



Eurowind Energy Ltd

Whitehill Wind Farm **EIA Scoping Report**

Final Report

LUC

June 2026



Eurowind Energy Ltd

Whitehill Wind Farm EIA Scoping Report

Project Number
16355

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Chapter 1

Introduction

1.1 Eurowind Energy Limited (hereafter referred to as 'the Applicant') intends to apply to North Ayrshire Council (NAC) under the Town and Country Planning (Scotland) Act 1997 as amended ('the Act') to construct and operate Whitehill Wind Farm and associated infrastructure (hereafter referred to as 'the Proposed Development'). The Proposed Development comprises up to five wind turbines with blade tip heights of up to 200 m, and associated infrastructure. It is located within the south-eastern extents of Clyde Muirshiel Regional Park (CMRP) across Lairdsie Hill and Greenside Hill approximately 3.8 km east of Largs and 3.2 km north-west of Kilbirnie (hereafter referred to as 'the Site').

1.2 The Site is wholly within the administrative area of NAC, and the location of the Site is shown in **Figure 1.1: Site Location**.

Purpose of the EIA Scoping Report

1.3 As the Proposed Development will have an installed capacity below 50 megawatts (MW), the Applicant will apply to NAC for planning permission under the Town and Country Planning (Scotland) Act 1997 (as amended).

1.4 Under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ('the EIA Regulations'), for certain types of developments, an Environmental Impact Assessment (EIA) must be undertaken. The EIA Regulations set out the types of development which require an EIA (referred to as 'Schedule 1 development') and other developments which may require EIA should they give rise to potentially significant effects (referred to as 'Schedule 2 development').

1.5 The Proposed Development does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations, but it does fall under Schedule 2 of the EIA Regulations, 3(a) 'an industrial installation for the production of electricity' and exceeds the threshold of the installation of more than 0.5 hectare. The Proposed Development has potential to give rise to significant environmental effects, in particular on landscape grounds, and therefore qualifies as EIA development and as such is subject to an EIA. The planning application will therefore be accompanied by an EIA Report.

1.6 LUC has been commissioned by the Applicant to prepare this Scoping Report as defined within the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations), and which accompanies the Applicant's written request to NAC for a 'Scoping Opinion' as to which environmental effects are to be considered in the EIA Report.

The Applicant

1.7 Established in Denmark in 2006, Eurowind Energy Limited is one of Europe's leading renewable energy developers, with operations in 16 countries across Europe and the United States.

1.8 Eurowind Energy Limited employs an experienced UK team based in Glasgow that was established in 2021. Eurowind Energy UK has one operational wind farm and one consented 16 MW solar farm at Howpark, in the Scottish Borders, as well as the recently consented flagship project Uisenis Wind Farm on the Isle of Lewis (189MW), and a growing development portfolio of over 2.5GW across the UK.

1.9 Eurowind Energy Limited develop, construct, and operate wind, solar photovoltaic and 'Power to X' assets across Europe and in the USA. They are dedicated to local long term solutions and believe that the

future of energy supply is renewable, clean, and sustainable. Projects are developed in close collaboration with a range of local stakeholders to develop smart schemes that work for all. Eurowind Energy Limited only engages in projects that they themselves want to invest in.

1.10 Further information on Eurowind Energy Limited can be found on its company website at <https://www.eurowindenergy.com>.

The Need for and Benefits of the Project

1.11 Globally, the UK has some of the most ambitious climate change and low carbon targets, and has most recently committed to the complete decarbonisation of UK electricity supply by 2030¹ to support its progress towards its legally binding net-zero target by 2050². The Scottish Government has also set a target of achieving net-zero by 2045³, and meeting 50% of total energy demand from renewables by 2030⁴. The Scottish Government published an updated Onshore Wind Policy Statement (OWPS)⁵ on 21 December 2022. The OWPS states that with nearly 9 GW currently operational in Scotland, onshore wind is a cheap and reliable source of zero carbon electricity. The OWPS sets an overall ambition of 20 GW of installed onshore wind capacity in Scotland by 2030 to meet the wider energy and climate change targets. The 20 GW is not a cap, and it is currently expected that onshore wind will play an important part of the drive toward net zero past 2030.

