viewpoints, settlements, hilltops, important routes and designated landscapes. A variety of landscape character types and points from different directions and distances will also be represented in the selected views.
- 8.2.30. The locations shown in **Table 8.1** and on **Figure 8.5** have been identified as preliminary viewpoint locations for the assessment, and are based on viewpoints that were used for the previous NLEI scheme where these are relevant to the Proposed Development. The final viewpoint locations will depend on the final layout for the Proposed Development and will take into consideration suggestions made by relevant consultees.

Table 8.1: Preliminary Viewpoint Locations

Viewpoint Number and Name	Grid Reference	Comment
1. SUW, Glengaber Hill	284377, 613933	The viewpoint is located on the SUW as it passes over Glengaber Hill. Within the Thornhill Uplands RSA.
2. SUW, Conrig Coll	282370, 612350	This viewpoint is located on the SUW on the southern edge of the Proposed Development. Within the Thornhill Uplands RSA.
3. B740, Corsebank	280667, 616159	This viewpoint is located on the B740 to the south of Corsebank Farm, where the valley opens out, allowing an open view of the surrounding hills.
4. Wanlockhead Beam Engine	287028, 613143	This viewpoint is located adjacent to the beam engine (within the Scheduled Monument and part of the visitor attraction in Wanlockhead) at the western edge of Wanlockhead. Within the Thornhill Uplands RSA.
5. Wanlockhead Museum	287225, 612942	This viewpoint is located on the footpath that leads from Wanlockhead Museum of Lead Mining to external exhibits. On the SUW, within the Scheduled Monument and within the Thornhill Uplands RSA.
6. Upper Wanlockhead	287571, 612711	This viewpoint is located on the elevated southern edge of Wanlockhead from where an open view is gained. Within the Thornhill Uplands RSA.
7. Lowther Hill	288967, 610768	This viewpoint is located at the top of Lowther Hill, near the buildings and dome of the National Air Traffic Services (NATS) radar tracking station. Within the Leadhills and Lowther Hills SLA and close to the SUW.
8. Auchentaggart Moor	280986, 609192	This viewpoint is located on a core path Auchentaggart Moor, on the ridge of Auchentaggart Hill. Within the Thornhill Uplands RSA.
9. Sanquhar Golf Course	277582, 609279	This viewpoint is on a minor road (also the SUW) that runs along the edge of the golf course.
10. Crawick Multiverse Park	277643, 611781	The viewpoint is located at the highest point within the Crawick Multiverse, a visitor attraction and GDL.
11. SUW, Whing Head	275085, 605642	This viewpoint is located on the ridge of the hills that form the southern side of Nithsdale, and provides the first views over Nithsdale for northbound walkers.

Viewpoint Number and Name	Grid Reference	Comment
12. Kelloholm	274184, 611257	This viewpoint is located on the eastern edge of Kelloholm and is included to represent views that may be gained from the settlement.
13. Blackcraig Hill	264797, 606445	This viewpoint is located near the trig point on Blackcraig Hill, on the southern side of Nithsdale. Within the Uplands and Moorlands LLA.
14. New Cumnock	261950, 614170	This viewpoint is located on the A76, near New Cumnock Station, where it crosses the River Nith and the railway. Just within the Uplands and Moorlands LLA.
15. Cairn Table	272480, 624209	This viewpoint is located at the summit of Cairn Table (593m above ordnance datum (AOD)). Just within the Uplands and Moorlands LLA and accessed by a core path.
16. Crawfordjohn	288102, 624115	This viewpoint is located on the B740 to the north of Crawfordjohn, within the Leadhills and Lowther Hills SLA.
17. Auchenknight	283930, 597851	This viewpoint is located near Auchenknight, a farm on the Drumlanrig Castle Estate, within the Drumlanrig Castle GDL and Thornhill Uplands RSA.
18. A76, Closeburn	289099, 593250	This viewpoint is located on the A76 near Closeburn, south of Thornhill. Within the Thornhill Uplands RSA.
19. Tinto Hill	295304, 634365	This viewpoint is located at the summit cairn of Tinto Hill (711m AOD), accessed by a core path and within the Upper Clyde Valley and Tinto SLA.

Cumulative Wind Farms

- 8.2.31. The assessment of cumulative effects in the LVIA will describe the effects arising from the addition of the Proposed Development to a range of cumulative scenarios, including operational, under construction, consented and application stage wind farms. Scoping stage sites are not usually included in the assessment due to the uncertainty of their layout and design, and the potential for considerable changes to be made between scoping stage and submission. D&GC and NatureScot will be consulted over the final list of wind farms to be considered in the cumulative assessment.
- 8.2.32. In accordance with NatureScot guidance³¹, the preliminary cumulative assessment study area will be 60km with the detailed cumulative assessment likely to focus on a study area with a maximum 45km radius.
- 8.2.33. The current known cumulative situation for a 45km study area is shown on **Figure 8.6**. It should be noted that this figure does not show the cumulative situation that will be assessed in the LVIA (unless there are no relevant changes to the current cumulative situation) and this will be updated as close as possible to the submission date for the EIA Report, with a 'cut-off' date being set in agreement with D&GC. This means that wind farm proposals that are currently at scoping stage, and not yet full applications, may become relevant at the time of the LVIA.

8.3. Assessment Methodology

- 8.3.1. The LVIA is intended to determine the likely significant effects that the Proposed Development will have on the landscape and visual resource. Five categories of potential effects on the landscape and visual resource are considered:
- physical effects on landscape elements;
 - effects on landscape character;
 - effects on wild land;
 - effects on views (including night-time effects of visible aviation lighting on wind turbines); and
 - cumulative effects.
- 8.3.2. Physical effects on landscape elements are restricted to the area within the Site and are the direct effects on the existing fabric of the Site, such as the removal of, alteration to, or reinstatement of ground cover. This category of effects is made up of landscape elements, which are the components of the landscape, such as moorland, which may be directly and physically affected by the Proposed Development.
- 8.3.3. Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements, or through visibility of the Proposed Development, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which fall into two groups: LCTs and landscape-related designated areas.
- 8.3.4. An assessment of effects on wild land is not required in this LVIA as the WLAs within the Study Area are over 23km as a minimum from the Proposed Development, as described in the baseline section, and will not undergo significant effects as a result of the Proposed Development.

³¹ NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments

- 8.3.5. The assessment of effects on views is an assessment of how the introduction of the Proposed Development will affect views throughout the Study Area. The assessment of effects on views is carried out in three parts:
- an assessment of the effects that the Proposed Development will have on a series of viewpoints;
 - an assessment of the effects that the Proposed Development will have on views from principal visual receptors, which include relevant settlements and routes throughout the study area; and
 - an assessment of the potential night-time effects of visible aviation lighting.
- 8.3.6. Cumulative effects arise where the study areas for two or more wind farms overlap so that both wind farms are experienced at proximity where they may have a greater incremental effect, or where wind farms may combine to have a sequential effect, irrespective of overlap in study areas.

Significance of Effects

- 8.3.7. The objective of the assessment of the Proposed Development is to predict its likely significant effects on the landscape and visual resource. The EIA Regulations require that the direct and indirect significant effects of the Proposed Development are identified, described and assessed, and therefore the LVIA effects are assessed to be either significant or not significant. The LVIA does not define intermediate levels of significance as the EIA Regulations do not provide for these.
- 8.3.8. As described in best practice guidance (GLVIA3)³², the significance of effects is assessed through a combination of two considerations; the sensitivity of the landscape or visual receptor and the magnitude of change that will result from the addition of the Proposed Development. While this methodology is not reliant on the use of a matrix to arrive at the conclusion of a significant or not significant effect, a matrix is included in **Table 8.2** to illustrate how combinations of sensitivity and magnitude of change ratings can give rise to significant effects. The matrix also gives an understanding of the threshold at which significant effects may arise.

³² Guidelines for Landscape and Visual Impact Assessment: Third Edition (Landscape Institute and IEMA, 2013) (GLVIA3)

Table 8.2: Illustrative Significance Matrix

		Magnitude of Change					
Sensitivity		High	High-Medium	Medium	Medium-Low	Low	Negligible
	High	Major (Significant)	Major (Significant)	Major-moderate (Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not Significant)	Minor (Not Significant)
	High-Medium	Major (Significant)	Major-moderate (Significant)	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not Significant)	Minor (Not Significant)
	Medium	Major-moderate (Significant)	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)
	Medium-Low	Moderate (Significant or Not Significant)	Moderate (Significant or Not Significant)	Moderate-minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)
	Low	Moderate (Significant or Not Significant)	Moderate-minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

8.3.9. In accordance with GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned justification is presented in respect of the findings of each case.

8.3.10. A significant effect occurs where the Proposed Development will provide one of the defining influences on a landscape element, landscape character receptor or view. A not significant effect occurs where the effect of the Proposed Development is not material, and the baseline characteristics of the landscape element, landscape character receptor, view or visual receptor continue to provide the definitive influence.

Sensitivity

8.3.11. Sensitivity is an expression of the ability of a landscape receptor or view to accommodate the Proposed Development and is determined through a combination of the value of the receptor and its susceptibility to the Proposed Development.

8.3.12. Levels of sensitivity (high, medium, and low) are applied in order that the judgement used in the process of assessment is apparent. Intermediate levels (medium-high and medium-low) may also be applied where the particular combination of value and susceptibility results in an intermediate definition.

Magnitude of Change

8.3.13. Magnitude of change is an expression of the extent of the effect on landscape and visual receptors that will result from the introduction of the Proposed Development. The magnitude of change is

assessed in terms of a number of variables, including the size and scale of the impact and the extent of the affected area. Levels of magnitude of change (high, medium, low, and negligible) are applied in order that the judgement used in the process of assessment is apparent. Intermediate levels (high-medium and medium-low) may also be applied where the particular combination of variables results in an intermediate definition.

Nature of Effects

- 8.3.14. The 'nature of effects' relates to whether the effects of the Proposed Development are beneficial, neutral or adverse. The landscape and visual effects of wind farms are difficult to categorise in either of these brackets as, unlike other disciplines, there are no definitive criteria by which effects can be measured as being categorically beneficial or adverse.
- 8.3.15. The LVIA will adopt a precautionary approach, which assumes that significant landscape and visual effects will be weighed on the adverse side of the planning balance, although beneficial or neutral effects may arise in certain circumstances.

Assessment of Cumulative Effects

- 8.3.16. The objective of the assessment of cumulative effects is to assess the ways in which the Proposed Development will interact with other relevant existing, consented, or proposed wind farms. The cumulative assessment will be carried out in accordance with NatureScot Guidance³³ and will include potential sequential cumulative effects on routes, including roads and other routes, as well as cumulative effects on static receptors and viewpoints.
- 8.3.17. The wind farms to be considered in the cumulative assessment will be agreed with D&GC and NatureScot with a 'cut-off date' prior to the production of the LVIA. These will include operational, under-construction, consented and application/appeal stage wind farms. Scoping-stage wind farms are not included unless there are exceptional reasons for doing so. Single turbines and those that are less than 50m to tip will not be included in the cumulative assessment.
- 8.3.18. In accordance with NatureScot guidance, the preliminary cumulative assessment study area will be 60km with the detailed cumulative assessment likely to focus on a study area with a maximum 45km radius.
- 8.3.19. The LVIA will assess the incremental effect arising from the addition of the Proposed Development to the cumulative situation, in accordance with GLVIA3, which notes (para 7.18):

'Some of those involved may tend to favour a limited view focussed on the additional effects of the project being assessed, on top of the cumulative baseline. Some stakeholders may however be more interested in the combined effects of all the past, present and future proposals, including the proposed scheme...Assessing combined effects of different proposals at different stages in the planning process can be very complex. Furthermore, the assessor will not have assessed the other schemes and cannot therefore make a fully informed judgement. A more comprehensive overview of the cumulative effects must rest with the competent authority.'
- 8.3.20. Significant cumulative landscape or visual effects arise where a 'wind farm landscape' is created as a result of the addition of the Proposed Development to other existing or proposed wind farms, resulting in wind turbines becoming sufficiently prolific that they become a prevailing or key

³³ NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments

landscape and visual characteristic across a specified area.

Assessment of Night-Time Effects

- 8.3.21. The Civil Aviation Authority (CAA) requires that 'en-route obstacles' at or above 150m above ground level are lit with visible lighting to assist their detection by aircraft. As the proposed turbines will be up to 220m tip height, there will be a requirement for some or all of the turbines to display visible red lights at night and an hours of darkness assessment of effects will therefore be required. The lights will be installed on the nacelles (and potentially the towers) of the wind turbines. Should a reduced lighting scheme be agreed with the CAA by the Applicant, is it proposed that this scheme would form the basis of the assessment of wind turbine lighting.
- 8.3.22. The assessment of turbine lighting is intended to determine the likely effects that the Proposed Development will have on the visual resource e.g. it is an assessment of the effects of visible aviation lighting on views experienced by people during hours of darkness. This assessment will be carried out in accordance with NatureScot guidance³⁴.
- 8.3.23. The assessment of night-time effects will be informed by a ZTV of the wind turbine lights and night-time visualisations from three viewpoints, in accordance with the above guidance, to be agreed with D&GC and NatureScot, that illustrate the proposed lighting effects. These viewpoints will represent locations from where people are most likely to experience the Proposed Development at night.

Residential Visual Amenity Assessment

- 8.3.24. If required, a Residential Visual Amenity Assessment (RVAA) will be prepared as an appendix to the LVIA. This will assess the impact of the Proposed Development on residential visual amenity and will be prepared in accordance with Landscape Institute guidance³⁵. In accordance with this guidance, the study area of the RVAA will extend to a radius of 2km from the nearest turbine in the Proposed Development. If there are no residential properties within the 2km radius, an RVAA will not be required and will not be included in the LVIA.

8.4. Technical Guidance

- 8.4.1. The following guidance and information/data sources will be taken into consideration in the LVIA and the presentation of graphics:
- Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3);
 - Landscape Institute (2019). Visual Representation of Development Proposals: Landscape Institute Technical Guidance Note 06/19;
 - Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment;
 - Landscape Institute (2024). Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3) Technical Guidance Note LITGN-2024-01;
 - NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments;
 - NatureScot (2024). Guidance on Aviation Lighting Impact Assessment; and
 - SNH (2017). Visual Representation of Wind Farms, Version 2.2.

³⁴ NatureScot (2024). Guidance on Aviation Lighting Impact Assessment

³⁵ Landscape Institute (2019). Technical Guidance Note 2/19 Residential Visual Amenity Assessment

8.4.2. Online resources:

- NatureScot (2024) NatureScot pre-application guidance for onshore wind farms. Available at <https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms>; and
- NatureScot (2023) Scottish Landscape Character Types Map and Descriptions. Available at: <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions>.

8.5. Potential Effects

8.5.1. The LVIA will include an assessment of effects on the landscape and visual receptors that are referenced in the baseline section of this chapter. The level of assessment will vary dependent on the likelihood of a significant effect arising, ranging from a high level, preliminary assessment to a full, detailed assessment.

8.5.2. It is proposed that the following receptors or impacts will be scoped out of the LVIA:

- assessment of effects on GDLs (other than where they are also covered by scenic designations, are visitor attractions, or elements within them might be relevant as visual receptors);
- assessment of effects on NSAs (subject to the ZTV of the final Proposed Development layout);
- effects on the Galloway Dark Sky Park; and
- assessment of effects on wild land.

8.6. Focused Questions

Do consultees have any comments on the proposed LVIA methodology (including that for the cumulative and night-time assessments)?

Are consultees in agreement with the proposed study areas?

Do consultees have any comments or suggestions in relation to the preliminary viewpoint locations listed in Table 8.1?

Are consultees in agreement with the proposal to scope out NSAs (subject to the ZTV of the final Proposed Development layout) and GDLs?

Are consultees in agreement with the proposal to scope out an assessment of effects on the Galloway Dark Sky Park?

Are consultees in agreement with the proposal to scope out an assessment of effects on wild land?

9. Archaeology and Cultural Heritage

9.1. Introduction

- 9.1.1. The 'cultural heritage' of an area comprises World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventoried Gardens and Designed Landscapes (GDLs), Inventoried Battlefields and other historic environment features. Alongside its inherent values, the 'setting' of an asset may also contribute to its cultural heritage significance.
- 9.1.2. The cultural heritage impact assessment will:
- identify cultural heritage assets that may be subject to significant effects, both within the limits of the Proposed Development and within a proposed Study Area of 10 kilometres (km) from the proposed turbine locations;
 - establish the potential for currently unknown archaeological assets to survive buried within the site;
 - assess the predicted effects on these assets; and
 - propose a programme of mitigation where appropriate.
- 9.1.3. It will consider direct effects (such as physical disturbance), indirect effects (such as vibration), setting effects, and cumulative effects (where assets affected by the Proposed Development are also likely to be affected by other unrelated development proposals).
- 9.1.4. This scoping chapter is supported by the following documents:
- **Appendix 9.1** – Cultural Heritage Appraisal; and
 - **Figure 9.1** – Designated Cultural Heritage Assets

9.2. Baseline

Assets within the Site Boundary

- 9.2.1. Several heritage assets are identified within the Site boundary, based on the sources listed in **Table 9.2**. There are no designated heritage assets within the Site boundary, however, as recorded by the Dumfries and Galloway Council there is a Historic Environment Record (HER) within the Site boundary that should be regarded as being of national significance. Asset MDG229 is an earthwork of an unknown function; however, previous surveys have identified that it is not defensive in nature. Asset MDG229 is located in the north of the Site, c.2.5km north of proposed T12.
- 9.2.2. Based on the publicly available HER data and a survey conducted by CFA Archaeology in 2016 for the North Lowther Energy Initiative project (NLEI scheme), there are a total of 26 recorded heritage assets within the Glensalloch Wind Farm Site boundary. There is a single regionally important heritage asset (MDG27004) recorded within the Glensalloch Wind Farm boundary. This comprises Upper Cog farmstead and trackway, which dates from the medieval period to the 19th century. Five additional assets, recorded as being of regional/local importance, are located within the site boundary (MDG21433, MDG21434, MDG25753, MDG25754, MDG27003) and all date between the medieval period to the modern period. These assets are all agricultural in nature, including farmsteads, enclosures, ridge and furrow, and earthwork banks. In addition, further assets are all agricultural and pastoral in nature, showing continuous and consistent land use throughout multiple periods.

- 9.2.3. The heritage assets are recorded throughout the Site; however, the majority do appear to be concentrated along the multiple watercourses that run through the Site and along the Site Boundary. These watercourses include Wanlock Water along the Site's northeastern boundary, Crawick Water along the Site's western boundary and Cog Burn and Glensalloch Burn within the southwest of the Site.
- 9.2.4. All cultural heritage assets within the Site are noted in **Table 9.1**. An up-to-date full commercial HER data search will be undertaken as part of the design process and used to inform an understanding of key constraints.

Table 9.1: Heritage Assets Within the Site Boundary

HER Reference (if present)	Name	Type of Asset	Period	Importance (if given)	Data Source
-	-	Sheepfold	Undated	-	HER
-	-	Sheepfold	Undated	-	HER
MDG21433	Nether Cog	Ridge and furrow; bank (earthwork); farmstead; sheep fold	Medieval to Modern	Regional/Local	HER
MDG21434	Nether Cog	Bank (earthwork); ridge and furrow	Medieval to 18th Century	Regional/Local	HER
MDG229	Clackleith Hill	Earthwork	Early Neolithic to Roman	National	HER
MDG243	Cogshead	Clearance cairn	Early Bronze Age to 19th Century	Other	HER
MDG25753	Clackleith	Enclosure	Medieval to 18th Century	Regional/Local	HER
MDG25754	Clackleith	Enclosure; farmstead	Medieval to Modern	Regional/Local	HER
MDG27003	Clackleith	Farmstead	Medieval to Modern	Regional/Local	HER
MDG27004	Upper Cog	Farmstead; trackway	Medieval to 19th Century	Regional	HER
MDG25745	Upper Cog	Farmstead	Medieval to Post-medieval	-	HER

HER Reference (if present)	Name	Type of Asset	Period	Importance (if given)	Data Source
MDG25746	Upper Cog	Farmstead	Medieval to Post-medieval	-	HER
N/A	Cogshead	Southern Upland Way	Undated	-	HER
N/A	-	Enclosure	Undated	-	CFA Archaeology Survey Data
N/A	-	Cogshead; cottage, clearance cairns; field system	Medieval to Post-medieval	-	CFA Archaeology Survey Data
N/A	-	Sheep Shelter	Undated	-	CFA Archaeology Survey Data
N/A	-	Peat Cuttings	Undated	-	CFA Archaeology Survey Data
N/A	-	Enclosure	Undated	-	CFA Archaeology Survey Data
N/A	-	Sheepfold	Undated	-	CFA Archaeology Survey Data
N/A	-	Peat Cutting	Undated	-	CFA Archaeology Survey Data
N/A	-	Sheepfold	Undated	-	CFA Archaeology Survey Data
N/A	-	Sheepfold	Undated	-	CFA Archaeology Survey Data
N/A	-	Field System	Medieval/Post-Medieval	-	CFA Archaeology Survey Data

HER Reference (if present)	Name	Type of Asset	Period	Importance (if given)	Data Source
N/A	-	Sheepfold	Undated	-	CFA Archaeology Survey Data
N/A	-	Agricultural Area	Undated	-	CFA Archaeology Survey Data
N/A	-	Modern Quarry	Modern	-	CFA Archaeology Survey Data

Assets outwith the Site Boundary

9.2.5. Within 10km of the proposed turbine locations, there are a total of 101 designated heritage assets. These include:

- 15 Scheduled Monuments;
- 80 Listed Buildings;
 - Three Category A;
 - 43 Category B;
 - 34 Category C;
- Three Inventoried Gardens and Designed Landscapes; and
- Three Conservation Areas.

9.2.5. There are no World Heritage Sites or Inventoried Battlefields within 10km of the proposed turbine locations.

9.3. Assessment Methodology

Legislation, Policy and Guidance

Legislation

- The Ancient Monuments and Archaeological Areas Act 1979;
- The Planning (Listed Buildings and Conservation Areas (Scotland) Act 1997;
- The Historic Environment (Amendment) (Scotland) Act 2014; and
- Scottish Statutory Instrument No. 101 The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Policy

9.3.1. The Scottish Government, Historic Environment Scotland, Dumfries and Galloway Council, and South Lanarkshire Council have issued statements of policy with respect to dealing with the historic environment in the planning system:

- National Planning Framework 4 (NPF4; 2023);
- Onshore Wind Turbines: Planning Advice (2014);
- Planning Advice Note 2/2011: Planning and Archaeology;

- Our Past, Our Future: The Strategy for Scotland's Historic Environment (2023);
- Historic Environment Policy for Scotland (HEPS 2019);
- Designation Policy and Selection Guidance (2020);
- South Lanarkshire Local Development Plan 2 (2021) relevant policies including:
 - NHE2 Archaeological Sites and Monuments; and
- Dumfries and Galloway Local Development Plan (2019) relevant policies including:
 - Policy HE1: Listed Buildings;
 - Policy HE3: Archaeology;
 - Policy HE4: Archaeologically Sensitive Areas;
 - Policy HE6: Gardens and Designed Landscapes; and
 - Policy HE7: Historic Battlefields.

Guidance

9.3.2. Relevant guidance and technical standard documents comprise:

- Historic Environment Scotland Guidance on Managing Change in the Historic Environment: Setting (2020);
- A Guide to Climate Change Impact: On Scotland's Historic Environment (2019);
- Scottish National Heritage (NatureScot) and Historic Environment Scotland Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment Process in Scotland (2019); and
- Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-Based Assessment (2014, updated 2020).

Proposed Sources

9.3.3. The sources to be consulted in the production of the EIA Report include, but are not limited to, those outlined in **Table 9.2**.

Table 9.2: Sources to be Consulted

Subject	Author Summary	Source
Designated Cultural Heritage Assets	The database of Historic Environment Scotland (HES)	HES digital data download.
Conservation Areas	Dumfries and Galloway Council, South Lanarkshire Council, and HES	HES digital data download, Conservation Area Appraisal from the relevant Council.
Non-designated cultural heritage assets (Local HER)	Data held by Dumfries and Galloway Council and West of Scotland Archaeology Service (on behalf of South Lanarkshire Council)	Digital data purchased from the relevant councils as a download
Non-designated cultural heritage assets (National database)	Trove online database curated by Historic Environment Scotland	Trove Online Database

Subject	Author Summary	Source
Historic Mapping	National Library of Scotland	National Library of Scotland website
Walkover Survey Data	CFA Archaeology – conducted as part of the NLEI scheme	The Applicant
North Lowther Energy Initiative Reports	Various	Online – Energy Consents Unit, DPEA
Unpublished reports	Various	Various
Published works of synthesis	Various	Various
Aerial Photography	HES	HES database Trove Online Database and National Collection of Aerial Photography (NCAP) (online)
Historic Land Use Assessment	HES	HES digital data download

Study Area

- 9.3.4. For the assessment, a Study Area (**Figure 9.1**) of 10km from the location of the proposed turbines has been defined. There is no guidance defining what the extent of an appropriate ‘study area’ should be for the archaeological and cultural heritage assessment of wind farms. The proposed Study Area therefore, represents an exercise in professional judgement, using the Zone of Theoretical Visibility (ZTV) and the scale of the development, and will be refined to a point of agreement between stakeholders during consultation.
- 9.3.5. Assets recorded within the Site and 1km of the Site Boundary will be analysed to inform the archaeological potential of the Site.

Scope of Assessment

Assets within the Site

- 9.3.6. There are no designated heritage assets within the Site Boundary. All non-designated cultural heritage assets within the Site Boundary will be assessed in order to determine any direct and indirect impacts. Should Dumfries and Galloway Council and West of Scotland Archaeology Service identify any non-designated assets that they consider to be of national/regional significance, and which they consider to derive significance from their setting, these should be made known to the Applicant via consultation.

Assets outwith the Site

- 9.3.7. All nationally significant designated assets within the aforementioned 10km Study Area will be subject to an initial setting assessment in order to determine any impacts (**Appendix 9.1**). Assets considered to be of national importance by Dumfries and Galloway Council and the West of Scotland Archaeology Service, including non-inventoried designed landscapes, will be subject to an appraisal and considered for further assessment once HER data has been obtained. A final scope of assets to be assessed within the EIA Report will be agreed upon with the relevant consultees.

Assessment and Types of Impact

- 9.3.8. Impacts have the potential to be caused by the Proposed Development where it changes the baseline condition of either the asset itself or its setting; it being noted that change does not necessarily result in a negative impact.
- 9.3.9. In accordance with EIA Regulations³⁶, the cultural heritage assessment will identify impacts and effects as either direct or indirect, adverse or beneficial, and short-term, long-term or permanent. The definition of impact is described below:
- Direct impacts (physical) occur where the physical fabric of the asset is removed or damaged, or where it is preserved or conserved, as a direct result of the Proposed Development. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.
 - Indirect (physical) impacts are those which would affect the heritage significance of an asset by causing change to its fabric indirectly, such as increased pollution or changes in water draining patterns which can indirectly affect the preservation of heritage materials.
 - Direct setting impacts result from the Proposed Development causing change within the setting of a heritage asset that affects its cultural significance or the way in which it is understood, appreciated, and experienced. Such impacts are generally, but not exclusively, visual, occurring directly as a result of the appearance of the proposal in the surroundings of the asset. Setting impacts may also relate to other senses or factors, such as noise, odour or emissions, or historical relationships that do not relate entirely to intervisibility, such as historic patterns of land-use and related historic features. Such impacts may occur at any stage of a proposal's lifespan and may be permanent, reversible, or temporary.
 - Cumulative impacts: can relate to the physical fabric or setting of assets. They may arise as a result of impact interactions, either of different impacts of the Proposed Development itself, or additive impacts resulting from incremental changes caused by the proposal together with other projects already in the planning system or allocated in a Local Development Plan.
- 9.3.10. Assessment will be undertaken separately for direct physical impact, indirect impact and direct setting impacts. Impacts upon the significance of heritage assets will take into account the level of their heritage significance (where known) and the magnitude (extent) of the identified impacts.
- 9.3.11. Impacts on cultural heritage assets will be identified and assessed with reference to the guidance set out by NatureScot and HES (2019). Assessment will be carried out in the following stages:
- initial consideration of intervisibility and other factors leading to the identification of potentially affected assets;
 - assessment of the cultural heritage significance of potentially affected assets;
 - assessment of the contribution of setting to the cultural heritage significance of those assets;
 - assessment of the extent to which change to any contributing aspects of the settings of those assets, as a result of the Proposed Development, would affect their cultural heritage significance (magnitude of change); and
 - determination of the significance of any identified effects.

³⁶ Scottish Natural Heritage and HES (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Available at: <https://www.nature.scot/doc/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others>.

- 9.3.12. Assessment on the impacts on the setting of cultural heritage assets will be carried out following the three-stage approach outlined in Managing Change in the Historic Environment: Setting (HES 2020):
- Stage 1: identify the historic assets that might be affected by the proposed development;
 - Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and
 - Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated.

Consultation

- 9.3.13. Based on the results of the baseline study, constraint mapping will be generated using GIS software to show mapped heritage assets in relation to a ZTV (**Figure 9.1**). This will filter out those assets that do not require further assessment. It will also be used to identify and agree on the most potentially sensitive assets; these may then require computer-generated visualisations to be produced as part of their assessment, in liaison with consultees.
- 9.3.14. Consultation will be undertaken with HES in relation to the method of assessment employed in assessing those heritage assets within their remit; these include: Scheduled Monuments, Category A Listed Buildings, Inventoried Gardens and Designed Landscapes (GDLs), and Inventoried Battlefields. Dumfries and Galloway Council and West of Scotland Archaeology Service (on behalf of South Lanarkshire Council) will be consulted in relation to non-designated heritage assets and designated heritage assets of regional significance, and any non-designated assets which they consider to be of higher significance.

Field Surveys

- 9.3.15. The Site was subject to a blanket walkover survey in 2016 as part of the NLEI scheme application. The NLEI scheme application boundary covered a larger area than the Site Boundary of the Proposed Development. Due to the Site having been subject to a blanket walkover survey, a further walkover survey of the Site is not proposed as part of this application. As such, the archaeological baseline of the Site will be informed by the 2016 data, up-to-date HER data, aerial photography, LiDAR, historic mapping, and other sources identified within **Table 9.2**.
- 9.3.16. Targeted field inspection of assets scoped in for further assessment will also be undertaken following a desk-based comparison of asset mapping with ZTV and satellite imagery. This survey would inspect any designated heritage assets potentially susceptible to impact from change to their setting as a result of impacts from the Proposed Development.

Zone of Theoretical Visibility

- 9.3.17. The setting impacts assessment will be assisted by a ZTV calculation, presented in **Figure 9.1**. A ZTV calculation maps the predicted degree of visibility of a proposed development from all points within a proportionate, defined study area around the site, as would be seen from an average observer's eye level (two metres above ground level). The ZTV model presented in **Figure 9.1** is based upon the maximum level of theoretical visibility, i.e., the maximum height of the turbine blade tips.

Cultural Heritage Significance

- 9.3.18. The categories of cultural heritage significance to be referred to are presented in **Table 9.3**, which will act as an aid to consistency in the exercise of professional judgement and provide a degree of transparency for others in evaluating the conclusions drawn.
- 9.3.19. The significance categories take into account factors such as: designation, status and grading. For non-designated assets, consideration will be given to their inherent heritage interests, intrinsic, contextual, and associative characteristics. In relation to these assets, the assessment will focus upon an assessment of the assets' inherent capability to contribute to our understanding of the past; the character of their structural, decorative and field characteristics as informed by the HER and Trove records and / or Site visit observations; the contribution of an asset to their class of monument, or the diminution of that class should an asset be lost; and how a site relates to people, practices, events, and/or historical or social movements. Assessments of the cultural significance of specific assets, where recorded within the HER, will be taken into account where appropriate.

Table 9.3: Cultural Heritage Significance

Cultural Heritage Significance	Example
Very High	Sites of international importance, including World Heritage sites.
High	Site of National importance, including: ▪ Scheduled Monuments; ▪ Category A Listed Buildings; ▪ Gardens and Designed Landscapes included on the national inventory; ▪ Designated Battlefields ▪ Conservation areas containing nationally important buildings; and ▪ Non-designated assets of equivalent significance.
Medium	Sites of Regional/local importance, including: ▪ Category B and C Listed Buildings; ▪ Conservation Areas containing buildings that contribute significantly to its character; and ▪ Non-designated assets of equivalent significance.
Low	Assets of local importance Heritage assets compromised by poor preservation and/or poor survival of contextual associations or with little of the asset remaining to justify a higher importance.
Negligible	Assets that are of very little or no heritage interest. Heritage assets where the ability to interpret their archaeological context has been removed/eroded.
Unknown	Further information is required to assess the significance of these assets.

- 9.3.20. In addition to identifying the cultural significance of a heritage asset, it is essential, where changes to setting are being assessed, to understand the contribution that setting makes towards the cultural significance of an asset. Elements of setting may make a positive, neutral, or negative contribution to the cultural significance of an asset. Thus, in determining the nature and level of impact upon an asset and their setting by the Proposed Development, the contribution that setting makes to an asset's cultural significance and thus its sensitivity to changes to its setting need to be considered.
- 9.3.21. This approach recognises the importance of avoiding significant adverse effects on the integrity of the setting of an asset in the context of the contribution that setting makes to the understanding, appreciation, and experience of an asset. It recognises that setting may be key in characterising, understanding, and appreciating some, but not necessarily all, assets. Indeed, assets of high or very high significance do not necessarily have high sensitivity to changes to their settings.
- 9.3.22. An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to an understanding and appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding, appreciation and experience of it and its cultural significance also has a bearing on the sensitivity of that asset to changes to its setting.
- 9.3.23. While certain cultural heritage assets of high or very high importance are likely to be sensitive to direct impacts, not all will have a similar sensitivity to effects on their setting; this would be true where setting does not appreciably contribute to their cultural significance. HES' guidance on setting makes clear that the level of effect may relate to *"the ability of the setting of an asset to absorb new development without eroding its key characteristics"*³⁷. Assets with very high or high relative sensitivity to setting impacts may be vulnerable to any changes that impact their setting and even slight changes may erode their key characteristics or the ability of their settings to contribute to the understanding, appreciation, or experience of them. Assets where relative sensitivity to changes to their setting is lower may be able to accommodate greater changes to their settings without key characteristics being eroded.
- 9.3.24. The key criteria used for establishing an asset's relative sensitivity to changes to its setting is detailed in **Table 9.4**. This table has been developed based on SLR's professional judgement and experience of assessing setting impacts. It has been developed in line with relevant policy and guidance.

Table 9.4: Sensitivity of Setting

Relative Sensitivity	Explanatory Criteria
Very High	An asset, the setting of which is crucial to an understanding, appreciation, and experience of it, should be regarded as having very high sensitivity to changes to its setting. This is particularly relevant where setting, or elements of, make a crucial and essential direct contribution to significance.
High	An asset, the setting of which is major to an understanding, appreciation, and experience of it, should be regarded as having high sensitivity to changes to its setting. This is particularly relevant where setting, or elements of, contribute substantially to their cultural significance.
Medium	An asset, the setting of which makes a moderate contribution to the understanding, appreciation, and experience of it, should be regarded as having medium sensitivity to changes to its setting. This could be an asset for which

³⁷ HES (2020)

Relative Sensitivity	Explanatory Criteria
	setting makes a contribution to significance but whereby its value is derived equally from its other characteristics.
Low	An asset, the setting of which makes some contribution to the understanding, appreciation, and experience of it, should be regarded as having low sensitivity to changes to its setting. This could be an asset where its significance is derived mainly from other characteristics.
Negligible	An asset where setting makes a minimal contribution to the understanding, appreciation and experience of the asset, and it should be thought of as having a negligible sensitivity to changes to its setting.

- 9.3.25. The determination of an asset's relative sensitivity to changes to its setting is first and foremost reliant upon the determination of its setting and how setting aligns with other key characteristics which contribute to cultural significance. While cultural significance is defined by the criteria set out in **Table 9.3**, the sensitivity of setting criteria for each asset will be defined using professional judgement and, where appropriate, by a site visit conducted by the assessor. The resulting sensitivity of setting will then be defined and referenced within the assessment for use in applying professional judgement to determine whether the resulting effects are in line with policy.

Magnitude of Impact

- 9.3.26. Determining the magnitude of any likely effects includes consideration of the nature of the activities proposed during the construction, operational and decommissioning phases of the Proposed Development. Changes could potentially include ground disturbance and changes to setting. The latter might include visual change, as well as noise, vibration, smell, dust, traffic movements etc. Effects may be beneficial or adverse, and may be short term, long term or permanent.
- 9.3.27. Taking into account all embedded mitigation measures, which will be developed throughout the design process, the magnitude of any effect will be assessed using professional judgement, with reference to the criteria set out in **Table 9.5**.

Table 9.5: Magnitude of Impact

Magnitude of Impact	Explanatory Criteria
High Beneficial	The Proposed Development would considerably enhance the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Medium Beneficial	The Proposed Development would enhance, to a clearly discernible extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Low Beneficial	The Proposed Development would enhance, to a minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.

Magnitude of Impact	Explanatory Criteria
Very Low Beneficial	The Proposed Development would enhance, to a very minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Neutral/None	The Proposed Development would not affect the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Very Low Adverse	The Proposed Development would erode, to a very minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect effect would not be considered to affect the integrity of the asset's setting.
Low Adverse	The Proposed Development would erode, to a minor extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect effect would rarely be considered to affect the integrity of the asset's setting.
Medium Adverse	The Proposed Development would erode, to a clearly discernible extent, the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect effect might be considered to affect the integrity of the asset's setting.
High Adverse	The Proposed Development would considerably erode the cultural heritage significance of the affected asset, or the ability to understand, appreciate and experience it. This level of indirect effect would probably be considered to affect the integrity of the asset's setting.

9.3.28. **Table 9.6** provides a matrix that relates the cultural significance of the asset to the magnitude of impact on its cultural significance, to produce an overall anticipated level of effect (significance of effect).

Table 9.6: Significance of Effect Matrix

Magnitude of Impact	Cultural Significance (Excluding Unknown)					
	Highest	High	Medium	Low	Negligible	Highest
High beneficial	Major	Major	Moderate	Minor	Very Minor	Major
Medium beneficial	Major	Moderate	Minor	Very Minor	Negligible	Major
Low beneficial	Moderate	Minor	Very Minor	Very Minor	Negligible	Moderate
Very low beneficial	Minor	Very Minor	Negligible	Negligible	Negligible	Minor

Magnitude of Impact	Cultural Significance (Excluding Unknown)					
	Highest	High	Medium	Low	Negligible	Highest
Neutral/None	Neutral/Nil	Neutral/Nil	Neutral/Nil	Neutral/Nil	Neutral/Nil	Neutral/Nil
Very low adverse	Minor	Very Minor	Negligible	Negligible	Negligible	Minor
Low adverse	Moderate	Minor	Very Minor	Very Minor	Negligible	Moderate
Medium adverse	Major	Moderate	Minor	Very Minor	Negligible	Major
High adverse	Major	Major	Moderate	Minor	Very Minor	Major

Cumulative Effect

- 9.3.29. Cumulative effects will be assessed in line with the guidance provided in the EIA Handbook³⁸. A cumulative effect is considered to occur when there is a combination of:
- a significance of effect on an asset or group of assets due to changes resulting from the Proposed Development; and
 - an impact on the same asset or group of assets resulting from other wind farm development (consented or proposed, but not operational) within the surrounding landscape.
- 9.3.30. Assets with a minor or higher significance of effect resulting from the Proposed Development in isolation will be considered for cumulative assessment, as these assets are most likely to be susceptible to significant cumulative effects.
- 9.3.31. Wind farm developments will be considered for cumulative impacts as follows:
- wind farm planning applications within 15km of an asset which have been submitted and have a decision pending; and
 - wind farm planning applications within 15km of an asset that have been granted permission but not yet constructed.
- 9.3.32. All wind farm developments considered as part of the cumulative assessment will be listed in full within the Cultural Heritage chapter of the EIA Report.
- 9.3.33. Wind farms that are under construction when the assessment is undertaken are considered as part of the baseline environment for operational impact assessments. Any effect resulting from operational wind farms has been considered as part of the baseline setting of the asset.

³⁸ Scottish Natural Heritage and HES (2018)

Significance and Integrity

Significance

- 9.3.34. Once the anticipated effects of the Proposed Development upon cultural heritage assets are defined, professional judgement will be used to determine whether those effects would be either 'Significant' or 'Not Significant' for the purposes of EIA. As part of this determination process, regard will be given to any relevant guidance.
- 9.3.35. With reference to the matrix presented in **Table 9.6:**
- any effects identified as 'major' would most probably be considered 'significant;'
 - any effects identified as 'moderate' might also be considered 'significant,' although professional judgement may determine otherwise on the basis of the associated site-/asset-specific detail; and
 - any effects identified as 'minor' or less are unlikely to be considered 'significant,' though again, professional judgement will be exercised.
- 9.3.36. A clear statement will be made in relation to all affected assets as to whether the identified effects upon them are considered to be 'significant' or 'not significant' for purposes of EIA.

Integrity

- 9.3.37. Policy 7h) of NPF4 states that development proposals affecting scheduled monuments will only be supported where; *"significant adverse impacts on the integrity of the setting of a scheduled monument are avoided."*
- 9.3.38. A significant effect in EIA terms does not necessarily equate to a significant impact upon the integrity of setting. Where EIA defined significant effects are found, a detailed assessment of adverse impacts upon the integrity of the setting is made. Whilst non-significant effects are unlikely to significantly impact the integrity of the setting, the reverse is not always true. That is, the assessment of an effect as being significant in EIA terms does not necessarily mean that the adverse effect on the setting of the asset will significantly impact its integrity. Changes to factors of setting that contribute to cultural significance, such that the understanding, appreciation and experience of an asset are not adequately retained will have a significant adverse impact on the integrity of its setting.

Mitigation

- 9.3.39. Where adverse effects on cultural heritage assets are possible, the magnitude of effect can be reduced through measures to prevent, reduce and/or, where possible, offset these effects.
- 9.3.40. Suitable measures for minimising direct physical impacts on heritage assets will be proposed within the EIA Report. Any programme of archaeological works will be designed and agreed with the relevant authorities. Suitable measures for reducing or removing any direct setting impacts will be embedded into the design of the Proposed Development where possible, and will be outlined within the EIA Report.

Residual Effects

- 9.3.41. Residual impacts are those that remain even after the implementation of suitable mitigation measures. Residual impacts will be identified, and the level of those residual impact defined with reference to **Table 9.6.**

9.4. Matters Scoped Out

- 9.4.1. On the basis of the work undertaken to date, the professional judgement of the cultural heritage team, and experience of other comparable projects, it is considered that direct (setting), indirect, and cumulative impacts of the Proposed Development on Category C Listed Buildings can be scoped out of the EIA in relation to cultural heritage. As per best practice guidance within the EIA Handbook (NatureScot, 2019), Category C Listed Buildings are of local rather than national or regional importance, unless in the opinion of an assessor the importance should be higher.
- 9.4.2. Category B Listed Buildings outwith 5km of the proposed turbines have been scoped out of any further assessment, with the exception of those wherein specific views are considered to contribute to their significance and/or to the ability to understand, appreciate and experience them.
- 9.4.3. In most cases, the significance of a Conservation Area derives from its character and the assets that it contains, rather than the contribution of the wider landscape. As such, any conservation area outwith 5km has been scoped out, with the justification that, even if visibility between the Proposed Development and the conservation areas may still occur, the conservation areas' significance would not be diminished.
- 9.4.4. It is also considered that any assets that fall outwith the ZTV (and where important views associated those assets' approaches and third points of appreciation also fall outwith the ZTV) can be scoped out of the EIA in relation to cultural heritage.

9.5. Potential Effects

Direct (Physical) and Indirect Effects

- 9.5.1. As stated, there are 26 non-designated heritage assets within the Site Boundary. Whilst positioned outside of the current placement of the turbines, these known cultural heritage assets may be susceptible to a significant level of direct or indirect impact as a result of the construction of the associated infrastructure (e.g., access tracks, substations). In addition, any design changes for the placement of the turbines may incur potential direct impacts on the heritage assets should any revisions to the turbine layout occur.
- 9.5.2. Furthermore, there is the potential for direct impact on any unrecorded cultural heritage assets within the site as a result of the construction process. The potential for impact on unrecorded cultural heritage assets will be assessed within the chapter. Relevant mitigation measures will be proposed in accordance with the measures set out above.
- 9.5.3. If there are any further ground-breaking works undertaken during operation or decommissioning of the wind farm (e.g., track widening), then there is the potential for further impact on recorded or unrecorded heritage assets. If this is the case, then further mitigation methods, may be required.

Direct (Setting) Effects

- 9.5.4. Setting impacts are most likely to occur as part of the construction and operational phases of development, these will be considered as part of the EIA Chapter.
- 9.5.5. Following the appraisal of assets set out in **Appendix 9.1**, seven designated cultural heritage assets and one non-designated cultural heritage asset will be subject to detailed settings assessment within the EIA Report, as there is the potential for the Proposed Development to have a significant effect upon them.

- 9.5.6. To provide this preliminary list of assets that will be subject to a detailed assessment, designated assets that were within the scope of assessment and within 10km of the Proposed Development were subject to an initial appraisal (**Appendix 9.1**). No designated heritage assets with long distance views as part of their setting were identified outwith 10km of the Proposed Development.
- 9.5.7. The appraisal (**Appendix 9.1**) has aimed to create a proportionate scope for the assessment and will be an evolving document throughout the EIA process. Assets that fall out of the proposed study area, the ZTV, and that do not have a third viewpoint that contributes to the significance of the asset have been scoped out of assessment. Assets that have been scoped in may be scoped out and vice versa, dependent on the final layout and as a result of consultee comments.
- 9.5.8. All designated cultural heritage assets within 10km, along with the ZTV indicating their visibility of the proposed turbines, are depicted on **Figure 9.1**.
- 9.5.9. The assets scoped in for further assessment within the EIA Report after the initial heritage appraisal are outlined in **Table 9.7**. Furthermore, the locations of visualisations, in the form of photomontages, are proposed in **Table 9.7**. These photomontage locations are approximate and final locations will depend on access and visibility of the final layout of the Proposed Development. Any changes in visualisation locations will be communicated to the appropriate consultees. The visualisations will include the developments considered for cumulative assessment.

Table 9.7: Assets Scoped In For Further Assessment Due To Potential For Settings Impacts

Asset Reference	Asset Name	Type of Asset	Photomontage Locations
SM5597	Wanlockhead, remains of lead mining and smelting	Scheduled Monument	NS 86783 13271
SM687	Crichton Peel & Sanquhar Castle	Scheduled Monument	NS 78517 09239
SM90310	Wanlockhead Beam Engine	Scheduled Monument	NS 87006 13130
SM5817	Lead mines and associated remains, Leadhills	Scheduled Monument	NS 88440 14542
SM656	Kemps Castle, fort 320m SW of Euchar Bridge	Scheduled Monument	NS 77295 08879
GDL00413	Crawick Multiverse	Inventoried Garden and Designed Landscape	NS 77645 11516
CA180	Wanlockhead	Conservation Area	NS 86783 13271
MDG229	Clackleith Hill	Nationally Important Non-designated Asset	NS 82689 17810

9.6. Summary of Scope

- 9.6.1. As stated, cultural heritage assets both within the Site and outwith the Site will be considered for potential for direct, indirect, settings and cumulative impacts as a result of the Proposed Development.
- 9.6.2. In regard to direct and indirect impacts, mitigation will be embedded into the design of the Proposed Development, in order to avoid impact on known heritage assets. Furthermore, the potential for direct impacts on as yet unrecorded heritage assets will be considered within the EIA Report. If warranted, further mitigation will be agreed with the Dumfries and Galloway Council Archaeologist.
- 9.6.3. A high-level appraisal has been undertaken of the designated heritage assets within 10km of the Proposed Development. This appraisal can be found in **Appendix 9.1** of the scoping report. As a result of the appraisal, the assets scoped in for further assessment within the EIA Report after the initial heritage appraisal are as follows:
- Wanlockhead, remains of lead mining and smelting (SM5597);
 - Crichton Peel & Sanquhar Castle (SM687);
 - Wanlockhead Beam Engine (SM90310);
 - Lead mines and associated remains, Leadhills (SM5817);
 - Kemps Castle, fort 320m SW of Euchar Bridge (SM656);
 - Crawick Multiverse (GDL00413);
 - Wanlockhead (CA180); and
 - Clackleith Hill (MDG229).
- 9.6.4. Furthermore, the potential for cumulative impacts as a result of the Proposed Development on any sensitive heritage receptors will be considered.

9.7. Focused Questions

Do consultees agree that the proposed scope of surveys is proportionate and that a walkover survey of the Site does not need to be repeated?

Do consultees agree with the proposed scope of the assessment, including the proposed Study Areas?

Do consultees agree with the proposed assessment methodology?

Do consultees agree with the assets scoped in for further assessment?

Are consultees satisfied with the locations and types of visualisations proposed?

10. Ornithology

10.1. Introduction

- 10.1.1. This section of the Scoping Report considers the scope of work required to assess potential significant effects associated with ornithology, during the construction, operational and decommissioning phases of the Proposed Development. Non-avian ecological effects are considered separately (see Section 11).
- 10.1.2. For reasons of brevity, only common species names are referred to in this text.
- 10.1.3. In accordance with standard Chartered Institute of Ecology and Environmental Management (CIEEM) (2018, updated 2024)³⁹ guidelines, this ornithology scoping exercise aims to:
- Establish an initial understanding of the baseline ornithological conditions and the potential significant effects that could arise;
 - Determine and agree the zone of influence of the Proposed Development and which important ornithological features could be significantly affected;
 - Outline the guidelines followed and methods adopted for survey, evaluation and assessment; and
 - Determine and agree the content of the Ornithological Impact Assessment.

10.2. Baseline

Study Area

- 10.2.1. The Proposed Development is located approximately 4.6 kilometres (km) northeast of Sanquhar and 3.2km west of Wanlockhead. It partially borders the B740 in the west where the road borders the western side of Crawick Water. The centre of the Site is at National Grid Reference (NGR) NS 82880 14350.
- 10.2.2. The Site is characterised predominantly by upland grassland, heath and wetland habitats with small pockets of conifer plantation. Land use across the Site is allocated to forestry and livestock grazing. There are currently no buildings or permanent built structures within the Site.
- 10.2.3. The ornithology assessment will consider the following Study Areas:
- Flight activity surveys - areas within a 500 metre (m) buffer of the outermost turbine locations;
 - Moorland breeding bird surveys – 500m buffer around the Proposed Development;
 - Breeding raptor surveys – 2 kilometres (km) buffer around the Proposed Development;
 - Black grouse surveys - 1.5km buffer around the Proposed Development, and
 - Designated and non-designated sites – the Proposed Development plus a 20km buffer.
- 10.2.4. The Site Boundary, ornithological Study Areas, vantage point locations and viewsheds are illustrated in **Figure 10.1** and **Figure 10.2**. Statutory and non-statutory designated sites within 20km of the Proposed Development are illustrated in **Figure 10.3**.

³⁹ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018, updated 2024). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version

Baseline Field Surveys

- 10.2.5. Ornithology surveys were undertaken by Direct Ecology Limited between May 2023 and March 2025; the scope of surveys is summarised in **Table 10.1**. The scope was based on current NatureScot (SNH 2017, updated 2025)⁴⁰ guidance on bird survey methods for onshore wind farms. Surveys were based upon a pre-scoping stage Site Boundary which is shown on **Figure 10.1**. As the pre-scoping stage Site Boundary encompassed a larger area than the current Site Boundary, the survey work covered a larger area than required. This however does not undermine the validity of surveys carried out.

Table 10.1: Scope of Ornithology Surveys at Glensalloch Wind Farm, May 2023 – March 2025

Survey Type	Season	Survey Effort*
Flight activity surveys	2023 breeding season & 2023/24 non-breeding season	72 hours of survey from each of six VP locations (May 2023 – March 2024)
	2024 breeding season & 2024/25 non-breeding season	72 hours of survey from each of six VP locations (May 2024 – March 2025)
Moorland breeding bird surveys	2023 breeding season	Three survey visits (May – July)
	2024 breeding season	Three survey visits (May – August)
Breeding raptor surveys	2023 breeding season	Three survey visits (May – July)
	2024 breeding season	Three survey visits (May – August)
Black grouse surveys	2023 breeding season	One survey visit (May)
	2024 breeding season	Not undertaken
*The limitations in survey effort and timings are specifically addressed in 'Survey Limitations' section		

Target Species

- 10.2.6. NatureScot guidance (2017, updated 2025)⁴⁰ recommends that primary target species are those which are afforded a higher level of legislative protection, particularly those on the following lists:
- Annex I of the European Council (EC) Birds Directive; and
 - Schedule 1 of the Wildlife and Countryside Act (WCA) 1981.
- 10.2.7. Some species are also selected as primary target species as a result of their behaviour which makes them more likely to be subject to impact from wind farms (NatureScot, 2025)⁴¹. Consideration is also given to species identified as of conservation concern (i.e. Birds of Conservation Concern (BoCC) red list, and on the Scottish Biodiversity List (SBL).

⁴⁰ Scottish Natural Heritage (2017, updated 2025). Recommended bird survey methods to inform impact assessment of onshore wind farms: version 2. SNH, Inverness

⁴¹ NatureScot (2025). Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas. NatureScot Guidance note.

10.2.8. The following primary target species were selected :

- Annex I and Schedule 1 raptor and owl species;
- Breeding and migratory wildfowl (excluding feral geese e.g. Canada goose);
- Breeding and migratory waders; and
- Black grouse.

10.2.9. Secondary target species were those non-primary target species which are potentially susceptible to impacts from wind farms but of lower conservation concern. It is generally accepted that passerine species are not significantly impacted by wind farms and are therefore not included as primary or secondary target species. Recording of secondary target species is subsidiary to the recording of primary target species. The following secondary target species were selected:

- Buzzard, sparrowhawk and kestrel;
- Tawny owl;
- Raven;
- Gulls⁴²;
- Grey heron and cormorant; and
- Any other non-passerine species of conservation concern which are considered to be potentially vulnerable to impacts from wind farm developments.

Survey Methodologies

Flight Activity Surveys

10.2.10. Vantage Point (VP) watches aimed to quantify the flight activity of primary and secondary target species within the Study Area in accordance with current NatureScot guidance. Activity patterns and time spent flying within the area viewable from each VP were recorded for all primary target species. This information enables an assessment to be made of potential collision and displacement impacts as a result of the Proposed Development.

10.2.11. VPs were selected to cover as much area as possible of the maximum potential turbine layout plus a 500m buffer to account for inaccuracies of flight line recording. The viewshed is the area visible from each VP within a 2km radius and 180 degree viewing arc while accounting for topography. The VP viewsheds were estimated using Geographical Information System (GIS) zone of theoretical visibility (ZTV) software with a surface offset of 20m (approximating to the lowest height likely to be swept by turbine rotors). The locations and the viewsheds from the VPs are shown in **Figure 10.2**. The surveys were undertaken from the following six locations:

- VP1 (NS 82250 17138);
- VP2 (NS 82309 15447);
- VP3 (NS 82237 15263);
- VP4 (NS 83291 14691);
- VP5 (NS 83610 13780); and
- VP6 (NS 80436 12142).

⁴² As of March 2025, the updated NatureScot guidance stipulates that all gull species should be treated as primary target species, however for the purpose of this assessment gulls were recorded as secondary species.

10.2.12. At the time of the survey the candidate turbine was expected to be up to a maximum of 250m, therefore height bands (HB) were selected to retain maximum flexibility as follows:

- HB1: <30m;
- HB2: 30 – 100m;
- HB3: 100 – 180m;
- HB4: 180 – 250m; and
- HB5: >250m.

Moorland Breeding Bird Surveys

10.2.13. Surveys for moorland breeding birds were carried out for all open habitats within the Study Area (where accessible), following NatureScot guidance (2017, updated 2025)⁴⁰. This involved following an adapted Brown & Shepherd (1993)⁴³ method, as recommended by Calladine *et al.* (2009)⁴⁴ with an effort of three visits per season in both survey years (see 'Survey Limitations' below, where survey effort limitation is addressed).

Breeding Raptor Surveys

10.2.14. Surveys were undertaken for raptors, following methods outlined within Hardey *et al.* (2013)⁴⁵, in suitable habitat (where accessible) within 2km of the Site, as per current NatureScot guidance.

10.2.15. All suitable raptor breeding habitat within the relevant areas, including open moorland/ rough grassland, forest plantation, moorland/ forest edge, rock crags and outcrops was surveyed.

Black Grouse Surveys

10.2.16. The survey methodology was based on that used for the 1995-96 national black grouse survey by Etheridge and Baines (1995)⁴⁶ and described by Gilbert *et al.* (1998)⁴⁷. This methodology is recommended for surveys for onshore wind farm projects in Scotland (SNH 2017, updated 2025).

10.2.17. All habitats within the Study Area that were considered suitable for lekking birds were surveyed where accessible during a single visit in May 2023 (spread over three days), within two to three hours of sunrise. Surveys were conducted on foot, with frequent stops to listen for the 'bubbling' calls of displaying birds, which are audible up to 1km away.

Survey Limitations

Access Restrictions

10.2.18. Access was restricted offsite and to the Wanlock Water valley to the east of the Site, and the terrain is complex. VP locations were necessarily located within the Site which limited the viewshed beyond the Site Boundary. Nevertheless, it is considered that the VP coverage was adequate across the

⁴³ Brown, A.F. and Shepherd, K.B (1993): A Method for Censusing Upland Breeding Waders. Bird Study, Vol. 40, no.3, pp. 189 -195.

⁴⁴ Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. Bird Study, 56: 3, 381-388.

⁴⁵ Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office, Edinburgh.

⁴⁶ Etheridge, B. & Baines, D. (1995). Instructions for the Black Grouse Survey 1995/6: a Joint RSPB/GCT/JNCC/SNH Project. Unpublished.

⁴⁷ Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.

Site and fit for purpose. This is considered an accepted limitation when siting VP locations as well as using the minimum number of VPs to reduce potential for disturbance.

- 10.2.19. The same restrictions limited the coverage of the breeding bird surveys. The walkover study area extended to 500m beyond the Site Boundary, but there was restricted access to the southern survey buffer and to parts of the northern and western survey buffers. Though not considered to have affected the number of breeding waders recorded, restricted access may have caused the number of breeding territories located beyond surveyable distance from the Site boundary to be underestimated.
- 10.2.20. The breeding raptor surveys extended to 2km beyond the Site Boundary, however no survey buffer to the northwest and the south of the Site could be covered due to access restrictions. This restricted access is not considered to have affected the number of raptor species or breeding territories recorded within the Site but is considered to have affected the number of species recorded nesting in the wider survey buffers where there was no access. This includes the area of Muirkirk and North Lowther Special Protection Area (SPA) that falls within the wider northwestern survey buffer beyond the Site Boundary.
- 10.2.21. The black grouse Study Area extended to 1.5km beyond the Site Boundary with access not permitted to some of this area. At least four historical black grouse lekking sites, returned from the desk study, fell within the restricted survey buffer or were considered too remote for surveyors to access pre-dawn, therefore they were not surveyed.

Survey Timings

- 10.2.22. The flight activity surveys in both survey years commenced in May rather than in March, therefore some flight activity of target species for which the breeding season starts in March/April may have been missed. However, the survey effort required throughout the survey season was maintained by increasing the rate of survey in the following months (a total of 72 hours per VP between May and March).
- 10.2.23. Breeding bird surveys were carried out using three-visit survey effort, which is short of the recommended four visits. Also, the first visits in both survey years were conducted in May, rather than in April. However, it is considered that the late start of the surveys and the reduced survey effort did not considerably affect the survey results, as the surveys covered the core breeding season and early breeding birds were still being recorded on their territories.
- 10.2.24. No black grouse surveys were undertaken in 2024. However, surveys in 2023 produced one lekking bird, therefore for the purpose of the Environmental Impact Assessment (EIA) Report it will be assumed that this location was still an active lek site in 2024. In addition targeted black grouse surveys will be conducted around all turbines (within 750m) in the pre-construction year to inform the mitigation measures required.

Summary

Flight Activity Surveys

- 10.2.25. During the first survey year (May 2023 – March 2024), a total of 179 flights by six primary target species was recorded. Flights were recorded by greylag goose (n=2), pink-footed goose (n=8), curlew (n=25), hen harrier (n=3), red kite (n=138) and merlin (n=3). Red kite activity peaked in September and October as well as in January.

- 10.2.26. During the second survey year (May 2024 – March 2025), a total of 129 flights by nine primary target species was recorded. Flights were recorded by greylag goose (n=1), pink-footed goose (n=11), mute swan (n=1), oystercatcher (n=2), curlew (n=10), woodcock (n=1), snipe (n=1), goshawk (n=2) and red kite (n=100). Red kite activity peaked in October.

Moorland Breeding Bird Surveys

- 10.2.27. During the 2023 breeding season, three target species, oystercatcher, curlew and snipe, were considered breeding within the Site and the 500m buffer. Common sandpiper was recorded during the first visit only, however the Crawick Water and waterbodies within the wider Study Area can provide suitable breeding habitat for this species. Lapwing was recorded only once in May 2023 near Fingland Rig and is not considered to be breeding within the Study Area.
- 10.2.28. During the 2024 breeding season, the same three target species were found breeding within the Site and the 500m buffer. Curlew were noted in the same locations as in the previous year, in the northeast of the Study Area, around Lowmill Knowe, in the southwest corner, and in the area around the Dodd and Fingland Hill. Oystercatcher were recorded in the survey buffer to the north. Snipe were equally distributed across the Site and the survey buffer.

Breeding Raptor Surveys

- 10.2.29. One barn owl was observed as an incidental registration on Site in October 2023, near the old Glensalloch farm buildings in the north of the Site. These buildings provide suitable roosting locations for barn owl and may also provide nesting habitat though no evidence of nesting was noted in the 2023 or 2024 survey visits.
- 10.2.30. One record of a single juvenile golden eagle was recorded during the 2023 walkover surveys, in flight between Wether Hill and White Dod and being mobbed by ravens. It is considered likely that this record represents a dispersing individual.
- 10.2.31. An active goshawk nest was found on Site in 2023, with alarm calling birds heard near the nest. Also, a goshawk was observed flying nearby Wedder Dob during the walkover survey in 2023, and it is presumed to be a territorial bird. No goshawk were observed at this location in 2024, however.
- 10.2.32. Hen harrier was observed during walkover surveys in 2023 with sightings near Willowgrain Hill and Wedder Dod. A female was also sighted west of Wanlockhead and a pair was recorded between White Dod and Green Hill in July 2023. Three flightlines were noted during the 2023 flight activity surveys in the southern part of the Study Area. This included one individual sky-dancing over White Dod, however no breeding was confirmed at this location.
- 10.2.33. Merlin was regularly observed during the walkover surveys in 2023 at four locations across the Study Area, including three suspected territories within the Site: near the Dod, Martyr's Knowe and Glensalloch Hill. The other territory was noted to the east of the Site Boundary close to Glendorch Rig. Also, two flightlines were recorded in the 2023 breeding season, one in May close to Lowmill Knowe and the other in July close to Wedder Dod. A male merlin was also noted incidentally hunting close to Wanlockhead in 2023. No breeding was confirmed in 2023 at either location. In 2024, merlin was observed infrequently; one flight was recorded in the breeding season close to Lowmill Knowe.
- 10.2.34. Peregrine falcon was recorded once during the raptor surveys close to Fingland Rig.

- 10.2.35. Red kite was the most frequently recorded species during the baseline surveys. One confirmed territory and one probable territory were noted in 2023 in the western survey buffer, close to Glenries and Bessy's Wood respectively. No territories were noted during the 2024 breeding season though red kite were commonly recorded during this period. It is considered likely that the Site was within the breeding range of at least one red kite pair in 2024.
- 10.2.36. Of the secondary target raptor species, buzzard, sparrowhawk and kestrel were present and are likely to breed within mature forestry within the Site and in the wider surrounding area. A buzzard's nest was found in the forestry between Clackleith Hill and Wedder Dod in 2023 and juvenile kestrels were found in the forestry near Glensalloch Hill during the 2023 walkover surveys.

Black Grouse Surveys

- 10.2.37. Survey results suggest that the Site supports at least one black grouse lek of a single bird. The bird was recorded lekking on 11 May 2023 in the west of the Site. This location is approximately 170m from the lek site identified by desk study and most recently recorded as active and supporting five birds in 2013; and approximately 300m from another lek site reported by desk study and most recently reported as active and supporting two birds in 2013.
- 10.2.38. An incidental record was made of a group of six males flushed in October 2023 near the location where five loafing birds were recorded in 2013.

Desk Study

- 10.2.39. The National Biodiversity Network (NBN) Atlas (data under Open Government License (OGL), Creative Commons with Attribution (CC-BY) and Creative Commons Zero (CC0) License) were consulted in 2023 for bird species records made within the last ten years, however no bird records were returned within 2km of the Site Boundary.
- 10.2.40. A request for ornithological data was made on 4 April 2023 to Conservation Data Management Unit, Royal Society for the Protection of Birds (RSPB) for records of Schedule 1, BoCC Red and Amber species and SBL species within 2km of the Site Boundary, made within the last ten years.
- 10.2.41. The request to RSPB yielded records of black grouse only. Records were provided from the *1831-2022 Scottish Lowlands & Southern Uplands Black Grouse Dataset*. Seven black grouse lekking sites were identified within the Site and 1.5km buffer, and a further two locations where black grouse were recorded loafing. The largest lek held six lekking males in 2013, and the most recent lek was recorded in 2018 holding a single individual. 2016 was the last year when more than one lekking male was recorded (three males were lekking at a single location).
- 10.2.42. A request for protected species and bird data within 2km of the Site Boundary recorded within the last 15 years was made to South West Scotland Environmental Information Centre (SWSEIC) on 6 June 2025 and data were received on 9 June 2025.
- 10.2.43. The SWSEIC data search returned 95 bird species recorded, of which nine species are listed on Annex 1 of the European Union (EU) Birds Directive and 15 species are listed on Schedule 1 of the WCA. These species and their legal and conservation status are shown in **Table 10.2**.

Table 10.2: Annex I and Schedule 1 Bird Records within 2km of the Proposed Development

Feature	Year of Last Record	Protection & Conservation Status
Greylag goose	2024	Sch1.2 ⁴⁸ ; BoCC5: Amber
Golden plover	2018	Ann I; SBL
Dotterel	2015	Ann I; Sch 1.1 & 1A; SBL; BoCC5: Red
Golden eagle	2014	Ann I; Sch 1.1 & 1A; SBL
Hen harrier	2018	Ann I; Sch 1.1 & 1A; SBL; BoCC5: Red
Red kite	2024	Ann I; Sch 1.1 & 1A; SBL
White-tailed eagle	2014	Ann I; Sch 1.1 & 1A; SBL; BoCC5: Amber
Barn owl	2013	Sch 1.1; SBL
Short-eared owl	2012	Ann I; SBL; BoCC5: Amber
Merlin	2024	Ann I; Sch 1.1; SBL; BoCC5: Red
Peregrine	2015	Ann I; Sch 1.1; SBL
Redwing	2020	Sch 1.1; SBL; BoCC5: Amber
Fieldfare	2018	Sch 1.1; BoCC5: Red
Black redstart	2015	Sch 1.1; BoCC5: Amber
Brambling	2014	Sch 1.1; SBL
Crossbill	2015	Sch 1.1
Snow bunting	2014	Sch 1.1; SBL
Table notes: Sch 1.1, 1.2, 1A, A1 : Wildlife & Countryside Act 1981 (as amended in Scotland): Schedule 1 (Part I); Schedule 1 (Part II); Schedule 1A; Schedule A1; Ann I - The Birds Directive 2009: Annex I; BoCC5: Red - Birds of Conservation Concern 5: Red List; BoCC: Amber - Birds of Conservation Concern 5: Amber List; SBL - Scottish Biodiversity List		

10.2.44. A full list of species records from the SWSEIC will be included in the EIA Report.

10.2.45. No data request have been so far submitted to the Dumfries and Galloway Raptor Study Group (DGRSG). However, to inform the EIA Report records of breeding Annex I and/or Schedule 1 raptors within 2km of the Site within the last ten years will be requested from DGRSG in September 2025 (following the collation of the breeding records by DGRSG from the 2025 breeding season).

Designated Sites

10.2.46. There are no statutory designated sites with an ornithological interest within the Proposed Development. The only designated site with ornithological qualifying features within 20km of the Proposed Development is the Muirkirk and North Lowther Uplands SPA, underpinned by the North Lowther Uplands Site of Scientific Interest (SSSI) and the Muirkirk Uplands SSSI, which is adjacent

⁴⁸ In Outer Hebrides, Caithness & Sutherland and Wester Ross only

to the northwest of the Proposed Development boundary (**Figure 10.3**). Details of the features and status of the designated features of these designations are listed in **Table 10.3**.

Table 10.3: Summary of qualifying features of Muirkirk and North Lowther Uplands SPA and component SSSIs

Feature	Last Assessed Condition	Population Size at Designation/Notes
Golden plover, breeding	March 2016: Unfavourable, declining	Breeding population of European importance. Minimum of 154 pairs (1999), 0.7% of the UK population.
Hen harrier, breeding ^{1,2}	June 2009: Unfavourable, declining	Breeding population of European importance. Average of 29.2 breeding females (1994-96), 6% of the UK population.
Hen harrier, non-breeding ²	March 2005: Unfavourable, declining	Wintering population of European importance. Average of 12 individuals (1991-95), 2% of the UK population.
Merlin, breeding	June 2010: Unfavourable, no change	Breeding population of European importance. Average of nine breeding pairs (1989-98), 0.7% of the UK population.
Peregrine, breeding	March 2005: Unfavourable, no change	Breeding population of European importance. Average of six breeding pairs (1992-96), 0.5% of the UK population.
Short-eared owl, breeding ²	March 2005: Favourable, maintained	Breeding population of European importance. Average of 26 breeding pairs (1997-98), 3% of the UK population.
Muirkirk Uplands SSSI: Breeding bird assemblage	December 2009: Favourable, maintained	Upland moorland assemblage of national importance. Includes teal, hen harrier, buzzard, merlin, peregrine, short-eared owl, red grouse, golden plover, dunlin, snipe, curlew, redshank, whinchat, stonechat, wheatear, and ring ouzel.
North Lowther Uplands SSSI: Breeding bird assemblage	July 2016: Unfavourable, no change	Upland moorland assemblage of national importance. Includes hen harrier, short-eared owl, merlin, peregrine, golden plover, red grouse, raven, dunlin, snipe, teal, curlew, redshank, whinchat and wheatear.
¹ Qualifying interest of North Lowther Uplands SSSI; ² Qualifying interests of Muirkirk Uplands SSSI		

- 10.2.47. In addition, the non-statutory designated site Airds Moss RSPB Reserve is 19.2km to the northwest and is managed for wintering hen harrier and breeding waders. The Airds Moss RSPB Reserve overlaps partially with the Muirkirk Uplands SSSI.

10.3. Assessment

Legislation, Policy and Guidance

10.3.1. The approach and method to the assessment will be informed by the following legislation:

- The Conservation (Natural Habitats &c) Regulations 1994 (as amended in Scotland) (the Habitats Regulations);
- The Wildlife and Countryside Act (WCA) 1981, as amended in Scotland;
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Nature Conservation (Scotland) Act 2004; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

10.3.2. The assessment will also be informed by the following policy and other documents:

- Dumfries & Galloway Local Biodiversity Action Plan (DGLBAP) (2009);
- National Planning Framework 4 (NPF 4) (2024) and in particular policy 3 (Biodiversity) which intends to protect biodiversity, reverse biodiversity loss, deliver positive effects and strengthen nature networks;
- Scottish Biodiversity List (SBL) (2005);
- Scottish Government Draft Planning Guidance: Biodiversity (2023); and
- The Scottish Biodiversity Strategy to 2045 (2024).

10.3.3. The approach and method to the assessment will be informed by guidance provided in the following guidance documents:

- Band, W.M., Madders, Whitfield, D. P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018, updated 2024). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3;
- Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy;
- Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283;
- Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office, Edinburgh;
- NatureScot (2024). Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms;
- Scottish Renewables *et al.* (2019). Good Practice during Wind Farm Construction, Version 4;
- Scottish Natural Heritage (SNH) (now NatureScot) (2016). Assessing Connectivity with Special Protection Areas;
- SNH (2016). Environmental Statements and Annexes of Environmentally Sensitive Bird Information;
- SNH (2017, updated 2025). Recommended bird survey methods to inform impact assessment of onshore wind farms: version 2. SNH, Inverness;
- SNH (2018). Assessing Significance of Impacts from Onshore Wind Farms on Birds Outwith Designated Areas, Version 2;
- SNH (2018). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and 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;
- Stanbury, A.J., Burns, F., Aebischer, N.J., Baker, H., Balmer, D.E., Brown, A.F., Dunn, T.E., Lindley, P., Murphy, M., Noble, D.G., Owens, R. & Quinn, L.R. (2024). *The Status of the UK's breeding seabirds: an addendum to the Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and Second IUCN Red List Assessment of Extinction Risk for Great Britain and*
 - Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72.

Potential Impacts

- 10.3.4. The key ornithological issues relating to the Proposed Development are the potential for it to adversely affect the conservation status of bird species with statutory protection (e.g. qualifying features for designated sites or listed on Schedule 1 of the Wildlife & Countryside Act, as amended) or otherwise those of high conservation concern, through habitat loss, disturbance, displacement, barrier effects and collisions with the turbines. Potential negative impacts (direct or indirect) on ornithology could arise during the construction, operation and decommissioning stages. These are defined as follows:

Construction Impacts

- 10.3.5. Direct land take for the installation of the Proposed Development infrastructure (turbine bases, substation, access tracks, borrow pits, etc.) would result in the long-term or permanent loss of habitat for birds within the Site, albeit such losses would be relatively small in the context of the Site as a whole.
- 10.3.6. Disturbance caused by construction may directly displace birds from breeding sites, directly affecting breeding success, or may temporarily displace birds from foraging areas, affecting their breeding success and/or winter survival.
- 10.3.7. In addition to these possible impacts on individuals and populations, any wind farm construction work undertaken during the bird breeding season (March to July/ August, inclusive) carries a risk of illegal destruction, damage or disturbance to occupied bird nests. The EIA Report will propose measures to address this impact through mitigation, such as seasonal timing of certain construction works, pre-construction surveys and the employment of an Ecological Clerk of Works (ECoW) during construction.

Operational Impacts

Disturbance/displacement and Barrier Effects

- 10.3.8. The operation and maintenance of turbines has the potential to cause disturbance and displace certain bird species from the Site. During the operational lifetime of the Proposed Development (40 years), birds of some species at least, may habituate to the presence of turbines, however, and so this impact may decline in the long-term. Barrier effects can be caused by the presence of operational turbines. They can potentially create an obstacle to the regular movements of birds, which will be considered in the EIA Report.

Collision Risk

- 10.3.9. The EIA Report will consider the potential collision risk from the proposed turbines on the primary target species that have been identified as using the Site. The impact of potential collision mortality on a species population is influenced by several characteristics of the affected population, notably

its size, density, recruitment rate (additions to the population through reproduction), mortality rate in the absence of collision mortality, and immigration and emigration rates to and from the population. These will be considered in the EIA Report.

- 10.3.10. In general, the impact of an individual (of breeding age) being lost from the population will be greater for species that occur at low density, are relatively long-lived and have low annual reproductive rates. Such species include wildfowl, waders and the larger raptors. Conversely, the impact will often be insignificant for short-lived species with high reproductive rates, including most passerines (e.g. skylark).
- 10.3.11. The potential collision risk is perceived to be higher for species that spend much of their time in the air, such as foraging raptors, and those that have regular flight paths between feeding and breeding/roosting grounds (e.g. geese). Vulnerability to collision is also influenced by factors such as the flight manoeuvrability of a species and its tendency to fly in conditions of reduced visibility (e.g. at night or in fog). These variances will be considered in the EIA Report as relevant to the identified species.

Cumulative Impacts

- 10.3.12. It is also important to assess the cumulative impacts of the Proposed Development and other operational, consented and proposed wind farms that may affect the broader populations of birds identified as target species in the survey area. NatureScot (2018) guidance on cumulative assessment states that the concept of favourable conservation status (FCS) should be used outside designated sites to determine whether an impact on a sensitive species is likely to be significant. A species' conservation status is favourable where:
- A species' population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;
 - A species' natural range is not being reduced, nor is it likely to be reduced for the foreseeable future; and
 - There is (and will probably continue to be) a sufficiently large habitat to maintain its population(s) on a long-term basis.
- 10.3.13. A cumulative effect will be judged as significant where it would negatively affect the favourable conservation status of a sensitive species, whether exacerbating an existing decline or preventing a sensitive species that is recovering from reaching favourable conservation status. The premise here is that impacts from a number of developments, when assessed cumulatively, may exceed some threshold value (e.g., for loss of habitat or loss of breeding birds from collision), beyond which the impact becomes unacceptable.

Decommissioning Impacts

- 10.3.14. A high-level assessment of the decommissioning of the Proposed Development will be undertaken as part of the EIA Report, as at this stage the future baseline conditions cannot be predicted accurately and both the proposals for repowering/decommissioning and the future regulatory context are unknown.
- 10.3.15. However, it can be assumed that the process of decommissioning will likely result in similar impacts to that of the construction phase but with a lesser magnitude and of a shorter period.

Data Sources

- 10.3.16. The ornithology impact assessment for Glensalloch Wind Farm will be informed by the findings of

the ornithological survey work undertaken between May 2023 – March 2025, as described in Section 10.2. The baseline information collected for the previous North Lowther Energy Initiative scheme (NLEI scheme) between April 2014 and August 2016 will be also used to contextualise the current baseline.

- 10.3.17. In addition, data on breeding Schedule 1 raptors will be sought from the DGRSG to inform the EIA Report, alongside contextual data from other nearby planning and Section 36 applications, where available and relevant.

Assessment of Effects

- 10.3.18. The assessment and reporting process will follow CIEEM guidelines (CIEEM, 2018, updated 2024) with reference to relevant NatureScot guidance as appropriate. The intended process is set out below:
- Further desk studies and collation of existing material, including all baseline survey data collected, raptor study group data and information from other nearby wind farm developments;
 - Identification of the important ornithological features (IOFs) at the Proposed Development;
 - Evaluation of the potential impacts of the Proposed Development during construction, operation and decommissioning and the effects these could have on the IOFs;
 - Ornithological features will be considered within a defined geographical context. The following geographic frame of reference will be used:
 - International;
 - National (i.e. Scotland);
 - Regional (i.e. Natural Heritage Zone (NHZ) 19, Western Southern Uplands and Inner Solway);
 - Local (i.e. the Site plus circa 10km); and
 - Less than local.
 - Analysis of data including collision mortality modelling, if required, for those IOFs with sufficient flight activity within the collision risk zone (NatureScot, 2024; Band, 2007), and assessing the potential displacement of IOFs with significant populations within the Site; and
 - Evaluation of the significance of effects by considering the impacts on the IOFs by employing appropriate guidance and professional judgement. When describing impacts, in accordance with CIEEM guidelines, reference will be made to the following:
 - magnitude (area or number of individuals to be impacted);
 - extent;
 - duration; and
 - reversibility, i.e., will the impact be permanent or reversible over a given timescale.
 - Incorporating measures to avoid and mitigate (reduce) potentially significant effects.
 - Assessing the significance of any residual effects after mitigation.
 - Identifying appropriate compensation measures to offset significant residual effects (if required).
 - Identifying opportunities for biodiversity enhancement.
 - Cumulative effects assessment along with other developments.

Consultation

- 10.3.19. Consultation will be undertaken with NatureScot, RSPB Scotland, and other relevant organisations as required following receipt of scoping responses.

10.4. Potential Effects

10.4.1. From review of desk-based information and field survey work completed at the Proposed Development, the following IOFs have been identified and are likely to be assessed:

- Black grouse (due to breeding within the Study Area);
- Hen harrier (a qualifying feature of the nearby Muirkirk and North Lowther SPA and recorded within the Study Area);
- Merlin (a qualifying feature of the Muirkirk and North Lowther SPA recorded within the Study Area);
- Red kite (due to breeding within the Study Area and levels of breeding and non-breeding season flight activity);
- Goshawk (due to breeding within the Study Area);
- Breeding wader assemblage: oystercatcher, curlew and snipe (due to wide distribution within the Study Area); and
- the Muirkirk and North Lowther SPA (due to proximity to the Proposed Development).

10.4.2. Matters to be scoped out of the EIA Report with respect to Ornithology include:

- Effects on species whose populations are below a certain geographic level of importance. In accordance with CIEEM (2018, updated 2024) guidelines, detailed assessment is only required for species with a certain level of importance or above. For Glensalloch Wind Farm, it is proposed to assess only species of local importance and above (as defined in Section 'Assessment of Effects', para. 10.3.18) and
- Impacts on species/ groups not susceptible to significant effects from wind farms. As specified in current NatureScot guidance (SNH 2017, updated 2025), impacts on species groups such as passerines (songbirds) which are not considered vulnerable to significant effects from wind farm developments are proposed to be scoped out.

10.5. Approach to Mitigation

10.5.1. Mitigation, compensation and enhancement measures are dependent on the assessment of impacts in the EIA Report. Outline details will be provided in the EIA Report with further details provided in an Outline Construction Environmental Management Plan (CEMP) and Outline Habitat Management Plan (HMP), to be included as part of the EIA Report. The Outline CEMP will form the basis of the final CEMP which will be produced and agreed post-consent. A detailed version of the HMP will also be produced and agreed with relevant stakeholders post-consent.

10.6. Focused Questions

Do consultees agree that the survey data collected is sufficient to inform the assessment and that the proposed assessment methodologies are appropriate?

Do consultees agree with the matters proposed to be scoped out?

Are consultees aware of any additional sources of data, not referred to above, or factors that may be relevant to the assessment?

11. Ecology

11.1. Introduction

- 11.1.1. This section of the Scoping Report considers the scope of work required to assess potential significant effects associated with ecology (habitats and non-avian animal species), during the construction and operational phases of the Proposed Development. Ornithological effects are considered separately (see Chapter 10).

11.2. Legislation, Policy and Guidance

- 11.2.1. The ecological assessment will follow guidance produced by the Chartered Institute of Ecology and Environmental Management (CIEEM)⁴⁹. Additionally, the following legislation, policy and guidance will be taken into consideration:

- The Wildlife and Countryside Act 1981 (as amended in Scotland);
- The Nature Conservation (Scotland) Act 2004;
- The Conservation (Natural Habitats &c) Regulations 1994 (as amended in Scotland) (the Habitats Regulations);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Protection of Badgers Act 1992 (as amended in Scotland);
- National Planning Framework for Scotland 4 (NPF4), particularly Policy 3;
- Scottish Government (2023) Biodiversity: draft planning guidance;
- NatureScot (2024a) General pre-application and scoping advice for onshore wind farms;
- NatureScot et al. (2021) Bats and onshore wind turbines – survey, assessment and mitigation; and
- NatureScot (2020) Scottish Biodiversity List (SBL).

11.3. Baseline

- 11.3.1. An initial desk-based study was undertaken in June 2025. The Study Area considered statutory designated sites within 10 kilometres (km), non-statutory designated sites within 2km, protected/notable species records within 2km and bat records within 10km. Desk study data was obtained from those sources considered to provide relevant ecological data and included:

- NatureScot SiteLink (NatureScot, 2025);
- South-West Scotland Environmental Information Centre (SWSEIC);
- National Biodiversity Network Atlas (NBN Atlas, 2025);
- Ancient Woodland Inventory (AWI) of Scotland (NatureScot, 2000);
- Carbon and Peatland 2016 Map of Scotland (Scotland's Environment, 2016); and
- Multi Agency Geographic Information for the Countryside (MAGIC, 2025).

- 11.3.2. In addition, a review of ecological data associated with the previous North Lowther Energy Initiative scheme (NLEI scheme) on the Site of the Proposed Development was undertaken. The Site is wholly contained within the study area of the previous NLEI scheme which comprised an area of approximately 5,000 hectares (ha). The Environmental Statement and various associated technical appendices submitted previously for the NLEI scheme were reviewed in preparing this Scoping Chapter.

⁴⁹ CIEEM (2018) 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.

Designated Sites

- 11.3.3. The data search for sites of nature conservation interest returned two sites of international importance (Special Area of Conservation (SAC)), six sites of national importance (Special Site of Scientific Interest (SSSI)) and no sites of local importance within 10 kilometres (km) of the Site Boundary. These are detailed in **Table 11.1** and shown on **Figure 11.1**.

Table 41.1: Statutory Designated Nature Conservation Sites within 10km

Site Name	Designation	Qualifying / Notified Ecological Features	Distance and Direction from Site Boundary (km)
Back Wood	SSSI	Upland oak woodland.	2.4km west
Upper Nithsdale Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes.	2.4km west & 2.4km south
Mennoch Water	SSSI	Fen meadow and upland oak woodland.	2.4km south
Coshogle Wood	SSSI	Upland oak woodland.	6.8km south
Red Moss	SSSI & SAC	Raised bog and active raised bog.	9.1km north
Muirkirk Uplands	SSSI	Blanket bog, breeding bird assemblage, hen harrier (breeding & non-breeding), short-eared owl (breeding) and upland assemblage. The Muirkirk and North Lowther Uplands Special Protection Area (SPA) is further recognised as an Important Bird Area (IBA), containing the largest remaining continuous block of unforested moorland in southwest Scotland (See Chapter 10).	9.8km northwest
Miller's Wood	SSSI	Upland birch woodland	9.9km, north

Non-statutory Designated Sites

- 11.3.4. The Site also sits within the Galloway and Southern Ayrshire UNESCO Biosphere which comprises an area of more than 9,700km². No Core Areas of the Biosphere occur within 10km of the Proposed Development.
- 11.3.5. The Ancient Woodland Inventory (AWI) showed 12 stands of ancient woodland occurring within 2km of the Site Boundary. Ancient woodland occurred most frequently along the banks of Crawick Water, which partially borders the Site to the west, and its tributaries Back Burn, Polthistly Burn, Glenaners Burn and Cog Burn. Ancient woodland occurring along Cog Burn partially lay within the Site. These are detailed in **Table 11.2** and shown on **Figure 11.2**.

Table 11.5: Ancient Woodland Inventory Sites within 2km

Wood Name (where available)	AWI ID	Area (ha)	Antiquity	Distance and Direction from Site Boundary (m)
Bank Wood	31,276	3.82	Ancient (of semi-natural origin)	Lies within the Site along the bank of Cog Burn in the west.
-	31,275	1.05	Other (on Roy map)	Lies partially within the Site along the bank of Cog Burn in the west.
-	31,277	1.97	Ancient (of semi-natural origin)	Lies partially within the Site along the bank of Cog Burn in the west.
-	31,274	0.88	Ancient (of semi-natural origin)	140m north
Blackburn Wood	31,279	0.74	Ancient (of semi-natural origin)	60m west
	31,278	1.34	Ancient (of semi-natural origin)	140m west
Bessy's Wood	31,279	0.74	Other (on Roy map)	140m southwest
	31,278	1.34	Ancient (of semi-natural origin)	1,210m southwest
Carco Back Wood	29,860	2.01	Ancient (of semi-natural origin)	1,210m southwest
Carco Wood	29,863	3.09	Other (on Roy map)	1,270m southwest
	29,862	1.59	Other (on Roy map)	1,600m southwest
Carco/Schlenders Wood	29,861	9.37	Ancient (of semi-natural origin)	1,390m southwest
-	31,272	1.34	Long-Established (of plantation origin)	1,000m west

Wood Name (where available)	AWI ID	Area (ha)	Antiquity	Distance and Direction from Site Boundary (m)
-	31,271	0.96	Ancient (of semi-natural origin)	1,100m west
Corsebank Wood	31,270	1.44	Ancient (of semi-natural origin)	1,170m northwest

Habitats

- 11.3.6. The Carbon and Peatland 2016 Map of Scotland⁵⁰ provided indicative soil conditions. The majority of the Site is indicated to consist of Class 0, mineral soils. The hills of the east and southeast of the Site are indicated to be composed of Class 3 peaty soils, not likely to be priority peatland habitat. The map also indicated some areas of Class 1 peat soil around the slopes of Glengaber Hill, Willowgrain Hill and Stood Hill in the southeast of the Site. These are likely areas of nationally important carbon-rich soils, deep peat and priority peatland habitat likely to be of high conservation value. The Site's forestry and felled woodland areas lay on Class 4 soil, unlikely to be associated with peatland habitats.
- 11.3.7. As part of the suite of ecological baseline assessment (to inform a subsequent EIA), National Vegetation Classification (NVC) survey of the Site plus appropriate buffers (see Section 1.6). However, for reference the previous NLEI scheme identified the following communities within their Study Area (i.e. 250m from proposed turbine locations and 100m from proposed access tracks), which had moderate or high potential to be Groundwater Dependent Terrestrial Ecosystems (GWDTEs):
- W6: *Alnus glutinosa* – *Urtica dioica* woodland;
 - M15: *Trichopherum germanicum* – *Erica tetralix* wet heath;
 - M25: *Molinia caerulea* – *Potentilla erecta* mire;
 - M27: *Filipendula ulmaria* – *Angelica sylvestris* mire;
 - MG9: *Holcus lanatus* – *Deschampsia cespitosa* grassland;
 - MG10: *Holcus lanatus* – *Juncus effusus* rush pasture;
 - U6: *Juncus squarrosus* – *Festuca ovina* grassland;
 - JE: *Juncus effusus* acid grassland community;
 - JA: *Juncus acutiflorus* acid grassland community;
 - W7: *Alnus glutinosa* – *Fraxinus excelsior* – *Lysimachia nemoreum* woodland;
 - M6: *Carex echinata* – *Sphagnum fallax/denticulatum* mire;
 - M23: *Juncus effusus/acutiflorus* – *Galium palustre* rush pasture;
 - M32: *Philonotis fontana* – *Saxifraga stellaris* spring; and
 - CG10: *Festuca ovina* – *Agrostis capillaris* – *Thymus polytrichus* grassland.
- 11.3.8. The NVC survey of the previous NLEI scheme also identified communities which potentially correlated to the following Annex I habitats (depending on other factors such as quality, extent, species assemblages, geographical setting, etc):
- Blanket bog (7130);
 - Transition mires and quaking bogs (7140);
 - Northern Atlantic wet heaths with *Erica tetralix* (4010);

⁵⁰ Carbon and peatland 2016 map, Scotland's Soils available at:
<https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map>

- European dry heaths (4030); and
- Species-rich *Nardus* grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe) (6230).

11.3.9. The NVC survey is to be fully refreshed, as per the methods and Study Area outlined in Section 1.6.

Protected and Notable Species

11.3.10. The SWSEIC data search provided numerous protected and notable species records within 2km of the Site (extended to 10km for records of bats) recorded over the last 15 years (2010-2025).

11.3.11. The SWSEIC data search returned a total of 257 records of bats comprising seven individual species, as well as numerous bats unidentified to species level:

- Daubenton's bat *Myotis daubentonii*;
- whiskered/Brandt's bat *Myotis mystacinus/brandtii*;
- Natterer's bat *Myotis nattereri*;
- Leisler's bat *Nyctalus leisleri*;
- common pipistrelle *Pipistrellus pipistrellus*;
- soprano pipistrelle *Pipistrellus pygmaeus*; and
- brown long-eared bat *Plecotus auritus*.

11.3.12. Five species of bat were recorded during the protected species surveys for the previous NLEI scheme. The bat activity surveys conducted in 2015 recorded an overall low level of bat activity, mainly commuting and foraging. Two buildings within the previous Site were previously recorded as having moderate potential for roosting bats, one of which remains within the Site, and trees with Potential Roosting Features (PRFs) were recorded at 11 locations across the previous study area, nine of which remain within Site.

11.3.13. The SWSEIC data search returned one record of a protected terrestrial mammal: Eurasian red squirrel *Sciurus vulgaris*, which is included within Schedule 5 of the WCA.

11.3.14. Other recorded terrestrial mammals, which are notable due to their inclusion on one or more of the SBL, UKBAP or LBAP, included one record of West European hedgehog *Erinaceus europaeus* and five records of mountain hare *Lepus timidus*.

11.3.15. The protected species surveys for the previous NLEI scheme recorded evidence of otter *Lutra lutra* across 25 locations within the Study Area, including spraints, footprints and potential resting areas. The majority of field signs occurred along the Wanlock Water and Cog Burn. The surveys also recorded evidence of badger and squirrels (only grey squirrel *Sciurus carolinensis* confirmed) utilising the Study Area.

11.3.16. The SWSEIC data search returned a total of nine records of amphibians and reptiles which are notable due to their inclusion on the SBL and UKBAP including two records of common toad *Bufo bufo* and seven records of common lizard *Zootoca vivipara*.

11.3.17. Common lizard and slow worm *Anguis fragilis* were recorded during the previous NLEI scheme surveys.

11.3.18. The SWSEIC data search returned one record of a notable fish: brown trout *Salmo trutta*, which is notable due to its inclusion on the SBL and UKBAP.

- 11.3.19. Electrofishing surveys for the previous NLEI scheme identified salmonids present in the majority of watercourses. Juvenile Atlantic salmon *Salmo salar* was recorded in good to excellent densities in the mid and lower sections of the Wanlock Water and its tributaries.
- 11.3.20. The SWSEIC data search returned a total of 16 records of invertebrates which are notable due to their inclusion on the SBL and UKBAP comprising one species of beetle, one species of butterfly and nine species of moth.
- 11.3.21. The SWSEIC data search returned one record of the flowering plant wild pansy *Viola tricolor*, which is notable due to its inclusion within the LBAP.
- 11.3.22. The SWSEIC data search returned one record of grey squirrel, an Invasive Non-native Species (INNS) listed under Schedule 9 of the WCA.

11.4. Potential Sources of Impact

Construction

- 11.4.1. During construction of the Proposed Development, in the absence of appropriate mitigation, it is anticipated that impacts may arise from:
- habitat loss or damage (permanent or temporary), or fragmentation due to construction of wind farm infrastructure, including drainage impacts to bog habitats;
 - possible changes to groundwater flows affecting GWDTEs;
 - inadvertent killing or injuring of fauna during construction;
 - disturbance or displacement of protected or notable fauna due to vehicular traffic, plant and the presence of construction workers; and
 - sedimentation or other pollution of water courses from construction activities and vehicular traffic.

Operation

- 11.4.2. During operation (proposed as 40 years) of the Proposed Development, in the absence of appropriate mitigation, it is anticipated that impacts may arise from:
- disturbance, displacement, injury or mortality of fauna due to vehicular traffic and presence of site operatives;
 - environmental incidents and accidents (e.g. spillages); and
 - moving turbine blades leading to mortality due to collision or barotrauma (bats only).

11.5. Assessment

- 11.5.1. The desk study provides historic background data on the species and ecological sensitivities of the Site and surrounding area that can be used both to inform the details of survey methodology and EIA.
- 11.5.2. The desk study for the Proposed Development was undertaken in June 2025. The sources of desk study data are listed in Section 11.3. All nearby wind farm developments will summarily be reviewed for relevant ecological data.

Field Surveys

- 11.5.3. To further inform the EIA, the following field surveys have been commenced and will be completed in 2025:
- UK Habitat Classification (UKHab) and NVC survey;
 - Protected mammals survey;
 - Daytime Bat Walkover (DBW) and Ground-level Tree Assessment (GLTA);
 - Bat activity surveys;
 - Electrofishing surveys and macro-invertebrate sampling; and
 - Freshwater pearl mussel Habitat Suitability Assessment
- 11.5.4. Due to the low numbers of records of reptiles returned by the data search, reptile surveys are not currently proposed. Rather, a check for suitable reptile habitat and a record of incidental observations will be made during the habitat and protected mammals surveys. Presence of reptiles will be assumed within areas of suitable habitat.
- 11.5.5. No at-height bat surveys are currently proposed. The requirement for these will be determined based on the outcomes of the DBW and GLTA. Bat transects have been scoped out as per NatureScot guidance⁵¹. Given the remote and exposed nature of the Site, long-term acoustic monitoring of bat activity using static bat detectors is the recommended methodology for surveyor health and safety. This approach will be confirmed via consultation.

11.6. Field Survey Methodologies

- 11.6.1. **Figure 11.3** provides the specific Study Areas for each survey type. Details on each survey is provided below.

UKHab and NVC

- 11.6.2. The habitat surveys will be undertaken within the Site Boundary plus, where accessible, a 250m buffer. All habitats will be classified using the UKHab system (which is the replacement of Phase 1 and is better suited for identifying priority habitats). The UKHab system comprises a 5 level Primary Habitat Hierarchy and all habitats will be classified to a minimum detail of Level .
- 11.6.3. NVC surveys will be completed in conjunction with the UKHab surveys to map in detail potentially important semi-natural vegetation communities on Site and allow identification of potential GWDTE and Annex I habitats. The methodology will follow the NVC users' handbook⁵². Habitats of interest will be recorded to community level with subcommunities recorded where necessary to determine if a habitat meets Annex I habitat criteria under the European Nature Information System (EUNIS) habitat classification system.

⁵¹ NatureScot (2021) Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation

⁵² Rodwell, JS (2006) National Vegetation Classification: Users' Handbook. JNCC, Peterborough

Protected Mammals

- 11.6.4. A combined protected species walkover survey for badger, pine marten, red squirrel, otter and water vole will be conducted across the Site and a 100m buffer, extended to 250m for otter, using standard methodologies^{53,54,55,56,57}.

Bat Surveys

- 11.6.5. A DBW will be conducted to observe, assess, and record any habitats suitable for bats to roost, commute, or forage both on Site and in the surrounding area in conjunction with the protected species walkover. This survey aims to determine the suitability of the Site for bats, assess what further surveys are required, and consider how those surveys would be safely carried out. This survey will be completed by an experienced ecologist in accordance with best practice guidance⁵⁸. Suitability will be assessed as 'none', 'negligible', 'low', 'moderate', or 'high'. While a full Preliminary Roost Assessment (PRA) is not included in this survey, if any structures are recorded with bat roosting suitability, they shall also be designated as above, with the addition of 'confirmed roost' if roosting evidence is recorded.
- 11.6.6. For the GLTA, trees will be grouped to be assessed as blocks within the Study Area and shall be categorised as either 'none' (no roost features present), 'FAR' (further assessment required), 'PRF-I' (potential roost feature suitable for a single or small number of bats) or PRF-M (suitable for a higher conservation value roost). This assessment will be refined if further survey is required (subject to additional visits if necessary; for example, to assess individual built structures and/or trees for future assessment to support a future application).
- 11.6.7. Static bat activity surveys have been commenced within the 2025 active bat season (April to September), with three specific survey periods either complete or planned during spring, summer and autumn. Full spectrum static detectors are being used for the collection of bat activity data. The survey has been designed to provide at least the minimum 10 nights of data recorded in suitable weather conditions each season, spring (April-May), summer (June-mid-August) and autumn (mid-August to mid-September). Detectors will be deployed for a minimum of 15 nights per season to maximise the chances of obtaining 10 nights of suitable data per season. Statics will be placed with the aim to cover the full range of habitat in which turbines are likely to be positioned within the Site to give a representative indication of bat activity in different locations and habitat types.

Aquatic Surveys

- 11.6.8. Each of the 23 locations previously fished for the NLEI scheme will be targeted to assess the presence / likely absence of fish species, in particular salmonids. Targeted 100m² areas of each

⁵³ Scottish Badgers (2018). Surveying for Badger Good Practice Guidelines. Version 01

⁵⁴ Cresswell, W.J., Birks, J.D.S., Dean, M., Pacheco, M., Trehwella, W.J., Wells, D. and Wray, S. (2012). UK BAP

Mammals: Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation. The Mammal Society, Southampton.

⁵⁵ Chanin P (2003a) Ecology of the European Otter. Conserving Natura 2000 Rivers, Ecology Series No. 10. English Nature, Peterborough

⁵⁶ Chanin P (2003b) Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10. English Nature, Peterborough

⁵⁷ Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal

Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

⁵⁸ Collins, J. (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London.

survey location will be fished. Barrier stop nets both upstream and downstream will be deployed of the 100m² pre-surveyed area. A three-run approach will be undertaken, electrofishing the survey location three times in a consecutive manner, allowing for depletion estimates of each targeted salmonid age class density to be measured. Standard protocols outlined by the National Electrofishing Programme for Scotland (NEPS)⁵⁹ will be used. Non-salmonid fish species which may be present and caught during such surveys will also be recorded and measured. However, their population densities may not be accurately assessed using the electrofishing techniques which have been designed for surveying salmon and trout populations. If no depletion in fish abundance is found a fourth run will be undertaken.

- 11.6.9. Kick-sampling for macro-invertebrates will be undertaken at each location which involves the placement of a net downstream with the surveyor agitating the riverbed using their foot for a minimum of two minutes. This will loosen invertebrates within the pebbles and mud within the watercourse, and they will float into the net.
- 11.6.10. Samples collected will be sent to an external lab for analysis. Species collected within the sample will be identified to either species or family level and the approximate abundance of each group recorded in the sample will be noted. Using the data collected, a biological index will be calculated for each sampling location which will be used to monitor water quality across the Site.
- 11.6.11. During the electrofishing surveys, habitat suitability will be assessed for the presence/likely absence of freshwater pearl mussel (FWPM) at all 23 locations. Characteristics such as substrate, flow regimes, clarity/ pollution evidence will be assessed. The outcomes of the habitat suitability assessment will determine the requirement for further FWPM surveys.

Ecological Impact Assessment

- 11.6.12. The EIA will be based on current CIEEM guidance⁶⁰ and will draw on other, more specific guidance as appropriate.
- 11.6.13. The impact assessment process will involve the following steps:
 - identifying important ecological features, i.e. features of sufficient value and/ or features subject to legal protection, for which detailed assessment is necessary;
 - identifying and characterising potential impacts on important features;
 - assessment of the significance of effects based on the assumption that standard mitigation measures, in line with standard wind farm construction good practice, would be embedded as part of the Proposed Development;
 - incorporating additional measures to avoid and mitigate (reduce) potentially significant effects (if required);
 - assessing the significance of any residual effects after mitigation;
 - identifying appropriate compensation measures to offset significant residual effects (if required);
 - identifying opportunities for ecological enhancement; and
 - cumulative impact assessment along with other wind farm developments (operational and planned).

⁵⁹ The Scottish Government (2023) National Electrofishing Programme for Scotland (NEPS) 2021: Analysis, Scottish Government.

⁶⁰ CIEEM (2018) 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.

Cumulative Effects

- 11.6.14. The potential for cumulative impacts with other wind farm proposals would be assessed. For (non-avian) ecological receptors potential cumulative impacts are only likely to be significant for other developments within the same hydrological catchments or located within the regular range of more mobile species, e.g. bats. As such the cumulative assessment would be restricted to other wind farms within the same hydrological catchment and/or other wind farms within approximately 10km.

Consultation

- 11.6.15. The following the stakeholders will be engaged in relation to the assessment:

- Dumfries and Galloway Council Biodiversity Officer;
- South Lanarkshire Council Biodiversity Officer;
- NatureScot;
- Scottish Environmental Protection Agency (SEPA);
- SWSEIC;
- Association of Salmon Fishery Board;
- Nith Catchment Fishery Trust;
- Scottish Wildlife Trust; and
- Marine Scotland.

11.7. Receptors to be scoped in and out of assessment

- 11.7.1. Based on baseline data, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, generally common and widely distributed habitats or species which do not fall within the following categories will be scoped out of the assessment:
- Habitats on Annex I to the Habitats Directive, on the SBL, Dumfries and Galloway Local Biodiversity Action Plan (2009), and species on Annex II to the Habitats Directive; and
 - Habitats or species protected by other relevant legislation such as the Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), the Wildlife and Natural Environment (Scotland) Act 2012 (as amended) and the Protection of Badgers Act 1992.
- 11.7.2. Habitats and species that do fall within the above categories are scoped in at this stage until an assessment can be made following completion of all baseline data.
- 11.7.3. Due to the distances, lack of connectivity and reasons for their designations, it is considered unlikely that the Proposed Development would result in any significant adverse effect on the qualifying interests of Back Wood SSSI, Upper Nithsdale Woods SAC, Mennoch Water SSSI, Coshogle Wood SSSI, Red Moss SSSI/SAC and Muirkirk Uplands SSSI. Impacts on these designated sites has been scoped out of the assessment.
- 11.7.4. No great crested newt surveys are proposed given the Site lies outside of the known range of this species, and no potentially suitable habitats are understood to be present and so this species will be scoped out of the assessment.

11.8. Approach to Mitigation

- 11.8.1. Mitigation, compensation and enhancements will be developed in consultation with key stakeholders, drawing on evidence from other schemes as appropriate. Mitigation is likely to take the form of design mitigation, construction mitigation and habitat restoration/management during

wind farm operation. Design mitigation, where possible, would be incorporated by the involvement of the lead ecologist in the design evolution process. This may involve, for example, the avoidance of areas of high-quality habitat or instigation of buffer zones around GWDTEs etc. Construction mitigation may involve restrictions on the timing of construction work in certain areas, suitable suite of pre-construction surveys and subsequent Species Protection Plans (SPPs) and the appointment of an Ecological Clerk of Works (ECoW).

- 11.8.2. Compensation and enhancement during the operational period is expected to be secured through the development and agreement of a Habitat Management Plan (HMP). Measures will be incorporated into an outline HMP (to be submitted as part of the EIA Report) that will seek to not only compensate but effectively restore habitat and enhance levels of biodiversity across the Site significantly from the baseline conditions. This will also seek to take account of the NPF4 Policy on biodiversity enhancement.
- 11.8.3. The outline HMP will be designed to take into account those habitats and features that are most likely to result in maximising the overall benefit to biodiversity. This can be demonstrated either quantitatively or qualitatively. In order to ensure the best possible outcomes for biodiversity, detailed consultation will be undertaken with the landowner and other stakeholders. Post-construction monitoring will be incorporated into the HMP (i.e. surveys which are required to measure specific outcomes against agreed targets and/or assist in determining condition) to assess the success of management measures and inform the need for any changes that might be required to improve the target outcomes.
- 11.8.4. All terrestrial ecological mitigation will be incorporated into a Construction Environmental Management Plan (CEMP). The CEMP will outline all required mitigation and provide details on timelines to be undertaken. The CEMP will also outline a timetable of actions and form part of the contract documents to ensure delivery of mitigation specified in the EIA Report. In addition, the CEMP will incorporate the provision of the ECoW to oversee the implementation of mitigation. The specific scope of an outline HMP and any required SPPs will be defined once baseline surveys are fully completed and the EIA has been undertaken.

11.9. Focused Questions

Do consultees confirm they are happy with the approach detailed in this Scoping Report, including the proposed scope of survey work, the proposed method of assessment and the matters proposed to be scoped out of further assessment?

Are there any developments or infrastructure schemes which should be taken into account when considering potential cumulative ecological impacts?

12. Hydrology, Geology, Soils and Hydrogeology

12.1. Introduction

- 12.1.1. This Chapter sets out preliminary baseline information on hydrology, geology, soils and hydrogeology and outlines the proposed scope of works of the Environmental Impact Assessment (EIA) Report to assess the potential significant effects from the Proposed Development on identified receptors relevant to hydrology, geology, soils and hydrogeology.
- 12.1.2. A Study Area of 1 kilometre (km) from the Site Boundary has been used to inform this scoping assessment.
- 12.1.3. Where relevant, baseline information available from documents submitted to support the North Lowther Energy Initiative (NLEI scheme) application have been used to support this Chapter of the scoping report. Where information has been used, this has been verified using desktop sources to confirm the presented data is current, given the 8 years since the application for the NLEI scheme was submitted.

12.2. Baseline

Site Setting

- 12.2.1. The Site is located approximately 4.6km to the northeast of Sanquhar and 3.2km west of Wanlockhead, within the Dumfries and Galloway Council area but bordering the South Lanarkshire Council area. The Site is centred on Ordnance Survey National Grid Reference (OSNGR) NS 82766 14225.
- 12.2.2. The Proposed Development is located within the Southern Uplands and comprises a mix of coniferous woodland plantation at lower altitudes and open land for rough grazing at higher altitudes. The Site comprises several hills and valleys with associated peaks and watercourses. Elevations range from approximately 580 metres (m) above Ordnance Datum (m AOD) in the southeast to 210m AOD in the northwest.

Climate

- 12.2.3. The Site is situated within the Met Office's Western Scotland climatic region⁶¹. Due to air cooling at altitude causing more cloud and precipitation, higher areas of the Site are likely to experience a greater level of precipitation compared with lower areas nearby to the west of the Site. Much of Western Scotland includes high ground exposed to rain-bearing westerly winds.
- 12.2.4. Scottish Environment Protection Agency (SEPA) rainfall data, taken from the Meadowfoot Rainfall Station⁶² located approximately 1.3km east of the Site within the Wanlockhead Sewage Works, indicates that the local area received an annual rainfall total of 1,524.6 millimetres (mm) in 2024. To put this in perspective, annual average rainfall across Scotland varies from over 3,500mm in the West Highlands, to less than 1,000mm in the upper Clyde valley.

Designated Sites

- 12.2.5. A review of NatureScot's SiteLink⁶³ indicates that the sites detailed within **Table 12.1** are within the Study Area and have been designated in relation to hydrology, geology, soils and/or hydrogeology which are of regional, national or international importance.

- 12.2.6. The location of the designated sites relative to the Study Area and baseline water environment is shown on **Figure 12.1: Local Hydrology**.

Table 12.1: Summary of Designated Sites

Designation Name	Designation	Feature Related to Chapter Discipline	Location Relative to Site	Scoped In / Out of Further Assessment
Leadhill – Wanlockhead	Site of Special Scientific Interest (SSSI), Geological Conservation Review (GCR) Site	Mineralogy of Scotland (lead – zinc geology deposits)	820m east	Scoped out as it is anticipated that the Proposed Development will not have any impacts on geology outwith the Site Boundary.
North Lowther Uplands	SSSI	Mineralogy of Scotland (Bail Hill GCR) Upland Habitats (blanket bog, wet and dry heaths and acid grassland)	25m to the north and west of the Site	Scoped out as Bail Hill GCR is located approximately 4.5km from the Site and it is anticipated that the Proposed Development will not have any impacts on geology outwith the Site Boundary. Whilst the North Lowther Uplands is located approximately 25m from the Site, Crawick Water is situated between the Site and the SSSI and the blanket bogs are sustained by rainfall and surface water rather than groundwater. As such, the Proposed Development will not impact the quality or quantity of water supporting the SSSI and will therefore, not impact the upland habitats.

- 12.2.7. There are no other sites designated for hydrology, geology, soils and/or hydrogeology within the scoping study area or downstream of the Site.

⁶¹ Met Office, Western Scotland: climate. Available online at: <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/weather/regional-climates/western-scotland-climate-met-office.pdf> [Accessed June 2025].

⁶² Scottish Environment Protection Agency, Rainfall Data: Meadowfoot. Available online at: <https://www2.sepa.org.uk/rainfall/data/index/115616> [Accessed June 2025].

⁶³ NatureScot, SiteLink. Available at: <https://sitelink.nature.scot/map> [Accessed: June 2025].

Geology

- 12.2.8. The Site is shown by British Geological Survey (BGS) mapping⁶⁴ to be underlain by sedimentary wacke bedrock of the Kirkcolm Formation. Several inferred fault lines associated with the Leadhills fault zone are mapped, trending northeast to southwest across the southeastern area of the Site. These fault lines have brought older rocks comprising sedimentary mudstone bedrock of the Moffat Shale Group to the surface. Further inferred fault lines trend northeast to southwest across the northern area of the Site. A mineral lode⁶⁵ is also present in the southeastern area of the Site, trending north to south between Lowmill Knowe and Willowgrain Hill. The lode has been historically mined for the minerals galena (lead) and sphalerite (zinc), with many other minerals also present.
- 12.2.9. No superficial deposits are recorded across higher elevations of the Site. The superficial geology, where present along valleys and watercourses, is shown by BGS mapping to comprise glacial till (unsorted sediment with gravel in a fine mud matrix) and alluvium (variable sediment of mud, sand and gravel with some peat in places). Limited isolated pockets of peat deposits are recorded throughout the Site.
- 12.2.10. Wanlockhead and Leadhills, both east of the Site, were historically the centres for lead mining in Scotland. This area has been extensively mined, exploiting mineral lodes for lead, zinc and silver. Mining has taken place since the 13th Century, but the majority occurred from the 18th Century to the mid-20th Century. A legacy of this mining is the discharge of heavy metals (lead, zinc, cadmium and copper) contaminating groundwater and the Wanlock Water valley downstream of Wanlockhead, as a result of mine water discharges and runoff passing through/over mine waste material. Information obtained as part of the EIA for the NLEI scheme⁶⁶ identified high and moderate areas of concern relating to historic mining operations. The only mining area requiring consideration at the Site is a moderate risk area associated with the aforementioned mineral lode.
- 12.2.11. Other mining areas of concern are located approximately 500m east and southwest of the Site Boundary. As the Proposed Development will not have any impacts on geology outwith the Site Boundary, it is not anticipated that the Proposed Development will have any impacts on these offsite mining areas.
- 12.2.12. The onsite mining area of moderate risk takes into account the wider mining area and identifies areas where deeper mine workings, shafts, and/or associated waste material may be present, including mapped mineral lodes which if excavated during construction could expose metal sulphide mineral to oxygen leaving soluble hydrated metal sulphate minerals that could be leached out, thereby resulting in increased metal pollution entering the soil and water environment. The nearest proposed turbine to the mineral lode is turbine T15, located approximately 865m to the northwest of the lode. As such, it is not anticipated that the Proposed Development will disturb the mineral lode or cause mobilisation of metal pollutants. Impacts on geology have therefore been scoped out of further assessment.

⁶⁴ British Geological Survey, Onshore Geoindex. Available online at <https://mapapps2.bgs.ac.uk/geoindex/home.html> [Accessed June 2025].

⁶⁵ Lode: A vein of minerals within a fissure

⁶⁶ ECU Reference: ECU00000426

Hydrogeology

- 12.2.13. Due to the underlying geology, it is unlikely that the bedrock or superficial deposits support any significant volume of groundwater. The wacke and mudstone bedrock has been classified by the BGS as a 'low productivity aquifer', whereby small amounts of groundwater may be found in near surface weathered zones and secondary fractures, with flow occurring through fractures and other discontinuities. The Site is located upon the Upper Nithsdale groundwater body, a Silurian – Ordovician aquifer dominated by fracture flow. Any groundwater present within the superficial deposits beneath the Site is likely to be perched and in hydraulic continuity with watercourses.
- 12.2.14. The NLEI scheme Environmental Statement states that springs emerge from the hillsides across the Site to form numerous minor burns, typically issuing at higher elevations near the top of hills. These springs are unlikely to flow all year round and will be dependent on the preceding precipitation.
- 12.2.15. The presence of nearby mine workings will locally affect the natural groundwater drainage due to the presence of shafts, levels, adits and worked stopes (stepped excavations) providing high permeability pathways for groundwater to flow through.
- 12.2.16. The Upper Nithsdale groundwater body (SEPA ID: 150663), which covers an area of 377.8km², is currently classified as having a poor overall status⁶⁷. Whilst the Upper Nithsdale groundwater body currently has a good quantitative status, it has a poor chemical status, attributable to legacy pollution due to historic mining and quarrying activities.

Soils and Peat

- 12.2.17. The National Soil Map of Scotland⁶⁸ indicates that the soils beneath the Site principally comprise peaty gleyed podzols with brown earths; a small area to the north of the Site is shown to comprise of noncalcareous gleys and humus-iron podzols. An area towards the east of the Site is shown to be underlain by dystrophic blanket peat.
- 12.2.18. Peatland classification mapping⁶⁹ indicates that the western half of the Site comprises mineral soils (Class 0), which are not considered to represent peatland habitats (**Figure 12.2**). The dystrophic blanket peat is classified as Class 5, whereby no peatland habitat is recorded but soils are carbon-rich. The eastern half of the Site is indicated to comprise predominantly peaty soil with some peat soil (Class 3) and predominantly mineral soil with some peat soil (Class 4); neither class is considered to represent nationally important carbon-rich soils. The Class 4 soils largely correlate with valley bottoms where minor burns are present, whilst the Class 3 soils are largely associated with higher elevations and the upstream tributaries of these burns. Five isolated areas of Class 1 peatland are recorded within the east and southeast of the Site which represent nationally important carbon-rich soils. No Class 2 peatland is recorded within the Site Boundary.

⁶⁷ Scottish Environment Protection Agency, Water Classification Hub. Available online at <https://informatics.sepa.org.uk/WaterClassificationHub/> [Accessed June 2025].

⁶⁸ The James Hutton Institute, National Soil Map of Scotland. Available online at: <https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/> [Accessed June 2025].

⁶⁹ NatureScot, Carbon and peatland 2016 map. Available online at: https://map.environment.gov.scot/Soil_maps/?layer=10 [Accessed June 2025].

- 12.2.19. A Phase 1 peat depth survey was undertaken by Mouchel in 2016 to support the application for the NLEI scheme. Measured peat depths averaged 0.4m, with 94% of recordings less than 1.0m and 98% of recordings less than 1.5m. The deepest probe reached a depth of 2.23m in the north of the Site. Over 64% of the sampled points had a peat depth shallower than 0.5m, and therefore, are not formally considered as peat.
- 12.2.20. A Peat Stability Assessment was undertaken by Mouchel in 2017 to support the application for the NLEI scheme. The assessment concluded that there were parts of the Site that had a “medium” or “high” risk of peat instability.
- 12.2.21. Due to the presence of peat at the Site, targeted Phase 2 peat depth survey will be undertaken as part of the EIA.

Groundwater Dependent Terrestrial Ecosystems

- 12.2.22. A National Vegetation Classification (NVC) habitat survey was completed by MacArthur Green (now part of SLR Consulting Limited) in 2015 and 2016 as part of the NLEI scheme. A range of habitats were recorded across that site, including those which SEPA identify as having the potential to be sustained by groundwater. Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) are located adjacent to mapped watercourses or across their headwaters. Most of the habitats are located upon till superficial deposits or wacke bedrock overlain by peaty gleyed podzols with brown earths. This is geology which exhibits low permeability, suggesting the habitats are sustained by rainfall and waterlogging of soils, rather than groundwater. The assessment of GWDTEs as part of the NLEI scheme, completed by Mouchel in 2017, concluded that all habitats have a low groundwater dependency and are not sensitive to changes in groundwater.
- 12.2.23. An updated NVC habitat survey will be completed as part of the ecology assessment for the Proposed Development which will require a revised GWDTE assessment; however, the existing information provides a good understanding of wetter habitats at the Site.

Local Hydrology

- 12.2.24. The Site is located within the River Nith catchment. The River Nith itself is located over 5km downstream of the Site. Most of the Site is drained by Cog Burn, a tributary of Crawick Water, which flows in a northwesterly direction across the southern area of the Site. As such, the Site is mainly situated within the surface water catchment of Crawick Water which drains in an overall southwesterly direction parallel to the northwestern boundary of the Site and is a tributary of the River Nith.
- 12.2.25. The northern area of the Site is located within the surface water catchment of Wanlock Water which drains in a northwesterly direction adjacent to and parallel to the northeastern boundary of the Site and is a tributary of Crawick Water. The northern access route off the B740 crosses Wanlock Water and Whitecleuch Burn (a tributary of Wanlock Water). Existing watercourse crossings are present at these locations.
- 12.2.26. A small area of the southwest of the Site is situated within the surface water catchment of Loch Burn, a tributary of the River Nith, which drains in a southeasterly direction away from the Site. There are a large number of minor burns across the Site which drain to these watercourses.

- 12.2.27. The southern boundary of the Site follows the watershed between the Crawick Water catchment and the Mennock Water catchment to the southeast. Land within the Site Boundary falls in a northerly direction away from the southern boundary and no watercourses within the Site are tributaries of Mennock Water. As such, the Site is hydrologically disconnected from Mennock Water.
- 12.2.28. The following watercourses are monitored by SEPA under the Water Framework Directive (WFD):
- Crawick Water (waterbody ID: 10618), which has a current (2023) overall classification of 'moderate'; and
 - Wanlock Water (waterbody ID: 10619), which has a current (2023) overall classification of 'poor'.

Flood Risk and Drainage

- 12.2.29. SEPA river flood mapping indicates that the Cog Burn, Wanlock Water, Whitecleuch Burn, and Crawick Water have an associated fluvial floodplain which is at high risk of flooding. Predicted flood extents are largely confined to the channels of these watercourses and do not present a significant development constraint. Access from the B740 to the north of the Site does cross two mapped fluvial floodplains associated with Wanlock Water and Whitecleuch Burn. However, existing watercourse crossings are present at these locations. Access from the B740 to the west of the Site will require a new watercourse crossing over Crawick Water and its tributary Back Burn. SEPA flood mapping indicates a high risk of fluvial and surface water flooding at this location.
- 12.2.30. Several surface water flow paths are shown to drain across the Site, generally following mapped watercourses within existing valleys. Minor overland surface water flow paths are indicated across the Site, draining towards the main stems of existing watercourses.

Water Supplies

- 12.2.31. All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas (DWPA) under the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013 and require protection for their current use or future potential use as drinking water resources. None of the surface water catchments which drain the Site are designated as DWPAs. Whilst the Upper Nithsdale groundwater body is designated as a DWPA, as it is classified as a low productivity aquifer it is unlikely the Proposed Development will lead to an adverse impact on the quantity or quality of groundwater abstractions. As such, it is proposed to scope out public drinking water supplies.
- 12.2.32. Private Water Supply Data was obtained from Dumfries and Galloway Council and South Lanarkshire Council as part of the NLEI scheme application. Properties assessed to have a potential hydrological connection to the Site were then visited as part of the assessment of that application. The assessment of Private Water Supplies completed by Mouchel in 2017 presents the location of known Private Water Supply sources. The data provided in the NLEI scheme application indicates that there are private water supply sources downslope and/or downstream of the Proposed Development. As such, Private Water Supplies will be scoped in for further risk assessment as part of the EIA.

12.3. Assessment Methodology

- 12.3.1. The potential effects from the Proposed Development on hydrology, geology, soils (including peat) and hydrogeology will be assessed by completing a desk study and field investigation followed by an impact assessment, the procedures of which are detailed below.

Legislation, Policy and Guidance

12.3.2. The EIA will be undertaken in line with current legislation, planning policy, and guidance including:

Legislation

- European Union (EU) Water Framework Directive (2000/60/European Commission (EC));
- EU Drinking Water Directive (98/83/EC);
- The Water Environment and Water Services (WEWS)(Scotland) Act 2003 (WEWS Act);
- The Environment Act 1995;
- Environment Protection Act 1990;
- The Flood Risk Management (Scotland) Act 2009;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (Controlled Activities Regulations (CAR)) (as amended);
- The Water Supply (Water Quality) (Scotland) Regulations, 2001;
- Private Water Supplies (Scotland) Regulations 2006;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017; and
- The Electricity Act 1989.

Policy

- National Planning Framework 4 (NPF4) adopted by Scottish Government on 13 February 2023. Specifically, Policy 2 (Climate Mitigation and Adaptation), Policy 5 (Soils), Policy 20 (Blue and Green Infrastructure), and Policy 22 (Flood Risk and Water Management); and
- Dumfries and Galloway Local Development Plan 2 adopted on 3 October 2019. Specifically, the following policies:
 - NE6: Sites of National Importance for Biodiversity and Geodiversity;
 - NE11: Supporting the Water Environment;
 - NE12: Protection of Water Margins;
 - NE14: Carbon Rich Soil; and
 - NE15: Protection and Restoration of Peat Deposits as Carbon Sinks.

Guidance

- Solway Local Plan District Flood Risk Management Plan 2022-2028;
- Dumfries and Galloway Council (2020). Flooding and Development Supplementary Guidance;
- Dumfries and Galloway Council (2020). Surface Water Drainage and Sustainable Drainage Systems (SuDS) Supplementary Guidance;
- Dumfries and Galloway Council (2020). Wind Energy Development: Development Management Considerations Supplementary Guidance;
- Planning Advice Notes (PANs) published by the Scottish Government;
- CIRIA (1997). Ground Engineering Spoil: Good Management Practice CIRIA Report 179;
- CIRIA (2015). Environmental Good Practice on Site C741;
- CIRIA (2015). The SuDS Manual C753;
- Forestry Commission (2006). Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat;
- Forestry Commission Scotland & Scottish Natural Heritage (2010). Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments in Scotland;
- Institution of Civil Engineers (2001). Managing Geotechnical Risk: Improving Productivity in UK Building and Construction;
- NatureScot, SEPA, FCS, and Scottish Renewables (July 2014). Good Practice during Windfarm Construction;

- NatureScot (2023). Advising on peatland, carbon-rich soils and priority habitats in development management;
- NatureScot and Peatland Action (2022). Technical Compendium: Good Practice for Peatland Restoration Techniques;
- Scottish Environment Protection Agency (2017). Developments on Peat and Offsite Uses of Waste Peat;
- Scottish Environment Protection Agency Scotland (2010). SEPA Regulatory Position Statement - Developments on Peat;
- Scottish Executive (2005). Scottish Roads Network Landslides Study Summary Report;
- Scottish Government (2017). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments;
- Scottish Government, Scottish Natural Heritage (now NatureScot) & SEPA (2017). Peatland Survey – Guidance on Development on Peatland;
- Scottish Renewables, SEPA (2012). Developments on Peatland - Guidance on the assessment of peat volumes, re-use of excavated peat and the minimisation of waste;
- SEPA (August 2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems (SEPA, 2024); and
- SEPA and NetRegs Pollution Prevention Guidelines (PPG) and replacement Guidance for Pollution Prevention (GPP).

Study Area

12.3.3. The following study areas will be applied for the EIA for hydrology, geology, soils and hydrogeology:

- The hydrological and hydrogeological study area will extend to 500m from the Site Boundary;
- The study area for peat and soils will reflect the extent of the Site Boundary;
- The study area for Private Water Supplies and potential GWDTE will be 250m from the Proposed Development; and
- The cumulative effects study area will extend to 5km from the Site boundary.

12.3.4. The Study Areas for hydrology, geology, soils, and hydrogeology are shown on **Figure 12.3**.

Desk Study

12.3.5. An initial desk study will be undertaken to determine and confirm the baseline characteristics by reviewing available information relating to hydrology, geology, soils and peat, and hydrogeology such as groundwater resources, licensed and unlicensed groundwater and surface water abstractions, public and private water supplies, surface water flows, flooding, rainfall data, water quality and soil data. This will include review of published geological maps, Ordnance Survey maps, aerial photographs, and site-specific data such as available peat probing data, NVC data, digital terrain models (slope plans) and geological literature. The desk study will also review and verify the relevance of baseline data collected as part of the NLEI scheme.

12.3.6. The desk study will identify sensitive features which may potentially be affected by the Proposed Development and will confirm the hydrological, geological, soils, and hydrogeological environment.

Field Surveys

12.3.7. The hydrological assessment specialists will liaise closely with the project ecology and geology/geotechnical specialists to ensure that appropriate information is gathered to allow a comprehensive impact assessment to be completed.

12.3.8. A detailed site visit and walkover survey will be undertaken, to:

- Verify the information collected during the desk and baseline study;
- Identify drainage patterns, areas vulnerable to erosion or sediment deposition, and any potential pollution risks;
- Visit any identified potential GWDTE (in consultation with the project ecologists);
- Obtain updated private water supply information from Dumfries and Galloway Council and South Lanarkshire Council, and visit any private water supplies within the study area that could potentially be affected by the Proposed Development to confirm details of the location of the abstraction, its type and use, as required;
- Prepare a schedule of potential watercourse crossings (where required);
- Assess the Site geomorphology and conduct additional targeted peat depth probing where required; and
- Inspect rock exposures and establish, by probing, an estimate of overburden thicknesses (a probe is pushed vertically into the ground to refusal and the depth is recorded).

12.3.9. The desk study and field surveys will be used to identify potential development constraints and be used as part of the design of the Proposed Development.

12.3.10. Once the desk study is completed and sensitive soil and peat, geological and water features are confirmed an EIA Report will be prepared to assess the potential effects on hydrology, geology, soils (including peat) and hydrogeology, as a result of the construction, operation, and decommissioning of the Proposed Development.

Embedded Mitigation

12.3.11. The Proposed Development will undergo design iterations and evolution in response to constraints identified as part of the baseline studies and field studies, to avoid and/or minimise potential effects on receptors where possible.

12.3.12. There is a comprehensive body of best practice guidance which has been developed to assist developers minimise the risks associated with wind farm construction and operation, and this will be used to develop site specific mitigation measures. Measures will be proposed to control and mitigate, for example, pollution risk (from anthropogenic and geogenic sources), flood risk, watercourse crossings, impacts on surface and groundwater flow paths, and management of peat and carbon rich soils.

12.3.13. For example, it is expected that the following potential mitigation measures will be included in the design of the Proposed Development:

- The micro-siting of turbines, tracks, and associated infrastructure in areas of no peat or shallow peat and in the least hydrogeologically and hydrologically sensitive areas by applying buffer zones around watercourses and other hydrological features;
- A buffer of 50m will be applied to watercourses shown on 1:10,000 scale mapping;
- Impacts on private water supply sources/distribution networks and areas of GWDTE will be avoided;
- Site-specific peat probing has been undertaken which has established limited areas of deep peat deposits at the Site. Micro-siting of the Proposed Development will avoid areas of deep peat (> 1m) where possible;
- Where it is not possible to avoid deep peat deposits, additional targeted peat probing will be undertaken in accordance with current best practice guidance. Should impacts to peatland be identified, a contemporary Peat Management Plan (PMP) and Peat Landslide and Hazard Risk Assessment (PLHRA) will be prepared;
- The site-specific PLHRA will aim to identify areas of potential peat slide risk and present

mitigation measures to manage the risk;

- The PMP will show how the integrity of carbon-rich soils and peat will be safeguarded; and
- Good practice measures will be applied in relation to pollution risk, and management of surface runoff rates and volumes to reduce or offset any detrimental effects on the geological, hydrogeological and hydrological environment. These measures will form part of the final Construction Environment Management Plan (CEMP) to be implemented for the Proposed Development.

Assessment of Effects

12.3.14. Having regard to the nature of the Proposed Development and key baseline characteristics, at this early stage the following potential receptors have been identified:

- Carbon rich soils and peat;
- Perched groundwater within the diamicton and alluvium superficial deposits;
- Upper Nithsdale groundwater body;
- Crawick Water and tributaries, including Wanlock Water and Cog Burn;
- Loch Burn and tributaries;
- Minor watercourses on the Site;
- Private Water Supply sources;
- Water dependant habitats, including peat habitat and potential GWDTE; and
- Flood risk receptors.

12.3.15. It is considered that the assessment would include:

- Potential effects on carbon rich soils and peat;
- Potential effects of the Proposed Development on the hydrological and hydrogeological regime, including water quality, water flow and drainage;
- In consultation with the project geologists and ecologists, assessment of potential effects on water dependant habitats, including peat habitat and GWDTE, if confirmed; and
- Assessment of potential flood risk and drainage impacts during construction and operation, including any proposed watercourse crossings.

12.3.16. It is anticipated the EIA Report would include the following technical appendices:

- PLHRA, where required;
- PMP, where required;
- Schedule of Watercourse Crossings;
- Private Water Supply Risk Assessment;
- GWDTE Risk Assessment, where required; and
- Outline Borrow Pit Appraisal.

12.3.17. A qualitative risk assessment methodology will be used to assess the significance of the potential effects. Two factors will be considered: the sensitivity of the receiving environment and the potential magnitude, should that potential impact occur.

12.3.18. This approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the Proposed Development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

12.3.19. The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment as well as its ability to absorb the effect without perceptible change) and the magnitude of impacts will each be considered through a set of pre-defined criteria.

- 12.3.20. The sensitivity of the receiving environment together with the magnitude of the effect defines the significance of the effect, which will be categorised into levels of significance.
- 12.3.21. A review of other existing, consented and proposed developments which are in-Scoping or in-Planning near the Proposed Development will be undertaken and potential impacts on hydrology, geology, soils (including peat), and hydrogeology will be assessed to identify cumulative impacts. With regard to the Proposed Development, it is likely that mitigation measures will be proposed that will have a neutral effect or provide betterment compared to baseline conditions. It is therefore considered unlikely that there will be any significant residual or cumulative impact to report.

Peat Landslide Hazard Risk Assessment (PLHRA)

- 12.3.22. If development is proposed on areas of peatland, where slopes exceed 2 degrees, a PLHRA will be completed using the site survey data and slope analysis (using Digital Terrain Model (DTM) data), highlighting areas that may be impacted by a peat slide so that appropriate mitigation measures can be identified.

Peat Management Plan (PMP)

- 12.3.23. The Phase 1 peat depth survey undertaken to support the application for the NLEI scheme will be supplemented with targeted Phase 2 peat depth surveys undertaken as part of the EIA to confirm the extent of carbon rich soils and peat within the Proposed Development. This will be used to inform site design and avoid/ minimise potential impacts to carbon rich soils and peat in accordance with NPF4.
- 12.3.24. If peat and carbon rich soils cannot be completely avoided and some development on peat and is required, a Stage 1 PMP will be prepared as a supporting technical appendix in line with relevant legislation, policy and guidance documents.
- 12.3.25. In terms of the Proposed Development, this hierarchy will be considered as follows:
- Prevent excavation;
 - Reduce volumes of peat excavated; and
 - Reuse excavated peat in a manner to which it is best suited.
- 12.3.26. The objective of the PMP will be to demonstrate to SEPA and other relevant parties that:
- the extent and characteristics of peat at the application site have been investigated;
 - excavations in peat have been minimised wherever possible through design iterations and adoption of an appropriate design and mitigation hierarchy; and
 - that excavation and subsequent management of peat, including an estimation of excavation quantities, has been considered as part of the EIA.
- 12.3.27. The following works will be completed:
- A detailed description of the in-situ peat characteristics at the application Site and the expected nature and classification (in accordance with von Post classification scale or similar) of excavated peat;
 - Details of the construction activities that are likely to result in peat excavation;
 - Peat depths within the Site will be presented using a 100m grid where access is possible and a 10m grid at proposed infrastructure locations (the probing will also provide information on the substrate below the peat);
 - The thickness of the peat will be established by probing and the underlying sub-strata

- confirmed by inspection of watercourses;
- The investigation will consider turbine locations, access routes, compounds, and borrow pits for signs of existing or potential peat instability;
- Augering of a representative selection of peat probe locations will be undertaken and the proportion of acrotelmic and catotelmic peat recorded; and
- Output from the field survey will comprise a record of investigation locations and summary of peat depths and augering results.

12.3.28. As a minimum, the following sources of information will be referenced, and the relevant data utilised in developing the PMP:

- Relevant chapters of the EIA Report (including general principles of peat management);
- Site survey data (topographical, peat probing and coring survey data);
- Site layout and other design drawings (cut and floated track layout etc);
- Borrow pit/engineering geology assessment report;
- Ecological assessment ((NVC maps to determine vegetation type and condition, von Post field observations, erosion state, etc.); and
- Hydrological assessment, such as information on peat hydrological controls (e.g., grips, forestry drainage, peat pipes, hags and gullies, erosion state, etc).

Schedule of Watercourse Crossings

12.3.29. A Schedule of Watercourse Crossings will be prepared as a supporting technical appendix to the EIA Report. The following works will be completed:

- Collect photographs and dimensions of watercourses where permanent watercourse crossings are proposed associated with access tracks;
- Present collected information and locations for each proposed watercourse crossing point;
- Detail the likely form of track crossing solution; and
- Indicate the requirement for Controlled Activities Regulations (CAR) application, where applicable.

Private Water Supply Risk Assessment

12.3.30. A Private Water Supply Risk Assessment will be prepared as part of the EIA Report. The following works will be completed:

- Obtain details of private and licensed water abstractions from Dumfries and Galloway Council, South Lanarkshire Council and SEPA, presented on mapping and tabulated;
- Verify the location of the private water supply sources as part of the hydrological site survey;
- Assess the presence of a complete source-pathway-receptor linkage and potential impacts; and
- Outline potential mitigation and monitoring recommendations for any at risk private water supply sources.

Groundwater Dependent Terrestrial Ecosystem Assessment

12.3.31. A GWDTE Assessment will be prepared as part of the EIA Report. The following works will be completed:

- Review NVC mapping, verified by the project ecologists, to screen for potential GWDTE habitat using SEPA guidance; and
- Assess areas of potential GWDTE using desk materials and from visual observations on

Site. Based on the initial review of baseline data presented with the NLEI scheme, the potential GWDTE are likely sustained by surface water rather than groundwater. Whilst an updated NVC survey will be completed as part of the ecology assessment, the existing information provides a good understanding of wetter habitats at the Site. Therefore, it is assumed no water sampling or intrusive ground investigation is required to complete the GWDTE assessment.

Outline Borrow Pit Appraisal

- 12.3.32. The identification and assessment of potential borrow pit locations will initially comprise a review of all relevant historical and geological maps, soil survey maps and aerial photographs together with any available borehole records held by the British Geological Survey. This information will be used in combination with elevation data for the Site to identify preferred borrow pit sites based on topographic gradients and anticipated geology.
- 12.3.33. This document will incorporate an engineering geological assessment of those locations identified as potentially viable borrow pits to supply sufficient quality and quantity of materials for the construction of the Proposed Development.
- 12.3.34. The Outline Borrow Pit Appraisal will include:
- Identify suitable borrow pit search areas;
 - Justification for each proposed location;
 - Estimated dimensions of the borrow pit to be developed within the “area of search”;
 - Estimated volumes of overburden to be removed;
 - Description of geology;
 - Anticipated method of working / extraction;
 - Proposals for restoration / reinstatement of each borrow pit;
 - Individual figures for each borrow pit showing:
 - The area of search and proposed dimensions in plan view on an OS background map;
 - An indicative cross-section of the proposed borrow pit with original and restored ground profile; and
 - A colour photograph of the proposed location, annotated with indicative borrow pit layout.

Additional Mitigation

- 12.3.35. Should the EIA identify potential significant effects which have not been mitigated through the embedded mitigation in the design process, additional mitigation measures will be presented in the EIA Report to further mitigate impacts on the hydrology, geology, soils (including peat) and hydrogeology. An assessment of residual effects will then be undertaken.

12.4. Potential Effects

- 12.4.1. Without mitigation or adherence to best practice, impacts on geology, hydrology, soils (including peat), and hydrogeology could occur during the construction, operational, and decommissioning phases of the Proposed Development. A summary of the potential effects on ground conditions and the water environment resulting from construction, operation, and decommissioning of the Proposed Development is provided below. These will be considered in the EIA Report.

Potential Effects During Construction

12.4.2. The following potential impacts during the construction phase will be considered in the EIA Report:

- Disturbance and loss of carbon rich soils and peat deposits;
- Ground instability (inc. peat slide risk if present);
- Impacts on surface water and groundwater quality from pollution from fuel, oil, concrete or other hazardous substances;
- Discharge of sediment-laden runoff to drainage systems and watercourses;
- Increased flood risk to areas downstream of the Site during construction through increased surface runoff and construction activities within mapped floodplains;
- Changes in groundwater levels, or saturation of peat deposits, from dewatering excavations;
- Potential change of groundwater flow paths and contribution to areas of peat and GWDTEs;
- Disturbance of watercourse bed and banks from the construction of watercourse crossings;
- Potential adverse impacts to private water supplies; and
- Disturbance and or pollution resulting from borrow pit formation and use.

Potential Effects During Operation

12.4.3. The following potential impacts during the operational phase will be considered in the EIA Report:

- Increased runoff rates and flood risk, resulting from increases in areas of tracks and hard standing at turbines;
- Changes in flood extents and flood depths upstream and downstream of river and floodplain crossings;
- Changes in natural surface water drainage patterns (which may affect water supply to areas of peat and GWDTE);
- Changes to groundwater levels and groundwater movement; and
- Longer term impacts on abstractions for water supplies, particularly any supplies dependent on groundwater.

Potential Effects During Decommissioning

12.4.4. Potential decommissioning effects are expected to be the similar to potential construction effects. Decommissioning the Proposed Development will be carried out in accordance with an approved decommissioning plan which will be expected to include the same safeguards as those provided during the construction stage of the Proposed Development.

Receptors and Effects Scoped Out of Assessment

12.4.5. It is proposed that the potential effects outlined above will be assessed as part of the EIA Report. At this stage, it is proposed that the receptors and effects detailed in **Table 12.2** can be scoped out of detailed assessment.

Table 12.2: Receptors and Effects Scoped Out of Assessment

Receptor / Effect Scoped Out	Justification
Effects on designated sites	There are no geologically designated sites within the Site Boundary, nor are there any hydrologically connected designated sites within 1km of the Site. It is therefore considered that there are no geologically designated sites which could be impacted by the Proposed Development.

Receptor / Effect Scoped Out	Justification
Effects on geology	While there will be effects arising from track construction and for turbine and crane pad areas, these are limited in area and do not extend beyond the immediate infrastructure footprint. The geology beneath the Site does not form part of a Geological Conservation Review site nor is it particularly sensitive. Whilst legacy mining activity to the east of the Site has resulted in the contamination of groundwater and Wanlock Water, as a result of heavy metals within mine water discharges and runoff from mine waste material, the Proposed Development avoids identified high and moderate areas of concern. As such, the Proposed Development will not cause additional mobilisation of metal pollutants.
Effects on Mennock Water and tributaries	The Site is hydrologically disconnected from the Mennock Water by existing topography and watercourses.
Effects on the River Nith	The River Nith is located over 5km downstream of the Site. Due to the attenuation and dilution of sediment and pollutants over such distances, the Proposed Development will not impact the quality or quantity of water reaching the River Nith.
Effects on Public Drinking Water Supply	The Site is not located within a surface water drinking water protected area. Whilst the Upper Nithsdale groundwater body is designated as a DWPA, as it is classified as a low productivity aquifer it is unlikely the Proposed Development will impact the quantity and quality of groundwater abstractions.
A Geomorphological Assessment	Photographs and records of key existing or baseline water features would be recorded and presented in the assessment.
Detailed Flood Risk Assessment	Published mapping confirms the Proposed Development is not located in an area at risk of fluvial, coastal or significant surface water flooding, except at required watercourse crossings. Mapped fluvial and surface water floodplains associated with rivers and minor watercourses are shown to be largely confined to watercourse channels. It is proposed that a simple screening of the potential sources of flooding (fluvial, coastal, groundwater, pluvial, infrastructure etc.) is presented with the EIA Report and measures that would be used to manage flood risk and control the rate and quality of runoff will be specified in the EIA Report. In accordance with SEPA Technical Flood Risk Guidance and Good Practice Guidance for river crossings, a detailed flood risk assessment of the access tracks and watercourse crossings which cross mapped floodplains will be undertaken at the detailed design stage and would be secured by a pre-development planning condition. The assessment will establish accurate baseline flood extents and flood depths and provide suitable parameters for the design of the access road and the crossing to ensure that they are capable of passing the 200-year plus climate change peak flow without adversely impacting peak flood extents and flood depths upstream or downstream of the crossing. The results of the detailed flood risk assessment will be included in the final CEMP, at the detailed design stage. If any land raising is proposed within the floodplain, appropriate flood compensation will be incorporated within the detailed design of the access tracks and agreed with statutory consultees prior to construction
Detailed Drainage Design	A description of the design standards and appropriate sustainable drainage measures which would be used to control and manage incident rainfall would be specified in the Drainage Impact Assessment (DIA) Report. The engineering design of the Site drainage would be prepared as part of the

Receptor / Effect Scoped Out	Justification
	detailed site design (post planning) and would form part of the final CEMP. This would be submitted to SEPA for approval at that stage and would be secured by a pre-development planning condition.
Water Quality Monitoring as part of the baseline assessment	Classification data is available from SEPA for the watercourses at the Site and there are no known sources of potential water pollution at the Site that might give rise to the need for water quality monitoring.
Detailed borrow pit designs	A Borrow Pit Site Management Plan describing pollution prevention measures would be prepared as part of the detailed site design (post planning) and form part of the final Construction and Environmental Management Plan. This would be submitted to SEPA for approval at that stage. An Outline Borrow Pit Appraisal will be submitted with the EIA Report.

12.5. Focused Questions

12.5.1. The following are questions to consultees:

Published mapping confirms that whilst parts of the Site are at risk of flooding from rivers and smaller watercourses, flood extents are largely confined to the watercourse channels. It is proposed, therefore, that a simple screening of potential flooding sources (fluvial, coastal, pluvial, groundwater etc.) is presented in the EIA Report. For river crossings and/or supporting infrastructure within the mapped floodplain, a detailed flood risk assessment will be undertaken at the detailed design stage and included in the final CEMP. This would be secured by a pre-development planning condition. Is this approach acceptable?

It is not proposed to prepare a detailed drainage design. Rather measures that would be used to control the rate and quality of runoff will be specified in the EIA Report. Again, is this acceptable?

Site investigations, including additional targeted peat probing, augering and condition assessment, private water supply survey, and GWDTE assessment will be undertaken, where required, as part of the proposed assessment. Should any additional investigation or data sources be considered when assessing baseline conditions?

It is not proposed to undertake any water quality sampling, establish groundwater monitoring points, surface water monitoring points or undertake leachability trials of any rock as there is published data that can be used to characterise baseline conditions and complete the impact assessment. Is this acceptable?

Please advise if there is any specific information or methodology that should be used/ followed as part of the private water supply risk assessment?

Do you agree that the scope of the proposed assessment is appropriate?

13. Traffic and Transport

13.1. Introduction

13.1.1. This chapter of the Scoping Report outlines the proposed method to assess the potential effects associated with traffic and transport during the construction, operation and decommissioning of the Proposed Development. The assessment method will follow the guidance in the Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement, July 2023⁷⁰. The method will involve:

- Establishing the environmental baseline;
- Identifying potential sources of impact;
- Quantifying impacts;
- Assessing effects;
- Identifying mitigation;
- Assessing cumulative effects; and
- Identifying residual effects.

13.2. Baseline

Study Area

13.2.1. The Study Area for the assessment will comprise the public road network likely to be used by traffic generated by the Proposed Development. The extent of the Study Area will be refined through the assessment, but it is likely to be similar to that used in the NLEI scheme assessment and comprise:

- The B740 between the A76 and the B7080.
- The B7078 between the B740 and the M74 at Junction 13.
- The sections of the M74 immediately to the north and to the south of Junction 13.
- The A76 immediately to the north and to the south of the B740.

13.2.2. The A76 and M74 are trunk roads and under the jurisdiction of Transport Scotland (TS). The southern half (approximately) of the B740 in the Study Area is within Dumfries and Galloway Council's (DGC's) area, while the northern half (approximately) and the B7078 are within South Lanarkshire Council's (SLC's) area.

13.2.3. The delivery of the turbine components during construction will require Abnormal Indivisible Load Vehicle (AILV) movements as some of the vehicles carrying the components will have at least one dimension that exceeds the maxima in The Road Vehicles (Construction and Use) Regulations 1986⁷¹. The assessment of the traffic and transport effects of the Proposed Development will be accompanied by an investigation of the feasibility of the AILVs routing to the Site, which will consider additional sections of road to those listed above. At present, however, it is envisaged that AILVs will use the same route proposed in the NLEI scheme, namely the M74, B7078 and B740.

⁷⁰ Davis, S., Hoare, D., Howard, R., Ross, A. (2023) Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Road Traffic and Movement. London: IEMA

⁷¹ The Road Vehicles (Construction and Use) Regulations 1986

Current Baseline

- 13.2.4. The above roads will be visited by members of the project team to record their nature, noting characteristics such as their configuration, presence of footways, speed limits, any restrictions on the passage of vehicles, and to identify any sensitive receptors. The IEMA Guidelines identify such receptors as:
- *“People at home*
 - *People at work*
 - *Sensitive and/or vulnerable groups (including young age, older age, income, health status, social disadvantage and access and geographic factors)*
 - *Locations with concentrations of vulnerable users (e.g. Hospitals, places of worship, schools)*
 - *Retail areas*
 - *Recreational areas*
 - *Tourist attractions*
 - *Collision clusters and routes with road safety concerns*
 - *Junctions and highway links at (or over) capacity”*
- 13.2.5. Data on accidents within the last three years on the roads within the Study Area will be collated from the Crashmap website. The roads authorities for the roads in the Study Area will be consulted to understand if there are any locations on the road network within the Study Area where there have been atypically-high accident rates and if there are any plans for remedial works or improvements at those locations.
- 13.2.6. Traffic data will be extracted from TS’s traffic survey database for the following sites:
- 0000ATC6_11 on the M74 to the north of Junction 13;
 - 0000ATC6_21 on the M74 to the south of Junction 13;
 - JTC00381 on the A76 to the north of the B740; and
 - ATC09056 on the A76 to the south of Sanquhar.
- 13.2.7. Traffic data will be extracted from the above sites for the last full calendar year for all vehicles and for Heavy Goods Vehicles (HGVs) only.
- 13.2.8. Traffic surveys will also be commissioned at locations on the B740 and B7078. These surveys will be carried out by Automatic Traffic Counter (ATC) for a week outwith school holidays and will record vehicle volumes, types and speeds.

Future Baseline

- 13.2.9. The number of future baseline vehicle movements on the roads in the Study Area will be estimated by applying a ‘low growth’ factor from the National Road Traffic Forecasts (NRTF) database to the observed baseline vehicle movements. The factor will be based on the anticipated year of construction of the Proposed Development.

13.3. Assessment

Legislation, Policy and Guidance

13.3.1. The assessment will be informed by the following legislation:

- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017⁷²;
- The Road Vehicles (Construction and Use) Regulations (1986)⁷³; and
- The Road Vehicles (Authorisation of Special Types) (General) Order 2003⁷⁴.

13.3.2. The IEMA Guidelines referred to above will be used to assess of the traffic and transport effects of the Proposed Development. That assessment will also be informed by:

- Circular 1/2017 The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, The Scottish Government⁷⁵
- National Roads Development Guide, SCOTS⁷⁶;
- Transport Assessment Guidance, Transport Scotland⁷⁷;
- Planning Advice Note: PAN 75 - Planning For Transport, The Scottish Government⁷⁸; and
- Design Manual for Roads and Bridges (DMRB) TA 46/97 Traffic Flow Ranges for Use in the Assessment of New Rural Roads. (Although TA 46/97 has been withdrawn from the DMRB, Transport Scotland state that it remains applicable to trunk road projects in Scotland⁷⁹.)

Method

Construction

- 13.3.3. The Proposed Development will generate demand for transport during its construction and this demand will have the potential to impact on users of the transport network and potentially have an effect on those users. Transport demand will be generated during construction by staff traveling to and from the Site and plant, components, materials and supplies being delivered to or removed from the Site. This transport demand will lead to additional cars, vans, Light Goods Vehicles (LGVs) and HGVs on the road network.
- 13.3.4. The typical number of daily construction-related vehicle movements that will be generated during each month of the construction programme will be estimated. These estimates will reflect the activities that will take place during the various phases of the construction programme and the amount of materials and number of items of equipment that will need to be delivered to or removed from the Site.
- 13.3.5. The Proposed Development includes a search area for a number of borrow pits. Any aggregate won from these borrow pits will reduce the amount of aggregate that needed to be delivered from offsite quarries (and hence generate vehicle movements on the public road network). The estimates of construction-related vehicle movements will reflect the amount of aggregate that it is considered

⁷² The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017

⁷³ The Road Vehicles (Construction and Use) Regulations 1986

⁷⁴ The Road Vehicles (Authorisation of Special Types) (General) Order 2003

⁷⁵ Planning Circular 1/2017: Environmental Impact Assessment regulations - gov.scot

⁷⁶ National Roads Development Guide

⁷⁷ TRANSPORT ASSESSMENT GUIDANCE

⁷⁸ PLANNING ADVICE NOTE: PAN 75 - PLANNING FOR TRANSPORT - gov.scot

⁷⁹ Design of trunk roads | Design standards | Transport Scotland

could be won from the onsite borrow pits.

- 13.3.6. The number of staff likely to be present during each week or month of the construction programme will be estimated based on the Applicant's experience of other similar developments, and the phasing plan for the Proposed Development. Professional judgment will be applied to estimate the routes taken by vehicles travelling to and from the Site.
- 13.3.7. The potential effects from the passage of the AILVs delivering the turbine components will be considered in the EIA Report.

Operation

- 13.3.8. The Proposed Development will generate only occasional maintenance and inspection vehicle movements once operational and these would be expected to cause no significant traffic and transport-related effects. Hence, assessment of potential effects during operation are proposed to be scoped out of the assessment.

Decommissioning

- 13.3.9. Decommissioning of the Proposed Development is likely to generate fewer vehicle movements than construction as some elements of the Proposed Development may remain in place after decommissioning. Notwithstanding that, the decommissioning of the Proposed Development will occur so far into the future that the information collected on the existing baseline would be of limited relevance. Furthermore, any projections of the future baseline would likely be too uncertain to be useful. Hence, assessment of potential effects during decommissioning are proposed to be scoped out of the assessment.

13.4. Potential Effects

Initial Screening of Scale and Extent of Impact

- 13.4.1. The additional vehicle movements expected to be generated by the construction of the Proposed Development will be compared to the baseline traffic flows and the percentage increase in all vehicles and in HGVs only will be calculated. These increases will then be reviewed against the IEMA Guidelines, which state:

'Following the determination of a study area, it is recommended the competent traffic and movement expert applies two broad rules of thumb as criteria to assist in delimiting the scale and extent of the environmental assessment:

Rule 1 – Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)

Rule 2 – Include highway links of high sensitivity where traffic flows have increased by 10% or more.'

- 13.4.2. The IEMA Guidelines also state *'It should also be noted that the day-to-day variation of traffic on a road is frequently at least + or - 10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact.'*
- 13.4.3. All sections of road within the Study Area will be subject to the threshold in Rule 1. The application of Rule 2 in the IEMA Guidelines requires the identification of *'any other link or location where it is felt specific environmental or population sensitivities may occur'*.

- 13.4.4. It is proposed that sections of road will be identified as being of high sensitivity based on the extract from the IEMA Guidelines in paragraph 13.2.4 and if they are subject to substantial use by sensitive groups (e.g. children, elderly or mobility impaired), they are at sensitive locations (e.g. fronted by schools, hospitals or care homes) or they have been identified by the relevant roads authority as having atypically-high accident rates. Roads that are identified as being of high sensitivity will also be the subject of the threshold in Rule 2.
- 13.4.5. Where the estimated increase in traffic arising from the construction of the Proposed Development does not breach the relevant 'Rule 1' or 'Rule 2' threshold for any section of road, the significance of any effects will be concluded to be negligible and not significant in terms of the EIA Regulations. No further assessment work will be undertaken on such sections.
- 13.4.6. Where the estimated increase in traffic arising from the construction of the Proposed Development breaches the relevant threshold for any section of road, the potential effects will be assessed as described below.

Potential Effects to be Considered

- 13.4.7. Where the appropriate threshold is breached for a section of road, the effects of the traffic estimated to be generated during the construction of the Proposed Development will be considered on the following issues.

Severance

- 13.4.8. Severance is the perceived division that can occur within a community when it becomes separated by major transport infrastructure and the separation of people from places and other people. The IEMA Guidelines state that *'Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively' and 'caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic.'*

Road Vehicle Driver and Passenger Delay

- 13.4.9. The IEMA Guidelines state that *'Traffic delays to non-development traffic can occur at several points on the network surrounding a development site.'* Regarding the significance of effects, the Guidelines state that *'These delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.'*
- 13.4.10. No detailed traffic modelling (which would quantify delays to drivers) is proposed given the predominately rural nature of the road network around the Site and the likelihood, based on professional judgment, that there is substantial spare capacity on that network.

Non-Motorised User Delay

- 13.4.11. The IEMA Guidelines state that *'Pedestrian delay and severance are closely related effects and can be grouped together. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility and general physical conditions of the development site.'*
- 13.4.12. Regarding the significance of effects, the Guidelines state that *'Given the range of local factors and conditions that can influence pedestrian delay (e.g. a discrete delay may have a lesser impact in an urban environment than a rural setting), it is not considered wise to set down definitive thresholds.'*

Instead it is recommended that the competent traffic and movement expert use their judgement to determine whether pedestrian delay constitutes a significant effect.'

Non-Motorised User Amenity

- 13.4.13. The IEMA Guidelines define this as *'the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic.'* The IEMA Guidelines also suggest that *'A tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled'* and that *'Thresholds are expressed as a starting point for any assessment and typically have been derived from studies of major changes in traffic flow and therefore should be used cautiously in any assessment. The assessment of amenity should pay full regard to specific local conditions.'*

Fear and Intimidation of and by Road Users

- 13.4.14. This considers the effects that moving vehicles have on people. It considers matters such as the volume of traffic, the proportion of heavy vehicles, the speed of vehicles and the proximity of traffic to people. The IEMA Guidelines set out a means to calculate a 'Degree of hazard score' based on the amount, composition and speed of traffic. This score is then used to identify a 'Level of fear and intimidation'; the degree of change in that level compared to the baseline is then used to categorise the magnitude of change.

Road User and Pedestrian Safety

- 13.4.15. The assessment of accidents relates to the potential for the traffic generated by a development to change accident rates on the road network. The IEMA Guidelines discuss a 'Safe System' approach but also state *'It is recommended that the traffic and movement expert engages with the relevant authorities to determine the best approach for determining the significance of road safety effects'*.
- 13.4.16. SLC and D&GC as roads authority for the roads in the Study Area other than the M74 and A76 have a duty under Section 39 of the Road Traffic Act 1988 to *'carry out studies into accidents arising out of the use of vehicles on roads or parts of roads [...] within their area'* and *'in the light of those studies, take such measures as appear to the authority to be appropriate to prevent such accidents, including [...] the construction, improvement, maintenance or repair of roads for the maintenance of which they are responsible'*.
- 13.4.17. The roads authorities will be consulted to determine if there are any locations on any of the roads within the Study Area which have atypically-high accident rates and, if so, what plans, if any, they have to address those rates.

Hazardous / Large Loads

- 13.4.18. As mentioned above, the Proposed Development will require some AILV movements to deliver some turbine components. A report on the feasibility of delivering these components will be included as an appendix to the EIA Report.
- 13.4.19. The number of such movements will be determined, and their potential significance will be based on the extent of works, if any, required to accommodate the vehicles, their number and the sections of road that they will use. There are, however, established procedures in place to manage such movements and it is considered that a risk or catastrophe analysis as described in paragraph 3.50 of the IEMA Guidelines is not required. (Note that it is not proposed at this stage to analyse the ability of any structures on the AILVs' route to cater for the laden weight of the AILVs. Such an analysis will be submitted after consent is granted and prior to the movement of the AILVs (once

exact turbine details are known).

Application of 'Rule 1' and 'Rule 2' to Road Safety and Driver Delay

- 13.4.20. The IEMA Guidelines state *'It should be noted that the Rule 1 and Rule 2 'criteria' process may not be appropriate for some impacts, and it is generally accepted by regulators and practitioners that it should not be applied to assessments of air quality, noise, road safety and driver delay. For these impacts, a separate study area and assessment criteria should be agreed with the relevant stakeholders.'*
- 13.4.21. The assessment criteria for potential noise effects are considered in Chapter 14 of this Scoping Report. It is proposed that the Study Area for the assessment of both Road User and Pedestrian Safety and Road Vehicle Driver and Passenger Delay is the same as that for the other potential effects (i.e. that described in paragraph 13.2.1). Proposed assessment criteria for those two potential effects are described in the following section (along with those for all the other potential effects listed above).

Magnitude of Impact

- 13.4.22. The magnitude of impact for each of the effects listed above will be on a scale of high, medium, low and negligible. The suggested application of that scale to each of the effects is shown in **Table 13.1**.

Table 13.6: Suggested Categorisation of Impact Magnitude by Potential Effect

Effect	Impact Magnitude			
	High	Medium	Low	Negligible
Severance	Change in road link traffic flow (all vehicles) of over 90%.	Change in road link traffic flow (all vehicles) of 60% to less than 90%.	Change in road link traffic flow (all vehicles) of 30% to less than 60%.	Change in road link traffic flow (all vehicles) of less than 30%.
Road Vehicle Driver and Passenger Delay	Judgement based on the individual characteristics of sections of road.			Change in road link traffic flow of less than 10%.
Non-Motorised User Delay	Judgement based on the individual characteristics of sections of road.			Change in road link traffic flow of less than 10%.
Non-Motorised User Amenity	Judgement based on the individual characteristics of sections of road with change in total traffic flows or HGVs of 100% or more.			Change in total traffic flows or HGV flows of less than 100%.
Fear and Intimidation of and by Road Users	Two changes in level of fear and intimidation.	One change in level of fear and intimidation with >400 vehicle increase in average 18 hour vehicle flow or >500 Heavy Vehicles	One change in level of fear and intimidation with <400 vehicle increase in average 18 hour vehicle flow or <500 HV increase	No change in Level of fear and intimidation.

Effect	Impact Magnitude			
	High	Medium	Low	Negligible
		(HV) increase in total 18 hour HV flows.	in total 18 hour HV flows.	
Road User and Pedestrian Safety	Judgement based on accident data. Low or negligible impact likely if section of road under consideration has not been identified by the relevant roads authority as having an atypically high accident rate.			Change in road link traffic flow of less than 10%.
Hazardous / Large Loads	Judgement based on number of such movements and nature of affected road network.			Section of road not planned to be used by AILVs.

Receptor Sensitivity

- 13.4.23. The sensitivity of receptors on the sections of road in the Study Area to potential effects from additional vehicle movements arising from the construction of the Proposed Development will be categorised based on the suggested categorisation shown in **Table 13.2**

Table 13.7: Suggested Categorisation of Receptor Sensitivity

Sensitivity	Description
High	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident cluster sites (if identified as such by roads authority), retirement homes and urban roads without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycleways, community centres, parks and recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions, residential areas with adequate footways, sections of road with pedestrian crossing facilities and sections of road with footways remote from the carriageway (either by presence of a verge or of on-street parking).
Negligible	Receptors with low sensitivity to traffic flows and those sufficiently distant from affected roads/ junctions.

Significance of Effect

- 13.4.24. A suggested effect significance matrix based on impact magnitude and receptor sensitivity is shown in **Table 13.3**.

Table 13.8: Suggested Effect Significance Matrix based on Impact Magnitude and Receptor Sensitivity

Receptor Sensitivity	Impact Magnitude			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

- 13.4.25. Major or moderate effects will be classed as significant in terms of the EIA Regulations.

Cumulative Effects

- 13.4.26. A cumulative assessment will be undertaken which will establish the cumulative increase in vehicle movements arising from the Proposed Development and any other developments which are consented but not yet implemented and which would increase traffic on the same sections of the road network as the Proposed Development.
- 13.4.27. This approach is consistent with Schedule 4, Paragraph 5 of the EIA Regulations which requires that EIA Reports provide ‘A description of the likely significant effects of the development on the environment resulting from, *inter alia*: [...] (e) the cumulation of effects with other existing and/or approved projects’.
- 13.4.28. This approach is also consistent with the Scottish Government’s document Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017⁷⁵ which states ‘Generally, it would not be feasible to consider the cumulative effects with other applications which have not yet been determined, since there can be no certainty that they will receive planning permission’.
- 13.4.29. The significance of predicted cumulative effects will be assessed using the same process as described above.

Mitigation

- 13.4.30. Options to embed primary mitigation in the design of the Proposed Development will be considered throughout the design process. Examples of primary mitigation would be using onsite borrow pits and batching plants. These examples are primary mitigation as they would generate fewer vehicle movements on the public road network than would be generated if all materials were imported to the Site.
- 13.4.31. Secondary mitigation measures will be suggested to avoid any potential significant effects. An example of such a measure would be stipulating that HGVs to and from the Site should avoid a specific route or avoid passing by a sensitive receptor at specific times.

- 13.4.32. Tertiary mitigation measures will include standard practices that are commonly implemented by contractors. Examples of such mitigation would be sheeting of loads (to prevent dust) and wheel washes (to prevent mud and debris being deposited on the public road).
- 13.4.33. Secondary and Tertiary measures will be described in a Construction Traffic Management Plan (CTMP). The traffic and transport chapter of the EIA Report will summarise the measures that could be included in a CTMP. The satisfactory submission of a CTMP can be made a condition of any consent granted for the Proposed Development.
- 13.4.34. Any further mitigation measures that may be required to address cumulative effects will be identified within the traffic and transport chapter of the EIA Report.

Residual Effects

- 13.4.35. Residual effects (i.e. those after the application of mitigation) will be assessed.

13.5. Summary

- 13.5.1. The scope of the traffic and transport chapter of the EIA Report will cover potential effects associated with traffic and transport during the construction of the Proposed Development. Potential effects during operation and construction will be scoped out of the assessment.
- 13.5.2. The assessment will follow the guidance in the IEMA Guidelines. Current and future baseline vehicle movements will be estimated for the roads within the Study Area. The additional vehicle movements estimated to be generated during the construction of the Proposed Development will be compared to these baseline estimates and assessed if the resulting increases breach the appropriate thresholds in the IEMA Guidelines.

13.6. Focused Questions

Is the spatial extent of the Study Area considered to be appropriate?

Do consultees agree with the proposed scope of the assessment for this topic area, and particularly do consultees agree with the proposal to scope identified matters out of detailed assessment?

Can relevant consultees please advise if there are any locations on the roads within the Study Area that have atypically-high accident rates and what works (if any) are proposed at such locations to address those rates?

14. Noise and Vibration

14.1. Introduction

- 14.1.1. This chapter considers the potentially significant effects of noise during the Site preparation and construction, operation, and decommissioning phases of the Proposed Development which will require further consideration within the Environmental Impact Assessment (EIA) Report.
- 14.1.2. This Scoping chapter sets out the key issues identified and proposes a method and standards for assessment of noise in the EIA Report.
- 14.1.3. Consultation with Dumfries and Galloway Council (DGC) Environmental Health Officers (EHOs) will continue throughout the assessment process to agree the following:
- The validity of previous baseline noise assessment works on the site undertaken for the NLEI scheme in 2016 and its potential for repurposing. .
 - The status of identified potential Noise Sensitive Receptors (NSRs);
 - Requirements for further noise monitoring positions for the baseline survey;
 - Identification of potentially cumulative developments and a detailed method for the consideration of potential cumulative effects; and
 - The derivation of appropriate noise limits, with apportionment for cumulative developments if appropriate.

14.2. Environmental Baseline

- 14.2.1. The Proposed Development is located within a rural location, on land currently used as farmland with some residential settlements interspersed about the Site perimeter.
- 14.2.2. There are several scattered residential properties around the Proposed Development with the closest occupied properties located to the south and east.

14.3. Potential Sources of Impact

- 14.3.1. The Proposed Development will introduce new noise sources into the area, both during the construction and operational phases. Significant adverse impacts can be prevented by restricting noise levels due to the Proposed Development to within noise limits determined in accordance with appropriate guidance, as detailed below.

14.4. Method of Assessment and Reporting

Guidance and Legislation

- 14.4.1. The following documents will be referenced in the EIA Report chapter:
- The Control of Pollution Act (CoPA) 1974;
 - Planning Advice Note (PAN) 1/2011: Planning and Noise;
 - Planning for renewable and low carbon energy ⁸⁰;
 - The Working Group on Noise from Wind Turbines, The Assessment & Rating of Noise from Wind Farms (ETSU-R-97) (1996)⁸¹;

⁸⁰ Available at: <https://www.gov.uk/guidance/renewable-and-low-carbon-energy>

⁸¹ 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.

- Institute of Acoustics (IoA) Bulletin Article Volume 34 No. 2, March / April 2009;
- Institute of Acoustics (IoA) (2013) A good practice guide to the application of ETSU-R-97 for wind turbine noise assessment (IoA GPG) and associated Supplementary Guidance Notes (SGS);
- British Standard BS5228 (2009) Part 1: Noise + A1 (2014) Code of practice for noise and vibration control on construction and open sites;
- British Standard BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound;
- Design Manual for Roads and Bridges (DMRB) 2020; LA111, 2020 and
- Calculation of Road Traffic Noise (CRTN) 1988.

14.4.2. As of 4th July 2025, proposed revisions to the ETSU-R-97 assessment methods for wind turbine noise (Draft Updated Guidance: Assessment and Rating of Wind Turbine Noise⁸²) have been put to public consultation by the Department for Energy Security & Net Zero.

14.4.3. Key proposed revisions that may be relevant at the time of production for the EIA Report chapter for noise include:

- Alignment of day and night fixed limits for wind turbine noise, with the raise of the lower value for the day-time noise limit range to 37 dB LA90.
- Expanded guidance on amplitude modulation assessment (particularly for existing wind farms).

14.4.4. A number of other proposed technical updates have been made to the guidance, these include:

- Updated descriptions of the profile of noise emissions from wind turbines, and relevant wind speed references and range, given evolutions in the technology since 1996.
- Clarification of guidance on determining noise limits such that developments are prioritised according to generation capacity.
- Providing clarification on the interpretation of 'financially involved' receptors for the application of noise controls
- Developing further guidance on cumulative impacts, incorporating existing evidence and best practice advice.
- Providing example planning condition wording and associated technical notes which can be referenced to simplify planning controls.
- Defining the way in which character corrections are to be calculated and combined.

14.4.5. At present this updated guidance remains in public consultation, as such if appropriate it may be referred to in further assessment work, subject to the feedback received during the public consultation, and subsequent developments in the guidance resulting if reissued or formalised.

14.4.6. Where DGC have their own noise-related requirements, these will also be considered in the EIA Report chapter. We request that any such requirements should be highlighted in the Scoping response.

⁸² [Assessment and rating of wind turbine noise](#)

14.5. Proposed Study Area

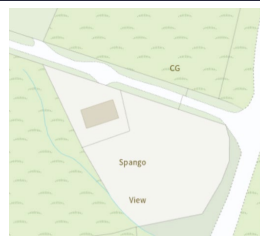
- 14.5.1. The nearest noise-sensitive receptors surrounding the Proposed Development will be considered within the noise assessment, as well as receptors located in proximity to cumulative wind farm developments.
- 14.5.2. Typically, receptors with predicted incident wind turbine noise levels as a result of the development in excess of 25dB L_{A90} will be considered in detailed and cumulative assessments.
- 14.5.3. Cumulative wind farm developments within 10 kilometres (km) of the Proposed Development will be considered within the cumulative operational noise assessment or where the contribution from the Proposed Development is >25dB L_{A90} . The identified wind farms which fall into this boundary will be identified as the agreed cumulative wind farm schedule for consideration and assessment. **Figure 14.1** illustrates the current cumulative position.

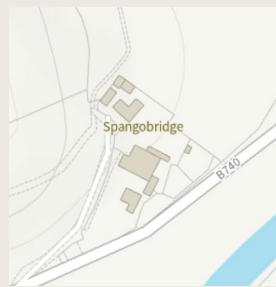
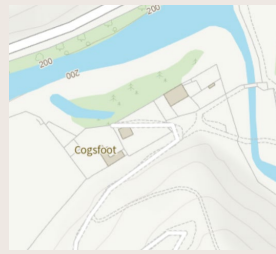
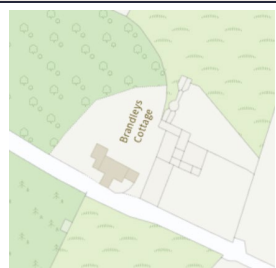
14.6. Field Survey

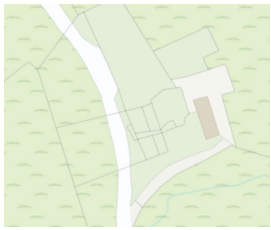
- 14.6.1. As part of the previous NLEI scheme, a noise impact assessment and baseline noise survey were undertaken by TNEI in 2016. In the first instance SLR on behalf of the Applicant will consider the validity of this dataset. However, if new wind farm development has occurred since 2016 within the Study Area, it may not be feasible to repurpose this dataset in full.
- 14.6.2. Typically baseline noise surveys maintain validity for circa five years from production. Thus, further baseline survey work may well be required subject to consultation with the EHO.
- 14.6.3. If found to be required, a further baseline noise survey will be undertaken in accordance with the IoA GPG for NSRs where the baseline noise environment does not include wind turbine noise. Wind speed measurements will be collected, likely by a remote-sensing SoDAR or LiDAR device, and standardised to 10 metres (m) in accordance with the method provided in the IoA GPG.
- 14.6.4. Micro-siting of the baseline survey locations will seek to exclude influence from non-representative noise sources such as plant, boiler flues, heat pumps, vegetation and any existing wind turbines. A record of the installation of monitoring locations will be provided to the EHO for review following the commissioning visit.
- 14.6.5. Records of the baseline data analysis will be provided to the EHO, identifying periods of rainfall excluded from the analysis and any other treatments of the data.
- 14.6.6. Given the existing Sunnyside Wind Farm development to the southwest of the Site, it is anticipated that it may not be possible to measure background noise levels in the absence of wind turbine noise at NSRs in this vicinity. Background noise levels at such NSRs will therefore be agreed through consultation with EHOs likely based on existing consented limits, or predictions.
- 14.6.7. **Table 14.1** comprises a list of key receptors, or receptor clusters, to be approached regarding access to undertake baseline noise surveying. The list is not intended to be exhaustive but to provide an initial list of noise sensitive receptors closest to the proposed boundary of the Site. **Figure 14.2** also illustrates the position of the NSRs listed in **Table 14.1**.
- 14.6.8. Not all receptors may permit access, therefore those receptors that do permit access may need to be considered as representative measurement locations for other receptors in their immediate vicinity. This will be agreed with the EHO via direct correspondence before commencement.

- 14.6.9. Typically, up to four monitoring locations may be selected to represent key receptor clusters of compass directions with respect to the location of proposed development. Measurements would be undertaken for 3-4 weeks depending on the quantity of sufficient wind speed data points collected.
- 14.6.10. Where other receptors are identified between scoping and production of the Noise and Vibration EIA Report chapter these will be accommodated into noise modelling exercises undertaken.

Table 14.1 Noise Sensitive Receptors

Receptor Name	Imagery (Not to scale)	Address	Coordinates
NSR 1		CLENRIES, U463N FROM ST MARY'S STREET TO CLENRIES ROAD END, SANQUHAR, DUMFRIES AND GALLOWAY, DG4 6JB	Latitude: 55.39209 Longitude: -3.88706
NSR 2		MOSSEND, PRIVATE ACCESS FROM B740 SOUTH OF BOUNDARY TO CLENRIES FARM, SANQUHAR, DUMFRIES AND GALLOWAY, DG4 6JB	Latitude: 55.39386 Longitude: -3.88862
NSR 3		SPANGO FARM, CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HB	Latitude: 55.44944 Longitude: -3.85505
NSR 4		SPANGO BANK CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HB	Latitude: 55.44992 Longitude: -3.85116
NSR 5		SPANGO VIEW, CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HB	Latitude: 55.44978 Longitude: -3.84879

Receptor Name	Imagery (Not to scale)	Address	Coordinates
NSR 6		SPANGO BRIDGE, CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HB	Latitude: 55.44021 Longitude: -3.86427
NSR 7		CORSEBANK/ CORSEBANK COTTAGE/ GLENANNERS CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HA	Latitude: 55.43011 Longitude: -3.88907
NSR 8		COGSFOOT, PRIVATE ACCESS FROM B740 SOUTH OF BOUNDARY TO CLENRIES FARM, SANQUHAR, DUMFRIES AND GALLOWAY, DG4 6EZ	Latitude: 55.41549 Longitude: -3.88813
NSR 9		SPOTH, DUMFRIES AND GALLOWAY SANQUHAR, DG4 6EY	Latitude: 55.40540 Longitude: -3.90272
NSR 10		CARCO, B740 FROM A76 FROM CRAWICK NEW BRIDGE TO SOUTH LANARKSHIRE BOUNDARY AT SPANGO, SANQUHAR, DUMFRIES AND GALLOWAY, DG4 6EY	Latitude: 55.40445 Longitude: -3.91569
NSR 11		BRANDLEYS COTTAGE, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HZ	Latitude: 55.38055 Longitude: -3.87703

Receptor Name	Imagery (Not to scale)	Address	Coordinates
NSR 12		PROPERTIES ABOUT MEADOWFOOT AND BEACHWOOD , U470N FROM CHURCH STREET NORTHWARDS, WANLOCKHEAD, DUMFRIES AND GALLOWAY, ML12 6XJ	Latitude: 55.40405 Longitude: -3.79646
NSR 13		DUNTERCLEUCH, MEADOWFOOT, U470N FROM CHURCH STREET NORTHWARDS, WANLOCKHEAD, DUMFRIES AND GALLOWAY, ML12 6XJ	Latitude: 55.41892 Longitude: -3.82044
NSR 14		CLACKLEITH, CRAWICK, SANQUHAR, DUMFRIES AND GALLOWAY DG4 6HB	Latitude: 55.43301 Longitude: -3.85091

14.7. Assessment of Construction Noise

- 14.7.1. A construction noise assessment will be undertaken in accordance with BS5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Noise'⁸³⁸⁴. Potential impacts from construction noise, will be assessed at the closest identified NSRs.
- 14.7.2. Predictions of noise will be based on the likely site preparation and construction methods and programme. Where appropriate, the assessment of construction noise will also consider off-site activities such as construction traffic and deliveries, where the necessary information is available.
- 14.7.3. Construction noise can typically be effectively controlled by employing appropriate best-practice methods and limiting hours of work at sites close to NSRs.
- 14.7.4. Noise from construction traffic on public roads will be assessed on the basis of change in traffic noise levels due to the addition of traffic associated with construction of the Proposed Development. Baseline traffic flows for each location will be determined from Chapter 13- Traffic and Transport.

⁸³ BS 5228-1:2009 (amended 2014) 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'

⁸⁴ The Health Effects of 72 Hours of Simulated Wind Turbine Infrasound: A Double-Blind Randomized Crossover Study in Noise-Sensitive, Healthy Adults. Available at The Health Effects of 72 Hours of Simulated Wind Turbine Infrasound: A Double-Blind Randomized Crossover Study in Noise-Sensitive, Healthy Adults - PMC (nih.gov)

14.8. Assessment of Operational Noise

- 14.8.1. Consultation will be undertaken directly with the DGC EHO to agree the detailed method of assessment for each aspect of the Proposed Development (i.e. construction, operational and decommissioning periods), however the general approach is outlined below.
- 14.8.2. The identity of the closest NSRs will be agreed and any financial involvement established. Any relevant wind energy schemes that should be included in the cumulative assessment, whether in planning, consented or operational, will also be identified and agreed. Potentially cumulative wind turbine developments will typically be excluded on the basis of a 10 decibel (dB) difference in noise emissions at relevant common NSRs, where this can be demonstrated through prediction, such that contributions from any wind farm result in negligible change with regard to total contribution at established design limits.
- 14.8.3. Daytime and night-time operational overall noise limits will be derived from measured background noise levels at the closest identified NSRs across the range of critical wind speeds (typically 4 – 12 metres per second (m/s)) in accordance with ETSU-R-97 and any specific requirements of the DGC EHO.
- 14.8.4. Analysis of predicted noise levels at NSRs affected by cumulative developments will be undertaken to identify controlling properties, in accordance with the methods provided in the IoA GPG. Apportionment of overall noise limits will be undertaken to determine residual noise limits specific to the Proposed Development, taking account of available headroom. This process will be agreed through consultation with the EHO at each stage.
- 14.8.5. Derived noise limits will be applied at NSRs using monitoring locations as proxies. The approach to allocating proxy data to NSRs will be agreed with the EHO.
- 14.8.6. A candidate turbine will be selected for the Proposed Development, the verified noise emission details of which will be reproduced in the EIA Report chapter (A-weighted and octave band data) for critical wind speeds. The candidate turbine will typically reflect the worst case scenario with respect to noise, and within the parameters being considered with regard to turbine dimensions.
- 14.8.7. Noise levels will be predicted within CadnaA noise modelling software, in accordance with the ISO9613 method and the IoA GPG requirements. Corrections for concave topography and line-of-sight visibility will be applied to predicted noise levels in accordance with the IoA GPG, where applicable.
- 14.8.8. Corrections for directivity may be applied within the cumulative assessment in accordance with the guidance set out in the IoA GPG where NSRs lie between two developments and where simultaneous down-wind predictions are therefore overly conservative.
- 14.8.9. Predicted levels will be evaluated against agreed noise limits and the magnitude of impact and significance of effect determined accordingly. All residential NSRs will be assumed to be of high sensitivity. The sensitivity of any other types of receptors identified will be agreed with the EHO.

14.9. Assessment of Decommissioning Noise

- 14.9.1. Noise from decommissioning activities will be scoped out as the overall noise impacts are usually lower than during the construction phase, and will be assessed and mitigated as required at the time of decommissioning.

14.10. Consultation

- 14.10.1. During the formal Scoping process, direct discussions will be held with the EHO regarding representative baseline noise survey locations and the approach to cumulative assessment.
- 14.10.2. The EHO may be invited to witness installation of the baseline noise survey to agree the suitability of measurement micro siting in accordance with the GPG.
- 14.10.3. Where access to private land is subsequently refused it may be necessary to seek agreement of suitable accessible proxy measurement locations where access is permitted. Such locations would be chosen to be considered representative of sensitive receptors in the surrounding area, and this would be undertaken to facilitate assessments in a timely manner and in accordance with the GPG.
- 14.10.4. Any commentary received on methodology, items scoped in and out of assessment, and perceived mitigation needs will be captured within the EIA Report Noise and Vibration Chapter.

14.11. Matters Scoped Out

- 14.11.1. There are various aspects that are proposed to be scoped out of the assessment.

Vibration

- 14.11.2. Given the nature of construction activities proposed and the relative distances from residential receptors i.e. >250m to turbine bases, the risk of ground borne vibration impacting on residential receptors is considered very low, as such it is not proposed that a vibration assessment be undertaken and that a vibration assessment is scoped out.

Infrasound and Low-Frequency Noise

- 14.11.3. A study commissioned by the UK Department of Trade and Industry (DTI) and conducted by Hayes McKenzie Partnership in 2006 investigated low frequency noise emissions from wind farms. The study concluded that there was no evidence linking infrasound or low frequency noise from wind turbines to adverse health effects.⁸⁵
- 14.11.4. In 2013, the Environmental Protection Authority of South Australia⁸⁶ published findings from a study measuring infrasound levels at various locations, including urban areas, rural areas near wind farms, and rural areas without turbines. The study found that infrasound levels near wind farms were comparable to those in other environments. Furthermore, no significant difference in infrasound levels was observed during periods when turbines were shut down.
- 14.11.5. Bowdler et al. (2009) concluded that *"there is no robust evidence to suggest that low frequency noise or ground-borne vibration from wind farms causes adverse effects on nearby residents."*⁸⁷
- 14.11.6. During a planning appeal (PPA-310-2028) concerning the Clydeport Hunterston Terminal Facility in 2018, the appointed Reporter, Mr. M. Croft, reviewed evidence from Health Protection Scotland and the NHS. He also considered low frequency noise surveys conducted by both the appellant and the local authority. These surveys confirmed compliance with planning conditions and found that the

⁸⁵ Hayes McKenzie (2006), <https://docs.wind-watch.org/Hayes-MacKenzie-Report-Final.pdf>

⁸⁶ <https://www.epa.sa.gov.au/>

⁸⁷ Published in Institute of Acoustics Bulletin Vol 33 no 4 Page 1 Amplitude Modulation of Wind Turbine Noise. A Review of the Evidence, <https://www.dickbowdler.co.uk/>

highest levels of low frequency noise occurred when turbines were not operating.

- 14.11.7. The Reporter concluded that there was insufficient evidence to establish a causal link between wind turbine noise and the health complaints reported by some residents. The NHS assessment also found no support for health concerns based on high-quality research.
- 14.11.8. A WSP report for BEIS⁸⁸ reviewed multiple studies and found that infrasound from wind turbines does not cause physiological or psychological harm. However, belief in harm can influence symptom reporting, suggesting symptoms are likely psychogenic.
- 14.11.9. An NHMRC-funded study published in Environmental Health Perspectives found no effects on sleep or health from 72-hour exposure to simulated wind turbine infrasound. It concluded that infrasound does not cause Wind Turbine Syndrome. Based on current evidence, low-frequency noise and infrasound do not require specific assessment in Environmental Impact Assessments.

Amplitude Modulation

- 14.11.10. Amplitude Modulation (AM) is a regular change in the loudness of noise, often caused by the spinning blades of a wind turbine.
- 14.11.11. This change happens at the Blade Passing Frequency—the rate at which blades pass a fixed point like the tower.
- 14.11.12. Key research and findings to date include:

2007 Salford University Study (for BERR)⁸⁹

- Looked into noise complaints and AM at UK wind farms.
- Found AM at only 4 out of 133 sites, and only 7–15% of the time.
- Concluded that AM causes are not well understood and cannot be easily predicted.

2013 RenewableUK Study⁹⁰:

- Reassessed earlier findings.
- Found that many suspected causes of AM are not actually linked to it.
- AM is caused by a unique mix of factors at each site.
- Still no reliable way to predict AM.

2016 IOA & BEIS Report⁹¹:

- Proposed a measurement method for AM.
- Suggested a penalty system and planning condition, but these were not officially adopted.

2017 Acoustics Bulletin Article⁹²:

- Proposed a draft planning condition for AM.

⁸⁸ Report for BEIS: A review of noise guidance for onshore wind turbines | WSP (Sept 2023)

⁸⁹ Salford University report into aerodynamic modulation of wind turbine noise (July 2007)

⁹⁰ Wind Turbine Amplitude Modulation: Research to Improve Understanding as to its Cause and Effect (Dec 2023),

⁹¹ Report for BEIS: A review of noise guidance for onshore wind turbines | WSP (Sept 2023)

⁹² Published in Institute of Acoustics Bulletin Vol 33 no 4 Page 1 Amplitude Modulation of Wind Turbine Noise. A Review of the Evidence

- Acknowledged that the penalty system is difficult to get right due to lack of solid research.

14.11.13. The current industry position is such that:

- No official planning condition for AM has been endorsed by either the UK or Scottish Government.
- The IOA guidance advises not to include AM in planning conditions due to limited evidence.
- Prediction of AM is still not feasible, so it is recommended to exclude AM from noise assessments.

14.11.14. The updated ETSU -97- R guidance issued for public consultation in July 2025 states as follows in regard to amplitude modulation assessment at proposed wind farm developments:

“It is, however, generally not possible to predict the occurrence of such noise characteristics at the planning stage. Tonal noise radiation from wind turbines, when it occurs, is usually associated with a specific design or component malfunction (combined with operational characteristics), rather than being an expected general characteristic of wind turbines.

The occurrence of elevated levels of AM is a complex phenomenon due to a combination of turbine and site characteristics; the current consensus is that AM cannot be predicted. Tonal noise and AM are therefore best controlled through enforcement of planning conditions which include the application of character corrections as described in section 4. Consequently, character corrections should not be added at the planning/application assessment phase.”

- 14.11.15. Noise from decommissioning activities will be scoped out as the overall noise impacts are usually lower than during the construction phase and will be assessed and mitigated as required at the time of decommissioning.
- 14.11.16. Operational noise effects will be scoped out where the predicted noise levels from the Proposed Development are below 10 dB below the typical lowest noise limit applicable to cumulative wind farm noise, typically a level of 30dB L_{A90}.
- 14.11.17. Where predicted noise levels from the Proposed Development are 10 dB or more below the lowest applicable noise limit then its contribution at NSRs can be considered to be negligible.
- 14.11.18. Vibration has been scoped out of the construction, operation, and decommissioning assessments as levels of vibrations will be negligible. Ground-borne vibration during the operational phase of the Proposed Development will not be perceptible at receptor locations, nor on the Site itself.
- 14.11.19. Levels of vibration during the construction and decommissioning phases are unlikely to be perceptible, except if there are short term construction activities in the near vicinity of receptor locations, where levels of vibration in any case will be significantly below the criteria set out in BS 5228 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites’.
- 14.11.20. Cumulative operational noise from the proposed wind turbines in conjunction with other (non-wind turbine) sources has been scoped out as the noise limits apply to wind turbine noise only.

14.12. Additional Considerations

Seismic Noise

- 14.12.1. Seismic noise is defined as ‘relatively persistent vibration of the ground, due to a multitude of sources, that is often an unwanted component of signals recorded by seismometers’. It is primarily generated by surface sources such as anthropogenic activity (transportation, industrial processes), wind and atmospheric phenomena, rivers and ocean waves.
- 14.12.2. Ground vibration can be measured and reported using various metrics including (but not limited to) peak particle velocity (PPV), amplitude (displacement), acceleration and frequency. The amplitude of seismic noise is measured in nanometres (nm) or micrometres (µm).

Eskdalemuir Seismic Array

- 14.12.3. Eskdalemuir Observatory is an environmental observatory near Eskdalemuir village in Dumfries and Galloway. The observatory was purposely located in an area of low background seismic activity, such that interference with measurements would be minimised.
- 14.12.4. There is also a second seismic array approximately 3 km to the north, established by the United Kingdom Atomic Energy Authority for monitoring nuclear weapons testing as the UK’s contribution to the monitoring network of the Comprehensive Test Ban Treaty (CTBT). The CTBT array has been in operation since 1962.
- 14.12.5. The Eskdalemuir Seismic Array and the relationship with the Proposed Development is discussed in Chapter 17 “Other Issues” of this scoping report.

14.13. Focused Questions

Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the IOA GPG to assess operational noise and BS5228 to assess construction noise?

Can consultees agree that assessment of vibration, infrasound, low frequency noise and amplitude modulation be scoped out of the EIA?

It is proposed that cumulative noise from wind farms is assessed in isolation from any other forms of development which have their own assessment criteria and methodologies and are therefore not comparable. Is this agreeable?

Are the Consultees aware of any additional potential noise-sensitive receptors, such as new housing developments?

What are the Council's requirements for the provision of information on noise during construction?

15. Aviation

15.1. Introduction

- 15.1.1. This section of the Scoping Report identifies the aviation receptors of relevance to the Proposed Development and considers the potential impacts arising from the construction, operation and decommissioning of the Proposed Development on aviation receptors.
- 15.1.2. The potential effects of wind turbines on aviation are widely publicised, but the primary concern is one of safety. There are three primary scenarios that may lead to potential impacts:
- Physical obstruction: Wind turbines can present a physical obstruction to aircraft in flight;
 - Impacts on aviation Primary Surveillance Radar (PSR) systems and the provision of radar-based Air Traffic Services (ATS): Wind turbines can create unwanted radar clutter which appears on radar displays and can affect the provision of ATS to pilots. Radar clutter (or false radar returns) can make it difficult for air traffic controllers to differentiate between aircraft and those radar returns resulting from the detection of wind turbines. Furthermore, the appearance of multiple false targets in close proximity can generate false aircraft tracks and reduce those returns from 'real' aircraft away from their true positions. It should be noted that impacts on radar systems are only possible if the wind turbine blades are moving, therefore this impact is generally applicable to the operational phase, or at the time of blade tip installation; and
 - Communication, Navigation and Surveillance (CNS) equipment: A wide range of systems, together with air-ground communications facilities, can be adversely affected by development of infrastructure projects; specifically, when located within the physical safeguarding zones of CNS equipment.

15.2. Legislation and Policy Context

- 15.2.1. This section outlines the specific legislation, policy and guidance taken into consideration on the potential impacts on aviation from the Proposed Development.

Legislation

- Civil Aviation Publication (CAP) 393 – Air Navigation, The Order and the Regulations, 2016 (Version 6, 12 February 2021) (Civil Aviation Authority (CAA), 2021a)⁹³: Contains the Air Navigation Order (ANO) 2016 and Regulations made under the order; and defines the Rules of the Air regarding civil aviation in the United Kingdom (UK).

Policy

- CAP 670 – Air Traffic Services Safety Requirements (Issue 3, 7 June 2019) (CAA, 2019)⁹⁴: Sets out the safety regulatory framework and requirements associated with the provision of ATS.
- CAP 764 – CAA Policy and Guidelines on Wind Turbines (Version 6, February 2016) (CAA, 2016)⁹⁵: Provides CAA policy and guidance on a range of issues associated with wind turbines and their effect on aviation that need to be considered by aviation stakeholders, wind energy developers and Local Planning Authorities when assessing the viability of wind turbine developments.

⁹³ The Air Navigation Order 2016

⁹⁴ CAP 670: Air Traffic Services Safety Requirements | UK Civil Aviation Authority

⁹⁵ CAP 764: Policy and Guidelines on Wind Turbines | UK Civil Aviation Authority

- CAP 774 – The UK Flight Information Services (Version 4, 15 December 2021) (CAA, 2021)⁹⁶: Details the suite of ATS which (excluding aerodrome services) are the only services provided in Class G airspace within the UK Flight Information Region. This document is equally applicable to civilian and military pilots and air traffic controllers.
- Military Aviation Authority (MAA) Regulatory Publication 3000 Series: Air Traffic Management Regulations (last updated 15 April 2024) (MAA, 2024)⁹⁷: Provides the regulatory framework and instructions to military personnel for provision of military Air Traffic Control (ATC).
- MAA Manual of Military Air Traffic Management (last updated 30 September 2019) (MAA, 2019)⁹⁸: Provides regulations for military ATC and emergency procedures and utilisation of military designated airspace.

Guidance

- CAP 032 - UK Integrated Aeronautical Information Package (IAIP) (CAA, 2025a)⁹⁹: Provides comprehensive information on UK civilian aerodromes and aviation procedures within UK airspace.
- CAA 1:500,000 Visual Flight Rules (VFR) Aviation Chart (CAA, 2025b)¹⁰⁰: Designed to assist in the navigation of aircraft. Enables pilots to determine their position, safe altitude and route to a destination, highlighting navigation aids along the way, alternative landing areas in case of an in-flight emergency, and other useful information such as radio frequencies and airspace boundaries.
- Ministry of Defence (MoD) Obstruction Lighting Guidance (1 January 2020) (MoD, 2020)¹⁰¹: Sets out the MoD's minimum requirements and standards for installation of aviation lighting of onshore and offshore wind turbine developments.
- National Air Traffic Services (NATS) Self-Assessment Maps (NATS, 2025)¹⁰²: Assists wind farm developers to understand where interference with NATS infrastructure is likely.
- UK Military Aeronautical Information Publication (UK Mil AIP) (MoD, 2025)¹⁰³: Provides comprehensive information on UK military aerodromes and guidance to military aircrew on in-flight navigation procedures.

15.3. Baseline

- 15.3.1. The following section provides a description of the baseline environment for aviation and should be read in conjunction with **Figure 15.1**.

Study Area

- 15.3.2. To assess the impact on aviation, a Study Area has been devised that takes into account the immediate vicinity of the Proposed Development, the consultation criteria for aviation assets as described in CAP 764 (Policy and Guidelines on Wind Turbines) and a wider Study Area determined by the range of potentially affected radar systems; both ATC and AD radar systems. A pictorial representation of the Site location and potential aviation receptors (airports and radar locations) is depicted on an aviation chart and shown at **Figure 15.1**.

⁹⁶ CAP 774: UK Flight Information Services | UK Civil Aviation Authority

⁹⁷ Regulatory article (RA) 3000 series: air traffic management regulations (ATM) - GOV.UK

⁹⁸ Manual of military air traffic management (MMATM) - GOV.UK

⁹⁹ eAIS Package United Kingdom

¹⁰⁰ NATS UK | VFR Charts

¹⁰¹ MOD Obstruction Lighting Guidance 2020.pdf

¹⁰² Wind farm self-assessment maps - Wind farm services - NATS

¹⁰³ UK Mil AIP | AIP

Airspace

- 15.3.3. The Proposed Development is situated in an area of Class G uncontrolled airspace which is established from the surface up to 5,500 feet (ft) above mean sea level (amsl). Above 5,500ft, the airspace is Class D controlled airspace up to Flight Level (FL) 195 (19,500ft) and forms part of the Scottish Terminal Manoeuvring Area (TMA). Approximately 8 nautical miles (nm) (15 kilometres (km)) to the west of the Proposed Development is the Prestwick Control Area which is established from 4,000ft up to 5,500ft and is also Class D controlled airspace. Above FL195, the airspace is Class C controlled airspace. In Classes C, D and G airspace, the following ATS rules apply:
- Class C airspace – all aircraft operating within Class C controlled airspace (i.e. above FL195) must be in receipt of an ATS from NATS En-Route PLC (NERL) or a separate authorised military service provider;
 - Class D airspace is established from 5,500ft amsl to FL195 and forms part of the Scottish TMA; airspace which is used for the protection of flights in to, and out of, Edinburgh, Glasgow International and Glasgow Prestwick airports. All aircraft operating in this airspace must be in receipt of an ATS from NERL, military controllers located at NERL's Area Control Centre, or a controller from one of the three airports; and
 - Class G airspace - any aircraft can operate in this area of uncontrolled airspace without any mandatory requirement to be in communication with, or receive a radar service from, any ATC unit. Pilots of aircraft operating under VFR in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstructions.

Civil airport Instrument Flight Procedures (IFPs) (including CNS equipment)

- 15.3.4. Edinburgh, Glasgow International and Glasgow Prestwick airports are the nearest major civil airports to the Proposed Development; see **Figure 15.1**. The Site is close enough to each airport that they are likely to request that formal assessments are carried out to confirm whether, or not, there will be an impact on existing IFPs. Consultation will be carried out with the airports in order to confirm any impact and full details will be provided within the EIA Report.

Military aerodrome IFPs (including CNS equipment)

- 15.3.5. The Proposed Development is not within the 30 nautical mile (nm) (56 kilometre (km)) safeguarding zone of any military aerodrome.

Civil ATC PSR

- 15.3.6. The Proposed Development is within the operating range of three airport PSRs (Edinburgh, Glasgow International and Glasgow Prestwick) and also one of NERL's PSRs:
- Edinburgh Airport PSR. At a distance of 36nm (67km), it is highly unlikely that any of the Proposed Development's wind turbines will be visible to the Edinburgh PSR.
 - Glasgow Airport PSR. At a distance of 34nm (63km), the Proposed Development's wind turbines are within the operating range of the Glasgow International Airport PSR. However, it is highly unlikely that any of the Proposed Development's wind turbines will be visible to the Glasgow International PSR.
 - Glasgow Prestwick Airport PSR. At a distance of 25nm (46km), the Proposed Development's wind turbines are highly likely to be visible to the Glasgow Prestwick Airport PSR.
 - NERL PSRs. The Proposed Development is located 0.9nm (1.6km) from NERL's Lowther Hill PSR. The radar is used to support civilian ATC and en-route operations for aircraft operating on civilian air routes and for aircraft arriving and departing to/from local airports. The Proposed Development's wind turbines will be visible to the Lowther Hill PSR.

Military ATC PSR

- 15.3.7. The Proposed Development will not be within Radar Line of Sight (RLOS) of any military ATC PSRs.

Military AD PSR

- 15.3.8. The Proposed Development will not be within RLOS of any military AD PSRs.

Low Flying (Military and Civilian EHSUs)

- 15.3.9. The Proposed Development is located within two strategically important military Low Flying Areas (LFAs); LFA16 and Tactical Training Area (TTA) 20T. These areas have challenging and sparsely populated terrain, a high incidence of unrestricted airspace above 2,000ft (giving increased flexibility to military aircraft to enter or leave the lower airspace) and better than average weather conditions. Aircraft flying in LFA16 and TTA20T fly in Visual Meteorological Conditions and/or at night using Night Vision Goggles.

Local Minor aerodromes

- 15.3.10. The Proposed Development is located outside the relevant consultation distances of any local minor aerodromes.

Local airspace restrictions (Prohibited/Restricted/Danger Areas and Military PEXAs)

- 15.3.11. The Proposed Development is outside the lateral boundaries of any Prohibited/Restricted/Danger Areas and military PEXAs.

Meteorological (Met) Office radars

- 15.3.12. The Proposed Development is outside the 20km safeguarding zone of any Met Office radars.

15.4. Assessment

- 15.4.1. A detailed desk-top review has been undertaken to characterise existing and future aviation baseline conditions in the vicinity of the Proposed Development to inform this Scoping Report. This has been undertaken by reviewing the relevant aviation legislation, policy and guidance documents outlined in section 15.2 in particular the UK IAIP, and will be augmented by consultation with the relevant aviation stakeholders during the EIA phase. The potential aviation issues considered for the Proposed Development assessment are as follows:

- civil airport IFPs (including CNS equipment);
- military aerodrome IFPs (including CNS equipment);
- civil ATC PSR;
- military ATC PSR;
- military Air Defence (AD) PSR;
- low flying (military and civilian Emergency Helicopter Support Units (EHSUs));
- local minor aerodromes;
- local airspace restrictions (Prohibited/Restricted/Danger Areas and Military Practice and Exercise Areas (PEXAs); and
- Meteorological (Met) Office radars.

- 15.4.2. As a result of the desk-top review, it has been possible to identify which aviation receptors are likely to be affected by the Proposed Development and will be assessed in the EIA Report and which receptors can be scoped out of the EIA Report.

EIA Impact Assessment

- 15.4.3. The early identification of significant potential aviation effects is fundamental to informing the EIA Report and the methodology in doing so will involve a high-level assessment of any, and all, likely effects distinguishing between those which are likely to be of significance.
- 15.4.4. The approach to the assessment methodology is set out in Chapter 7: EIA Methodology & Approach and, as far as possible, will be adhered to through the EIA Report. However, there are key requirements within aviation that requires the methodology to be amended and applied specifically for the aviation assessment.
- 15.4.5. Similarly to the previous NLEI scheme, the methodology used will be a desk-based review using the data sources as described in section 15.2. However, defining categories of receptor sensitivity and magnitude of impact is not appropriate for aviation as baseline aviation activities and equipment are highly sensitive to impacts and any magnitude of restriction on, or compromise to, activities or equipment (without embedded mitigation) is considered to be high. Therefore, the sensitivity of receptor and magnitude of impact will be explained via professional reasoning and judgement rather than via definitions of different categories. These judgements will then feed into the determination of significance.
- Major: a significant restriction on the ability of the Air Navigation Service Provider (ANSP) to continue to ensure safety and/or provide unrestricted ATS;
 - Moderate: a possible restriction on the ability of the ANSP to continue to ensure safety and/or provide unrestricted ATS but which might be mitigated by changes to operating procedures or technical mitigation;
 - Minor: a possible restriction on the ability of the ANSP to continue to provide unrestricted ATS but which is manageable with little change to existing operating procedures;
 - Negligible: any effect should be completely manageable within current operating practices and without any requirement for change to procedures.
- 15.4.6. Any anticipated impact upon aviation stakeholders which results in restricted operations will be considered to be of significance prior to implementation of suitable mitigation measures. Discussions were previously held with various aviation stakeholders in relation to the NLEI scheme, which will partly inform future discussions in relation to the Proposed Development.
- 15.4.7. The aviation chapter within the EIA Report will conclude with a high-level summary of potential effects, an overview of any radar, technical or operational mitigation requirements, together with mitigation options.

15.5. Potential Effects

- 15.5.1. This section identifies potential impacts in relation to the construction, operation and decommissioning of the Proposed Development.

Construction

- potential impact on Edinburgh Airport IFPs;
- potential impact on Glasgow International Airport IFPs;
- potential impact on Glasgow Prestwick Airport IFPs; and

- potential impact on low flying operations (military and civilian EHSUs).

Operation

- potential interference with Edinburgh Airport's ATC PSR;
- potential interference with Glasgow International Airport's ATC PSR;
- potential interference with Glasgow Prestwick Airport's ATC PSR; and
- potential interference with NERL's Lowther Hill ATC PSR.

Decommissioning

- 15.5.2. No effects on aviation are expected during the decommissioning phase further to those impacts identified for the construction phase.

Consultation

- 15.5.3. Following submission of the Scoping Report, and receipt of the Scoping Opinion, the Applicant will engage with all relevant aviation stakeholders in order to confirm any potential impacts and identify potential mitigation solutions. In particular, the Applicant expects to consult with the following aviation stakeholders regarding potential impacts on their operations:

- Civil Aviation Authority (CAA);
- Edinburgh Airport;
- Glasgow International Airport;
- Glasgow Prestwick Airport;
- MoD; and
- NATS.

- 15.5.4. The intention will be to confirm impacts and identify suitable mitigation solutions prior to submission of the formal planning application. Full details will be provided in the EIA Report.

15.6. Potential Mitigation

- 15.6.1. As part of the project design process, a number of best practice and designed-in mitigation measures (referred to collectively as embedded mitigation) are either present or will be included to reduce the potential for effects relating to aviation. Current embedded mitigation measures relevant to aviation are described in **Table 15.1** as follows:

Table 15.9: Embedded Mitigation Measures

Embedded Mitigation Measures	Justification
Approval and implementation of a Lighting Plan (LP), which will set out specific requirements in terms of aviation lighting to be installed on the wind turbines, as required under CAA (2016). CAP 393, Air Navigation: The Order and the Regulations 2016.	An LP will be prepared in consultation with CAA and MoD and will take into account requirements for aviation lighting as specified in Article 222 of the UK ANO, 2016 and changes to International Civil Aviation Organisation Annex 14 Volume 2, Chapter 6, Paragraph 6.2.4 promulgated in November 2016. The production of an LP will be a condition of any planning consent. Measures will be adopted to ensure that the potential for risk of aircraft collision with the Proposed Development's infrastructure is minimised.

Embedded Mitigation Measures	Justification
All structures of more than 91.4m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre, which maintains the UK's database of tall structures (Digital Vertical Obstruction File) at least ten weeks prior to construction.	Aeronautical charting requirements will be a condition of any planning consent. Measures will be adopted to ensure that the potential for risk of aircraft collision with the Proposed Development's infrastructure is minimised.
Any temporary obstacles associated with wind farms which are of more than 91.4m in height are to be alerted to aircrews by means of the Notice to Airmen (NOTAM) system.	Consultation with the CAA will be required to ensure that temporary obstacles of more than 91.4m are identified to aircrews by NOTAM. Notification of temporary obstacles would be a condition of the planning consent. Measures will be adopted to ensure that the potential for risk of aircraft collision with the Proposed Development's infrastructure is minimised.
CAA will be informed of the locations, heights and lighting status of the wind turbines including estimated and actual dates of construction and the maximum heights of any construction equipment to be used, prior to the start of construction.	Consultation with the CAA will be required. Inclusion of locations, heights and lighting status of the wind turbines on aviation charts and in the UK IAIP would be a condition of the planning consent. Measures will be adopted to ensure that the potential for risk of aircraft collision with the Proposed Development's infrastructure is minimised.

Construction

- 15.6.2. The embedded mitigation measures outlined in **Table 15.1** will need to be implemented prior to the construction phase of the Proposed Development to ensure that any potential effects caused by the presence of obstacles (e.g. cranes and stationary wind turbines) are mitigated successfully.
- 15.6.3. In addition, if any changes are required to any civil airport IFPs (such as Edinburgh, Glasgow International and Glasgow Prestwick), these procedures will need to be amended and re-published in appropriate aviation documentation ahead of the construction phase of the Proposed Development.

Operation

- 15.6.4. It should be noted that adverse effects on PSR systems are only possible if the wind turbine blades are moving, therefore this impact is applicable to the operation phase only. PSR mitigation will be possible for the affected ATC PSRs as follows:

Civil Airport ATC PSRs (Edinburgh, Glasgow International and Glasgow Prestwick)

- 15.6.5. All 3 airports have recently installed an ATC PSR mitigation system known as the Terma Scanner radar.
- 15.6.6. The Applicant will consult with the airports regarding any potential impact to their ATC PSR operations and the process by which a mitigation solution can be implemented. It is expected that mitigation negotiations will take place ahead of submission of the section 36 application and full details will be provided in the EIA Report.

NERL ATC PSR (Lowther Hill)

- 15.6.7. NATS has proven processes and techniques to mitigate the adverse impact of wind turbines on their PSRs. The Applicant will commence discussions with NATS about potential mitigation solutions and it is likely that the proposed solution will be Multi-Radar Tracker blanking; a technical mitigation solution routinely offered by NATS that removes wind turbine returns from the ATC radar display. Equally, NERL has recently been replaced the radar at Lowther Hill with an Indra radar which has inbuilt wind turbine mitigation software that could potentially mitigate any adverse impact created by the Proposed Development. It is expected that mitigation negotiations will take place ahead of submission of the formal planning application and full details will be provided in the EIA Report.

Decommissioning

- 15.6.8. No mitigation measures and anticipated for the decommissioning phase of the Proposed Development other than the embedded mitigation measures outlined in **Table 15.1**.

Limitations and Assumptions

- 15.6.9. No overarching assumptions or limitations have been identified that apply to the assessment for aviation. The data sources used in this chapter are detailed in section 6.9.2 and are the most up to date publicly available information which can be obtained from the applicable data sources. It is considered that the data employed will be robust and sufficient for the purposes of the impact assessment in the EIA Report.

15.7. Summary and Justification

Table 15.10: Aviation elements scoped in or out of future Environmental Impact Assessment

Element	Phase	Scoped In	Scoped Out	Justification
Edinburgh Airport IFPs	Construction	✓		The Proposed Development is within the IFP safeguarding area for a civil airport of this nature. Consultation will be required with Edinburgh Airport. A formal IFP assessment may need to be carried out by a CAA Approved Procedure Design Organisation (APDO).
Glasgow International Airport IFPs	Construction	✓		The Proposed Development is within the IFP safeguarding area for a civil airport of this nature. Consultation will be required with Glasgow International Airport. A formal IFP

Element	Phase	Scoped In	Scoped Out	Justification
				assessment may need to be carried out by a CAA APDO.
Glasgow Prestwick Airport IFPs	Construction	✓		The Proposed Development is within the IFP safeguarding area for a civil airport of this nature. Consultation will be required with Glasgow Prestwick Airport. A formal IFP assessment may need to be carried out by a CAA APDO.
Military aerodrome IFPs (including CNS equipment)	Construction		✓	The Proposed Development is outside the designated 30nm (56km) IFP safeguarding zone for military aerodromes. Consequently, there will be no impact on military aerodrome IFPs.
Low flying operations (military and civilian EHSUs)	Construction	✓		Installation of wind turbines pose physical obstructions to aviation operations carried out in the vicinity of wind farms. Wind turbines can be difficult to see from the air, particularly in poor meteorological conditions, leading to a potential increase in obstacle collision risk.
Edinburgh Airport's ATC PSR	Operation	✓		Operating wind turbines can result in reflected energy appearing as clutter on controllers' radar screens, which can represent, or mask, actual aircraft radar returns. Consultation will be required with Edinburgh Airport.
Glasgow International Airport's ATC PSR	Operation	✓		Operating wind turbines can result in reflected energy

Element	Phase	Scoped In	Scoped Out	Justification
				appearing as clutter on controllers' radar screens, which can represent, or mask, actual aircraft radar returns. Consultation will be required with Glasgow International Airport.
Glasgow Prestwick Airport's ATC PSR	Operation	✓		Operating wind turbines can result in reflected energy appearing as clutter on controllers' radar screens, which can represent, or mask, actual aircraft radar returns. Consultation will be required with Glasgow Prestwick Airport.
NERL Lowther Hill ATC PSR	Operation	✓		Operating wind turbines can result in reflected energy appearing as clutter on controllers' radar screens, which can represent, or mask, actual aircraft radar returns. Consultation will be required with NERL.
Military ATC PSR	Operation		✓	The Proposed Development is not within radar coverage of any military AD PSR systems. Consequently, there will be no impact on military ATC PSR operations.
Military AD PSR	Operation		✓	The Proposed Development is not within radar coverage of any military ATC PSR systems. Consequently, there will be no impact on military AD PSR operations.

Element	Phase	Scoped In	Scoped Out	Justification
Local minor aerodromes	All Phases		✓	The Proposed Development is outside the designated consultation distances of any minor aerodromes. Consequently, there will be no impact on local minor aerodrome operations.
Local airspace restrictions (Prohibited/Restricted/Danger Areas and Military PEXAs)	All Phases		✓	The Proposed Development is outside the lateral boundaries of any Prohibited/Restricted/Danger Areas and Military PEXAs. Consequently, there will be no impact on restricted airspace.
Met Office radars	All Phases		✓	The Proposed Development is outside the designated 20km safeguarding zone of any Met Office radar. Consequently, there will be no impact on Met Office radar operations.

15.8. Focused Questions

Do consultees agree with the study areas defined for this topic area?

Do consultees agree with the data sources which are suggested for the assessment of aviation?

Do consultees agree with the suggested embedded mitigation measures and is this mitigation appropriate?

Do consultees agree that all receptors and impacts have been identified for aviation?

Do consultees agree with the proposed approach to assessment?

Do consultees agree with the impacts which have been scoped out of the EIA?

16. Shadow Flicker

16.1. Introduction

- 16.1.1. This section of the scoping report considers the potential effects from the operation of the Proposed Development on residential receptors, due to shadow flicker.

16.2. Baseline

- 16.2.1. Shadow flicker occurs when a certain combination of conditions prevail at a certain location, time of day and year. It firstly requires the sun to be at a certain level in the sky. The sun then shines onto a window of a residential dwelling from behind the wind turbine rotor. As the wind turbine blades rotate it causes the shadow of the turbine to flick on and off. This may have a negative effect on residents in affected properties. Shadow flicker occurs only within buildings where shadows are cast across a window aperture, and the effects are typically considered to occur up to a maximum distance of 10 times the rotor diameter from each wind turbine.
- 16.2.2. The Dumfries and Galloway Council Local Development Plan 2 Supplementary Guidance 'Wind Energy Development: Development Management Considerations' states that with respect to shadow flicker, '*Maintaining a separation distance of at least 10 times the turbine rotor blade diameter from sensitive uses/receptors can help reduce the effects but this may need to be extended depending on specific locational circumstances.*' The Update of UK Shadow Flicker Evidence Base (2011), published by the Department for Energy and Climate Change (DECC) states that an acceptable study area for assessment is ten rotor diameters from each turbine and within 130 degrees either side of north. Scottish Government guidance 'Onshore wind turbines: planning advice' advises that beyond this distance there should be no adverse impact from shadow flicker. It is therefore proposed that the Study Area for shadow flicker assessment will comprise an area of 10 rotor diameters, within 130 degrees either side of north, from the final proposed turbine locations.
- 16.2.3. For an accurate assessment of shadow flicker, complex modelling is required, taking into account the turbine's dimensions and the movement of the sun throughout the year. Data collection for input into the modelling will include:
- The locations of properties within ten rotor diameters of each proposed wind turbine;
 - The locations and dimensions of the proposed turbines; and
 - The local topography (Ordnance Survey Digital Terrain Model).
- 16.2.4. The candidate turbine has not yet been decided, however, it is currently anticipated that the maximum rotor diameter would be up to 172m. Therefore, based on a worst-case scenario, the shadow flicker study area would be up to 1,720 metres (m) from the proposed turbine locations (plus an allowance for any potential micro-siting).
- 16.2.5. From an initial desktop review, based on the current proposed turbine locations, and utilising a 1,720m Study Area as per the worst-case scenario, there are residential properties that fall within the shadow flicker Study Area. Details on the relevant properties included in the Study Area will be provided in the EIA Report. If shadow flicker cannot be avoided through design, technical mitigation solutions are available, such that no significant effects are considered likely.

16.3. Assessment

- 16.3.1. In relation to the previous NLEI scheme, shadow flicker was scoped out of the EIA process, however given the change in turbine dimensions it is appropriate to consider the assessment of shadow flicker for the Proposed Development. Once the final turbine layout and parameters are fixed, the locations of residential properties in proximity to the Site will be verified and if any are situated within 10 rotor diameters, and within 130 degrees either side of north from the proposed candidate turbine locations, a shadow flicker model will be run to predict potential levels of effect.
- 16.3.2. There is no standard UK or Scottish guidance relating to a limit for shadow flicker. The only guidance providing additional recommendations is the Northern Irish PPS 18 (2009) guidance which recommends that for properties within 500 m of the turbines, shadow flicker should not exceed 30 hours per year.
- 16.3.3. The assessment will therefore adopt a criterion of 30 hours of shadow flicker in one year as a significance threshold. Where less than 30 hours of shadow flicker is predicted to occur in one year at a particular property, this is considered to be a minor effect (not significant), with significance increasing in relation to the number of hours (over 30) of shadow flicker per year, in accordance with best practice guidance.
- 16.3.4. The location of all residential dwellings, including confirmation that no new dwellings have been built, or gained planning permission, in proximity to the Site will be verified during the EIA.
- 16.3.5. The shadow flicker assessment comprises numerical modelling of the proposed turbines and receptors within the defined study area. SLR Consulting use one of the industry standard software packages, ReSoft Wind Farm software (version 5.0.1.2). The shadow flicker modelling will calculate the position of the sun throughout the day in accordance with the curvature of the earth, the time of year and the Site's position. The software will calculate the occurrences of shadow flicker at each identified receptor. Analysis will be conducted to represent a worst-case scenario, namely:
- The sun is shining all day, from sunrise to sunset.
 - The rotor plane is always perpendicular to the line from the wind turbine to the sun.
 - There are no obscuring features such as trees and vegetation.
 - The analysis looks at shadow casting over the building from all directions rather than over vertical orientated windows only; and
 - The wind turbine is always operating.
- 16.3.6. A 'likely case' scenario will also be provided, where the average sunshine hours at the Site are taken into consideration.

16.4. Potential Effects

- 16.4.1. Shadow flicker may have an amenity effect on residents in affected properties. Shadow flicker can affect nearby human receptors, and its effects therefore must be considered during the design of the Proposed Development. It only occurs when a specific set of circumstances are present namely when the turbine is in operation (i.e. sufficient wind speed is present), there is limited cloud cover, and the turbine lies between the direction of the sun and the building in question.
- 16.4.2. As shadow flicker only occurs during operation, an assessment of potential effects during construction and decommissioning is scoped out of detailed assessment. An assessment of potential shadow flicker effects will be scoped into detailed assessment if any residential receptors are identified within the Study Area of the final turbine locations.

- 16.4.3. From an initial review of the scoping layout, it is unlikely that shadow flicker could be scoped out of detailed assessment during the operation of the Proposed Development, due to apparent presence of inhabited residential properties within 10 rotor diameters of the turbine locations as they are currently proposed. However, the baseline scenario and necessity for assessment would be confirmed once the design has been finalised.

Cumulative Assessment

- 16.4.4. Once the design has been finalised, a review of operational, under construction, and consented wind energy developments within the vicinity of the Site will be undertaken. If there are any residential receptors identified within both the Study Area of the Proposed Development, and within the equivalent Study Area of a cumulative development, a cumulative shadow flicker assessment will be undertaken to determine the potential cumulative shadow flicker effect on these receptors due to the Proposed Development.

Potential Mitigation

- 16.4.5. If shadow flicker cannot be avoided through design, technical mitigation solutions will be explored, where necessary and appropriate, such that no significant effect would remain.

16.5. Focused Questions

Do consultees agree that the spatial extent of the proposed shadow flicker study area is sufficient and appropriate?

Do consultees agree with the proposed significance thresholds for potential shadow flicker nuisance?

Do consultees agree with the proposed scope of the assessment for shadow flicker, and particularly do consultees agree with the proposal to scope potential effects during construction and decommissioning out of detailed assessment?

17. Other Issues

17.1. Introduction

- 17.1.1. This chapter sets out the proposed approach to the assessment of effects on climate change (including carbon balance), telecommunications, seismic waves, major accidents and disasters and population and human health. A proportionate approach has been taken to the consideration of these topics based on experience from the previous North Lowther Energy Initiative scheme (NLEI scheme) and findings of the related Public Inquiry as well as the current Scoping layout and other relevant topics within this Scoping Report.

17.2. Climate Change (incorporating Carbon Balance)

- 17.2.1. The purpose of the Proposed Development is to generate electricity from a renewable source of energy, offsetting the need for electrical generation from the combustion of fossil fuels. Consequently, the electricity that will be generated and distributed by the Proposed Development will result in a saving in emissions of Carbon Dioxide (CO₂) with associated environmental benefit. The climate change assessment will therefore draw largely on this premise. However, no form of electricity generation is completely carbon free; for onshore wind there will be emissions resulting from the manufacture of components, as well as emissions from both construction and decommissioning activities, and transport.
- 17.2.2. A carbon balance assessment will be undertaken using the latest version of the Scottish Government guidance, and the findings will be presented in a Carbon Balance Report, which will form a technical appendix to the Other Issues chapter in the EIA Report. The main aims of the calculation will be: to quantify sources of carbon emissions associated with the Proposed Development (i.e. from construction, operation and transportation of materials, as well as loss of peat); to quantify the carbon emissions which will be saved by operating the Proposed Development; and to calculate the length of time for the project to become a 'net avoider', rather than a 'net emitter' of carbon dioxide emissions. The Carbon Balance Report will inform the assessment of effects of the Proposed Development in relation to climate change mitigation, which will consider both the estimated carbon losses during construction, and the carbon losses and savings during the Proposed Development's operation (including cumulatively with other wind farm developments). The assessment will be undertaken in accordance with the latest Institute of Environmental Management and Assessment (IEMA) guidance¹⁰⁴, including the method for determining significance of effect.
- 17.2.3. The climate change assessment will also consider the ability of sensitive receptors to adapt to future climate change once the Proposed Development is operational. All specialist topic area authors will be provided with the latest climate change projections (UKCP18) (and relevant assumptions), which allow climate change to be projected at the regional level; in this case, southwest Scotland. Each topic chapter will consider the relevance of this for their baseline descriptions i.e. future baseline, in order to determine those receptors which are susceptible to a changing climate. The adaptation assessment will consider how the Proposed Development may affect the ability of these receptors to adapt to projected climate change, and specifically, whether the significance of effect of the Proposed Development acting upon them will change as a result of future climate change (the in-combination effect). The assessment will be undertaken in accordance with the latest IEMA guidance, including the method for determining significance of effect¹⁰⁵.
- 17.2.4. For the climate change assessment, the following effects will be scoped out:
- The ability of receptors to adapt to climate change during construction of the Proposed Development as these effects are assessed long term, i.e., over the 40-year operational period.

- Project resilience (or vulnerability) to climate change. The latest (IEMA) guidance¹⁰⁵ states that, *"The resilience of something is a measure of its ability to respond to changes it experiences. If a receptor or a project has good climate change resilience, it is able to respond to the changes in climate in a way that ensures it retains much of its original function and form. A receptor or project that has poor climate change resilience will lose much of its original function or form as the climate changes"* (page 49). The Proposed Development will be designed to cope with changes in temperature and rainfall. Turbines will shut down if winds are too strong or if overheating occurs, and appropriate infrastructure design including maintaining up to a 50m buffer around watercourses where possible and the incorporation of standard good practice measures for site drainage (including SuDS principles and designing all watercourse crossings and infrastructure to withstand a 1:200 year flood event) will be achieved.
- Indirect emissions arising during operation from the demand for energy produced using fossil fuels (e.g., electricity for heating, cooling and lighting) as it is expected that power to operate the Proposed Development will come from the turbines themselves or, in the event that the turbines are not generating, the UK grid which is expected to consist mostly of renewable energy generation during the operational life.

17.3. Telecommunications

- 17.3.1. Wind farms can interfere with electromagnetic signals and utilities, potentially affecting TV reception, telecommunication links, and both above and below ground infrastructure. To identify the existing infrastructure constraints for the Proposed Development, consultation and desk based study will be completed for the Site.
- 17.3.2. Consultation with Ofcom, BT, EE and JRC for the NLEI scheme established that four telecommunication links cross the Site and may have had the potential to be affected once the wind farm became operational. Two of these were BT links; one of which connects Green Lowther radio station (approximately 2.7km east of the Site) to Todholes Hill radio station (approximately 5.4km west of the Site) with the other connecting Green Lowther radio station to Fingland Rig within the western side of the Site. Consultation with EE determined that mobile signals are transmitted via the Green Lowther and Todholes Hill radio stations. JRC identified two radio links which pass through the Site. One of these is an Ultra High Frequency (UHF) telemetry link which connects Green Lowther radio station with Fauldhead substation, near Kirkconnel. The other is a point to point microwave link which connects Green Lowther with Craigie Hill, near Prestwick.
- 17.3.3. BT objected to the NLEI scheme application on the basis of the proximity of T2 and T18 to their link path, and likewise; JRC objected on the basis of the proximity of T7 and T8 to their link path. Post-submission discussions between the link operators and NLEI Ltd found that suitably worded planning conditions could be implemented to mitigate the impacts on these links through micro-siting or via a technical mitigation solution. The Reporter assigned to the appeal for the NLEI scheme found this position to be acceptable.
- 17.3.4. Consultation will be undertaken with BT, JRC, O2, EE, Vodafone, Ofcom and Atkins to determine the current telecommunications baseline. Where possible, the design of the Proposed Development will address impacts on links by establishing the necessary stand-off distances recommended by the link operators to avoid interference. Where this is not feasible, additional mitigation will be proposed which was previously deemed to be acceptable for the NLEI scheme. Where impacts are not anticipated on existing links as a result of the Proposed Development, then effects on telecommunications will be scoped out.

¹⁰⁴ IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance (2nd Edition)

¹⁰⁵ IEMA (2020) The Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation

17.4. Seismic Waves

- 17.4.1. Seismic waves in the context of this development, located in the Eskdalemuir Consultation Zone (ECZ), refer to relatively persistent vibration of the ground, due to a multitude of sources, that are often an unwanted component of signals recorded by seismometer. They are primarily generated by surface sources such as anthropogenic activity (transportation, industrial processes), wind and atmospheric phenomena, rivers and ocean waves.
- 17.4.2. Ground vibration can be measured and reported using various metrics including (but not limited to) peak particle velocity (PPV), amplitude (displacement), acceleration and frequency. The amplitude of seismic noise is measured in nanometres (nm) or micrometres (µm).

Eskdalemuir Seismic Array

- 17.4.3. The Site is located ~40km northwest of the Eskdalemuir Seismic Array (EKA), therefore operation of the Proposed Development is anticipated to be subject to a Seismic Impact Limit (SIL).
- 17.4.4. Eskdalemuir Observatory is an environmental observatory near Eskdalemuir village in Dumfries and Galloway. The observatory was purposely located in an area of low background seismic activity, such that interference with measurements would be minimised. There is also a second seismic array approximately 3km to the north, established by the United Kingdom Atomic Energy Authority for monitoring nuclear weapons testing as the UK's contribution to the monitoring network of the Comprehensive Test Ban Treaty (CTBT). The CTBT array has been in operation since 1962.

Eskdalemuir Noise Budget

- 17.4.5. The UK is bound by the Comprehensive Nuclear-Test-Ban Treaty not to compromise the detection capabilities of the EKA
- 17.4.6. Responsibility for the safeguarding of the EKA rests with the Ministry of Defence (MoD).
- 17.4.7. A 'noise budget' of 0.336nm for seismic noise from wind turbines has been set for the EKA; this applies to the cumulative seismic vibration of permitted wind turbines within 50km of the EKA and is defined as a root-mean square (rms) value for displacement.
- 17.4.8. When a proposed new wind farm development is added to a spreadsheet maintained by the MoD, the 'Noise Budget Tool', it re-calculates the cumulative amplitude of the new development, together with all of those already appearing in the spreadsheet.
- 17.4.9. By this means the MoD assesses whether the amplitude of a further proposed development would cause the cumulative total to exceed the noise budget; if so, an objection will be lodged.

NLEI Scheme Seismic Discussion

- 17.4.10. Numerous consultations were undertaken in late 2019 in respect to the available seismic budget for the previous more densely designed NLEI scheme and a noise budget was obtained. However, it is understood that this noise budget' is not transferable to the Glensalloch Wind Farm project. Since 2019, the Eskdalemuir Working Group, led by the Scottish Government, has been re-established to work with the onshore wind industry and the MoD to find a practicable working solution to wind farm deployment within 50km of the array. The Applicant is a member of the Eskdalemuir Working Group.

- 17.4.11. Initial calculations of the anticipated seismic impact of the Proposed Development and representative candidate turbines have been undertaken. The calculations confirmed that the Proposed Development can be delivered at the Site within the established SIL, on the assumption that the seismic budget is made available to the Proposed Development.
- 17.4.12. It is anticipated that the Applicant will therefore consult with the MOD in respect to the Proposed Development and the potential seismic impacts on the EKA.
- 17.4.13. The grid connection date for the Proposed Development is anticipated to be 2030. Given the progress by the Eskdalemuir Working Group to date, and commitments to progress made by the UK Onshore Wind Taskforce, it is expected that an industry-wide solution applicable to the Proposed Development will be implemented prior to the proposed construction start date.
- 17.4.14. Therefore, given the impending solution, it is not anticipated that the Proposed Development would have a significant effect on the operation of the EKA and impacts on the EKA are proposed to be scoped out of the EIA.

17.5. Major Accidents and Disasters

- 17.5.1. The latest IEMA guidance¹⁰⁶ is clear that major accidents and disasters can be scoped out where proposed design measures or compliance with legislation and best practice will minimise the likelihood of a major accident or disaster occurring. The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events, and it is expected that its construction and operation will be managed within the requirements of a number of health and safety related regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974.
- 17.5.2. A Mining Desk Study prepared in support of the NLEI scheme identified two areas within the Site which were considered to present moderate or high risk of mine subsidence due to the presence of mining voids. The high-risk area centres around the flanks of Wanlock Water valley where most historic mining activity took place. The moderate risk area takes into account the wider mining area where deeper mine workings, shafts and/or associated waste material may be present (including around Wanlock Water Valley and to the south of Highmill Knowe). The Site Boundary for the Proposed Development does not include the high risk/moderate risk area previously identified around the Wanlock Water valley, and no turbines or associated infrastructure are proposed in the moderate risk area south of Highmill Knowe (nearest infrastructure (T15) is approximately 865m to the northwest). It is proposed that an appropriate geotechnical assessment will be undertaken during the pre-construction and construction periods of the Proposed Development, as is normal practice for wind farms, to ensure that any previously unidentified geotechnical constraints associated with historic mining are known and avoided, such that there will be a very low risk of mine subsidence during construction and operation.
- 17.5.3. A Peat Stability Assessment undertaken in support of the NLEI scheme identified 10 localised areas of initial stability concern (two high risk and eight moderate risk); these being on Slough Hill, Reecleuch Hill, Highmill Knowe, Willowgrain Hill, White Dod and Wether Hill, albeit most of these locations are no longer within the Site Boundary. As such, peat instability is considered to be a known issue based on peat depth and topography. An updated Peat Landslide Hazard Risk Assessment (PLHRA) will be prepared for the Proposed Development. Infrastructure will be set back from areas of peat instability, and the adoption of applicable good practice measures will reduce the effect of peat instability, such that the risk of a major accident or disaster occurring as a result is unlikely.

¹⁰⁶ IEMA (2020) Major Accidents and Disasters in EIA: A Primer

- 17.5.4. With regards to ice throw, the Applicant will install notices throughout the Site alerting members of the public of the possible risk of ice throw and ice fall under certain conditions.
- 17.5.5. Modern turbines are fitted with sensors which detect if wind speeds are too high to operate safely, resulting in their shut down. This prevents excessive wear and damage to the gearbox and reduces the risk of turbines catching fire or blades being severed. As a result, the risk of turbine mechanical failure is considered to be very low.
- 17.5.6. It is acknowledged that there could be a risk of road traffic accidents occurring as a result of increased traffic volumes, particularly the transportation of abnormal loads, during construction. However, measures to manage traffic movements through construction programming/routeing, and methods to maintain road safety will be included in a Construction Traffic Management Plan (CTMP).
- 17.5.7. Subject to the conclusions of the rest of the EIA Report, it is proposed that effects in relation to major accidents and disasters will be scoped out of the EIA, with appropriate text provided to justify this.

17.6. Population and Human Health

- 17.6.1. A proportionate approach will be taken with regards to the assessment of effects on health based on experience, published studies, IEMA guidance and professional judgement. At this stage, it is anticipated that the assessment of potential health effects will be undertaken in the context of noise (including infrasound and amplitude modulation), private water supplies, flood risk and shadow flicker (the methodologies for which are set out in preceding chapters). Where significant effects associated with these topics are not predicted (i.e. as a primary effect) then it is expected that there will be no resulting effects on health (i.e. as a secondary effect). As such, effects on health associated with these topics (and the requirement for detailed assessment) will be determined as the EIA progresses.
- 17.6.2. With respect to dust effects during construction of the Proposed Development, the Design Manual for Roads and Bridges (DMRB) states that the locations of 'sensitive receptors' within 200m of construction areas should be identified and mitigation measures to reduce dust effects be applied. For any properties within 200m of construction works, the Applicant will commit to adopting good practice measures for dust management during construction (including keeping material imports sheeted) and will implement these through a Construction Environmental Management Plan (CEMP), thereby controlling and reducing any potential effects that dust generation may have on the health of residents. The effects of dust will therefore be scoped out.
- 17.6.3. As a result of extensive mining in the Wanlockhead and Leadhills areas (both east of the Site), there has been a legacy of heavy metal leachate (lead, zinc, cadmium and copper) contaminating groundwater in the Wanlock Valley. As noted above, no turbines or associated infrastructure are located in a mining risk area, such that ground excavation works are not expected to lead to increased heavy metal pollution entering the water environment. Therefore, impacts of heavy metal pollution and potential health effects are scoped out. Moreover, none of the surface water catchments which drain the Site are within a Drinking Water Protected Area (DWPA); therefore, effects on public health through impacts on public drinking water are not likely and are also scoped out.
- 17.6.4. Notwithstanding the above, the EIA process will identify any further geotechnical assessment and/or monitoring programmes required during the pre-construction, construction and post construction periods of the Proposed Development such that there will be a very low risk of increased heavy metal pollution.

17.7. Focused Questions

Do consultees agree with the proposed scope of the assessment of effects on climate change, telecommunications, seismic waves, major accidents and disasters and population and human health, and do they agree with the proposal to scope identified matters out of detailed assessment for these topics?

18. Feedback

- 18.1.1. This report has been prepared for the ECU in support of a request by Glensalloch Wind Farm Ltd for a 'Scoping Opinion' in relation to the information to be provided within the EIA Report to accompany the section 36 application for consent for Glensalloch Wind Farm.
- 18.1.2. The ECU will seek the views of those statutory and non-statutory consultees with an interest in the Proposed Development and these parties will be invited to make comments to the proposed scope of and approach to the EIA process and reporting. Some of the key consultees are tabled below.

Statutory and Non Statutory Consultees Notified of Scoping		
Statutory Consultees:		
Dumfries & Galloway Council	SEPA	NatureScot
Historic Environment Scotland		
Internal Scottish Government Advisors:		
Transport Scotland	Scottish Forestry	
Non Statutory Consultees:		
British Horse Society	BT	Civil Aviation Authority - Airspace
Crown Estate Scotland	Defence Infrastructure Organisation	Fisheries Management Scotland
Nith District Salmon Fishery Board	Nith Catchment Fishery Trust	Galloway and Southern Ayrshire Biosphere
Joint Radio Company	John Muir Trust	Mountaineering Scotland
NATS Safeguarding	RSPB Scotland	Scottish Rights of Way and Access Society (ScotWays)
Scottish Water	Scottish Wildlife Trust	South Lanarkshire Council
Visit Scotland	Glasgow Airport	Glasgow Prestwick Airport
The Coal Authority	West of Scotland Archaeology Service	Galloway and Southern Ayrshire Biosphere
Relevant Community Councils, Village Councils, Village Groups:		
Royal Burgh of Sanquhar Community Council	Wanlockhead Community Council	Kirkconnel and Kelloholm Community Council

- 18.1.3. In responding to the ECU, please also copy your comments to the two addresses below:

Ruth Highgate
Savills
163 West George Street
Glasgow G2 2JJ
Email: ruth.highgate@savills.com

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Appendix 9.1: Cultural Heritage Appraisal

Table 11: Scheduled Monuments within 10km of the Proposed Turbine Locations

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
SM5597	Wanlockhead, remains of lead mining and smelting	0-15	1.8km	West	Scoped in for further assessment.
SM4714	Waterhead, platform settlement 900m N of	0	7km	Southwest	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.
SM4275	Cairn Kinny	15	7.1km	Southeast	The asset is a prehistoric cairn, located at the summit of Cairn Kinny hill at 493m AOD. The cairn overlooks the lesser summits of Ewe Hill to the east and Bain's Knowe to the north. The cairn overlooks the Duneaton Water, c.2km to the north and east, and tributaries of the watercourse, including Shaw Burn to the north. Cairns are often found in elevated positions, overlooking watercourses, valleys, or other natural routeways through the landscape. As a funerary monument, the cairn was likely constructed to be visible from the surrounding landscape, as well as to have wide-ranging views over the surrounding landscape. The aspects of the asset's setting which contribute to its significance comprise its wide-ranging

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					views, particularly views of the lower lying watercourses that it surrounds, as well as views of the asset when approaching through these routeways. The ZTV indicates that the Proposed Development would introduce 15 turbine tips in views to the southeast, along the distant hill tops of the Lowther Hills. The Proposed Development would not be present in views towards the watercourses, nor present in views when approaching the asset along the watercourses. Whilst the Proposed Development is present in views to the southeast, the hills that the asset is located upon do not form part of the asset's setting. As such, the Proposed Development would not impact the ability to understand, appreciate and experience the asset and its setting. It is scoped out of further assessment.
SM650	Castlehill, earthwork 400m S of	1	9.7km	Northwest	The asset is a medieval moated site, located at the base of a valley within the Lowther Hills. Kirk Burn runs 0.5km to the east, and Carron Water runs 0.4km to the west, with both watercourses meeting 1.5km to the south. The

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					survey records¹⁰⁷ for the asset state that it is situated within a non-defensive pastoral setting, supported by surrounding evidence of rig and furrow, indicating the asset is a possible homestead. The asset's pastoral setting comprises its proximity to the two watercourses and the low-lying fertile ground, which is suitable for agriculture or grazing. Whilst the asset is not thought to be defensive, the asset would have had good views along the low-lying valley, which runs north to south, which would have allowed for visibility of cattle or a general defensive aspect of the asset's setting. The Proposed Development would introduce a single turbine in views to the northwest. The turbine would not impact the ability to understand, appreciate, or experience the asset's pastoral setting or its placement within the low-lying valley. As such, the asset is scoped out of further assessment.
SM681	Kirkbride Kirk, Kirkbride	0	6.8km	Northwest	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith

¹⁰⁷ Historic Environment Scotland (2025) Castlehill. Available at: <https://www.truve.scot/place/46378>

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					the ZTV. As such, it has been scoped out of further assessment.
SM679	Orchard, cross socket	0	3.3km	Northeast	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.
SM656	Kemps Castle, fort 320m SW of Euchar Bridge	9-15	6.1km	Northeast	Scoped in for further assessment.
SM687	Crichton Peel & Sanquhar Castle	7	4.9km	Northeast	Scoped in for further assessment.
SM708	Ryehill, motte	4	4.9km	Northeast	The asset is a medieval motte, situated in the flood plain of the River Nith, which is located to the asset's south. The motte was constructed by the prominent Ross family, who settled in the area at the end of the 12 th century. The asset was likely situated within the floodplain for both agricultural and defensive reasons. The surrounding fertile soil may have been ideal for agricultural cultivation or the grazing of livestock. In addition, the river floodplain would act as a natural routeway through the landscape, demonstrated by the route of the

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					Modern A76, which runs to the north of the asset. The positioning of the motte would have allowed the inhabitants to control access along this routeway and act as a visual display of command over the valley. As such, key approaches towards the asset follow the course of the river, roughly northwest to southeast. The asset is situated c. 1km to the southeast of Crichton Peel and Sanquhar Castle (SM687), also constructed by the Ross family, albeit at a slightly later date. Whilst views towards the later castle weren't part of the original placement of the castle, views between the two assets provide context for the Ross family's presence within the area in the medieval period. The ZTV indicates that the Proposed Development would introduce up to four turbine tips within views to the northeast of the asset. The turbines would not be present in direct views when approaching the asset along the river, nor when looking between the two medieval assets situated along the banks of the River Nith. Whilst these turbines may be present within peripheral views when approaching the asset, the turbines would not present a distraction to the ability to understand, appreciate or experience the

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					asset's agricultural or defensive position, nor the wider context of the Ross family's presence in the area during the medieval period. As such, the asset is scoped out of further assessment.
SM670	Durisdeer, Roman fortlet between Dash Cleuch and Kirk Burn	0	9.6km	Northwest	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.
SM678	Auchengruith Craig, cross-shaped earthwork	0	2km	Northwest	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.
SM90310	Wanlockhead Beam Engine	5	3.5km	Northwest	Scoped in for further assessment.
SM13677	Historic gold workings, Leadhills, South Lanarkshire	0	7.3km	West	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
SM13747	St Connel's Church and graveyard	0	9km	East	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.
SM5817	Lead mines and associated remains, Leadhills	0-14	4km	West	Scoped in for further assessment.
SM5597	Wanlockhead, remains of lead mining and smelting	0-15	1.8km	West	Scoped in for further assessment.
SM4714	Waterhead, platform settlement 900m N of	0	7km	Southwest	The asset, its key approaches, points of appreciation and views with intervisibility between contemporary assets all lie outwith the ZTV. As such, it has been scoped out of further assessment.

Table 12: Category A Listed Buildings within 10km of the Proposed Turbine Locations

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
LB17192	Wanlockhead Village Library	6	3.4km	Southwest	The asset is a small village library, dated to 1850. The building houses the Miners' Library, which is one of the oldest subscription libraries in Scotland. The building is not the original home of the library, which was established in 1756, with the library's current home being funded by voluntary subscriptions and formally opened in 1851. The asset has some architectural interest, as a vernacular purpose-built library cottage, but the asset's significance primarily comes from the miners' library, which was extremely important in the education of the miners who lived in Wanlockhead. The asset's setting is the mining village of Wanlockhead, where the miners would have lived. The mining village provides context to the library, demonstrating the type of patrons that may have visited it. Wide-ranging or long-distance views do not contribute to the aspects of the setting of the asset which contribute to its significance. The ZTV indicates that the Proposed Development would introduce six turbine tips into views to the southwest. As long-distance views do not contribute to the asset's significance, the Proposed Development would

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					not impact the ability to understand, appreciate or experience the Miner's library within the context of Wanlockhead. It is therefore scoped out of further assessment.
LB40540	High Street, Tolbooth/Town House	9	5.1km	Southwest	The asset is a tollbooth, located along the high street in Sanquhar. The building was designed by William Adam in the Baroque style, and construction commenced in 1735. The tollbooth replaced an earlier one, which had stood on the site since the late 15th century. The asset primarily derives its significance through its architectural interest, as a well-preserved Baroque style tollbooth, with interesting architectural features both externally and internally. The asset also derives its significance from its historical interest, both through its relation to William Adam and its location on the site of the earlier structure. The asset's setting comprises its position within Sanquhar, which helps provide context for its construction, as well as the key approach northwest along Sanquhar High Street, which provides a key point of appreciation for the building. Whilst the ZTV indicates that up to nine turbine tips would be visible from the Tollbooth, the ZTV presents a bare earth scenario. In reality,

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					views of the Proposed Development would be screened by the surrounding built environment of Sanquhar. As such, the Proposed Development would not impact the ability to understand, appreciate, or experience the Tollbooth when approaching along the high street and would not impact the ability to understand the asset's connection with Sanquhar. It is therefore scoped out of further assessment.
LB732	Scots Mining Company House Including Retaining Wall To Station Road And Excluding Former Stable Block And Gatepiers, Station Road, Leadhills	0	5.1km	Southwest	The asset, its key approaches and points of appreciation all lie outwith the ZTV. As such, it has been scoped out of further assessment.

Table 13: Category B Listed Buildings within 5km of the Proposed Turbine Locations

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
LB10276	The Holm	10	4.0	Northeast	The asset is a late 18th/early 19th century stable block, in a classical style. The asset derives its significance primarily from its architectural interest, with many original features including the tall two-storey inner range, the quadrangular walled garden, and the symmetrical single-storey flanking wings. Whilst adjacent to the B740 road, which runs to its north, the asset sits at a lower elevation than the road, which means that the architecture of the asset cannot be fully appreciated upon the approach. The asset's setting once comprised the wider Queensberry Estate, as the stables once formed subsidiary buildings for a shooting lodge. The shooting lodge has since been demolished but was located to the asset's east. Whilst the asset still exists within a rural setting, the original connection to the shooting lodge is no longer extant. As such, the setting of the asset has a minimal contribution to its significance, only demonstrating the rural nature of the surrounding area at the time of its construction. As such, whilst the immediate rural landscape has some contribution to the significance of the asset, views of the wider landscape do not.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					The ZTV indicates that the Proposed Development would introduce up to 10 turbine tips in views from the asset. As noted, views of the wider landscape do not contribute to the significance of the asset and views of the proposed turbines would not impact the ability to understand, appreciate, or experience the asset within its immediate rural landscape. It is scoped out of further assessment.
LB17196	Wanlockhead Village, Stewart Place	5	3.2	Northeast	The asset comprises the original company store within the centre of Wanlockhead, which once served as the main shop for those who worked at the lead mine and lived in the village. The asset derives part of its significance from its architectural interest, as the early 1800s building remains significantly in its original form. The asset also derives its significance from its historical interest as a company store, which operated under the Truck System from the 18 th century until 1871. A co-operative store remained in its place until 1900. In addition, the company store likely inspired a similar system in New Lanark. The asset's setting comprises the mining village of Wanlockhead, which housed the mine workers, and the asset's location within the wider mining landscape. The ZTV indicates that up to five turbine tips would be visible from

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					the asset in views to the northeast. The built environment of Wanlockhead is likely to limit and restrict these views further. Whilst the mining landscape provides context for the placement of the asset, long-distance views of five turbine tips would not distract from or impact the ability to understand, appreciate or experience the asset within the mining landscape. The ability to understand, appreciate and experience the asset within the mining context would remain intact. The asset is therefore scoped out of further assessment.
LB17254	Crawick Viaduct	14	4.7	Northeast	The asset is a railway viaduct, dating to 1859. The viaduct carries the Closeburn to New Cumnock rail line over Crawick Water and the B740 road. The asset derives its significance primarily from its architectural interest, with channelled bull-faced ashlar masonry, rusticated voussoirs, and battered piers. The asset's setting comprises its functional position over the road and Crawick Water. Outward views from the viaduct do not contribute to its significance. However, views from the road and the river offer the chance to appreciate the architecture of the viaduct from below.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					The indicates that 14 turbine tips may be visible from the asset and along the B740 towards the asset in views to the northeast. As noted, outward views from the viaduct itself do not contribute to its significance. The turbines may be present in views towards the viaduct from the B740, however, they would not present a distraction to the ability to understand, appreciate or experience the asset and its architectural interest. The asset is scoped out of further assessment.
LB17255	Eliock Bridge	0	4.8	North	The asset, its key approaches and points of appreciation all lie outwith the ZTV. As such, it has been scoped out of further assessment.
LB17260	Mennock Viaduct	0	4.8	North	The asset, its key approaches and points of appreciation all lie outwith the ZTV. As such, it has been scoped out of further assessment.
LB40537	2 Church Road	9	5.0	Northeast	The assets comprise Category B Listed Buildings within the settlement of Sanquhar. They comprise buildings from the 18 th and 19 th centuries when the town was undergoing a period of expansion due to intensive industrial activity within the surrounding area. The assets are located within the Sanquhar Conservation
LB40547	39, 41 High Street, Post Office And House	5	4.9	Northeast	
LB40548	63 High Street, Bank Of Scotland	5	4.9	Northeast	

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
LB40549	71, 73 High Street.	5	4.9	Northeast	Area and provide the Conservation area with its post-medieval character. The structures primarily derive their significance from their architectural interest, with well-preserved 18th and 19th-century features. Some assets contain rare examples of architectural features from this period, such as the bow-fronted post office (LB40547). In addition, the assets derive their significance, in part, from their historic interest, as they demonstrate the development of Sanquhar over the 18th and 19th centuries in response to the advancing industry in the area. The aforementioned post office is the oldest still-operating post office in the world, having been founded in 1712. The assets' setting comprises Sanquhar itself, which provides context for their construction and allows their original use, and any subsequent reuses, to be understood, appreciated and experienced. The assets do not derive their significance from any long-distance views of the surrounding landscape. Whilst the ZTV indicates that between five and nine turbine tips would be visible from these assets, as they do not derive their significance from views of the wider landscape, the
LB40551	High Street, St Ninians Church, Hall, Gatepiers And Screen Wall	4	4.8	Northeast	
LB40554	26 High Street, Royal Bank Of Scotland	8	4.9	Northeast	
LB40557	74, 76 High Street	5	4.9	Northeast	
LB40558	78-86 High Street (Even Numbers)	5	4.9	Northeast	
LB40561	Laurie's Wynd, Former Crichton School	5	4.8	Northeast	
LB40562	Laurie's Wynd, Crichton Schoolhouse	5	4.8	Northeast	
LB40549	71, 73 High Street.	5	4.9	Northeast	

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					Proposed Development would not impact them. As such, they are scoped out of further assessment.

Table 14: Inventoried Gardens And Designed Landscapes Within 10km Of The Proposed Turbine Locations.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
GDL00143	Drumlanrig Castle	0-15	8.5	North	The asset is an Inventoried Garden and Designed Landscape (GDL), which dates back to the 17th century. The GDL surrounds Drumlanrig Castle (LB3886), which is located in the south of the GDL. The GDL comprises multiple designed elements, including parkland, drives, woodland plantations, formal gardens, and multiple outbuildings. It also contains the River Nith, which runs through the centre of the GDL. The significance of the GDL derives from the combination of these features, with multiple key views which provide opportunities to understand, experience and appreciate the GDL. The ZTV indicates that there would be limited to no visibility of the Proposed Development across the majority of the GDL, including from the main approach towards the castle. There are areas of greater visibility, mainly on the higher ground to the west of the GDL. The majority of the higher ground comprises the historic Rig Plantation, where outward and long-distance views are deliberately limited and screened due to the woodland. Further areas of greater visibility include some open parkland in the east of the GDL and the

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					northwest. Whilst there are paths and drives which wind through the parkland, they intended to highlight views of the parkland itself instead of showcasing views of the wider landscape. As such, views of the wider landscape, including those towards the Proposed Development, do not contribute to the significance of the GDL in the areas with visibility of the proposed turbines. As such, the asset is scoped out of further assessment.
GDL00413	Crawick Multiverse	0-15	4.2	Northeast	Scoped in for further assessment.
GDL00339	Scot's Mining Company House	0	5km	Southwest	The asset, its key approaches and points of appreciation all lie outwith the ZTV. As such, it has been scoped out of further assessment.

Table 15: Conservation Areas Within 5km Of The Proposed Turbine Locations.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
CA180	Wanlockhead	0-15	2.1	Southwest	Scoped in for further assessment
CA326	Sanquhar	0-9	4.7km	Northeast	Sanquhar is a conservation area, centred on the Sanquhar High Street. Sanquhar is a village with likely medieval origins; however, the majority of the remaining buildings are post-medieval in date. The village originally had a role as a royal burgh and has an extensive history of industrial and agricultural activity. Due to this industrial activity, both from mining and milling, the settlement expanded in size within the 18th and 19th centuries. As such, the centre of Sanquhar developed fully during this period and has retained a post-medieval character, demonstrated through its 18th and 19th-century buildings. These buildings include the Category A Listed Tollbooth (LB40540), situated at the northeast of the village, and multiple Category B and C Listed Buildings. As noted, the majority of these buildings are situated along the high street, which is the retained historic core of the settlement. The key approach through the village is along the A76, which forms Sanquhar High Street and runs northwest to southeast. This approach forms the main point of appreciation for the character of the conservation area.

Designation Reference	Designation Title	Zone of Theoretical Visibility (0-15 Turbines)	Distance to Nearest Turbine (km)	Direction to Nearest Turbine	Appraisal Comments
					Whilst the ZTV indicates that between zero and nine turbine tips from the Proposed Development are anticipated to be visible from the conservation area in a bare earth scenario, this does not account for the built environment of Sanquhar acting as a screening. In reality, the Proposed Development would not be visible along the majority of the high street due to the surrounding built environment, and where visible, the turbine tips would not cause a distraction to the post-medieval character of Sanquhar. At most, the turbines would be visible from roads leading out of the conservation area along its northern boundary, however, these outward views do not form part of the conservation areas character. As such, the asset would not be impacted by the Proposed Development. It is scoped out of further assessment.
CA393	Leadhills	0	4.8	West	The asset, its key approaches and points of appreciation all lie outwith the ZTV. As such, it has been scoped out of further assessment.

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