1.12 The Proposed Development will contribute to energy and climate change targets by providing renewable electricity generation in Scotland, and an opportunity to reduce carbon dioxide (CO₂) emissions from electricity use. The EIA Report will include information on the Proposed Development's contribution to renewable energy targets and climate change, through the carbon balance calculation (see **Chapter 11: Other Issues** below).

1.13 In addition, the Proposed Development will provide social and economic benefits to local communities and to the wider region, for example through financial investment. Details of the socio-economic benefits of the Proposed Development will be set out in a standalone Socio-economic, Tourism and Recreation Assessment Report prepared by BiGGAR Economics, which will be separate to the EIA Report and support the Town and Country Planning application. This will consider whether the Proposed Development maximises net economic benefit, in the context of Policy 11 of Scotland's National Planning Framework 4 (NPF4), which states in paragraph (c) that "*development proposals will only be supported where they maximise net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities*".

Planning Policy Context

1.14 The assessment of the Proposed Development's accordance with the relevant national, regional and local planning policy and renewable energy framework will be provided in a separate Planning Statement to be submitted in support of the Town and Country Planning application. In this instance, the development plan comprises NAC's Local Development Plan (LDP2)⁶. However, NAC is currently in the early stages of preparing their LDP3, but this is not expected to be adopted until June 2028 (after the submission of the planning application). The progress of LDP3 will nonetheless be kept under review as the EIA for the Proposed Development progresses.

¹ DESNZ (2024) Clean Power 2030 Action Plan. Available [online] at: <https://www.gov.uk/government/publications/clean-power-2030-action-plan>

² Climate Change Act 2008. Available [online] at: <https://www.legislation.gov.uk/ukpga/2008/27/contents>

³ The Climate Change (Scotland) Act 2009. Available [online] at: <https://www.legislation.gov.uk/asp/2009/12/section/A1>

⁴ Scottish Government (2017). The Future of Energy in Scotland: Scottish Energy Strategy. Available [online] at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/>

⁵ Scottish Government (December 2022) Onshore Wind: Policy Statement 2022 [online].

Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2022/12/onshore-wind-policy-statement-2022/documents/onshore-wind-policy-statement-2022/onshore-wind-policy-statement-2022/govscot%3Adocument/onshore-wind-policy-statement-2022.pdf>

⁶ <https://www.north-ayrshire.gov.uk/Document-library/ldp2.pdf>

1.15 The objectives of the UK and Scottish Governments will be summarised in the Planning Statement in relation to encouraging increased deployment and application of renewable energy technologies, consistent with sustainable development policy principles and national and international obligations on climate change.

Consultation

Scoping Consultation

1.16 This Scoping Report is being issued to NAC who will consult with statutory and non-statutory consultees (as listed in **Appendix A: Proposed Scoping Consultee**) before adopting their Scoping Opinion. The specialist EIA team will continue to liaise with consultees as required to agree any additional assessment methodologies, design mitigation or key concerns.

Public Consultation

1.17 The Applicant will actively engage in discussions with local community groups and councils regarding community involvement in the Proposed Development, and how the community might benefit from the Proposed Development.

1.18 Public consultation events will be held in person as the proposals progress, and these will be advertised in the local press in advance. This consultation will provide an opportunity for the public to learn about the Proposed Development, through viewing information boards, maps and visualisations. Feedback on the Proposed Development will be encouraged; and where received, this will be taken into account in the design of the Proposed Development.

1.19 A Proposal of Application Notice will be submitted to NAC prior to the submission of the planning application to agree the approach to consultation. The feedback from the consultation events will be summarised within the Pre-Application Consultation Document that will accompany the EIA Report as part of the planning application submission.

Document Structure

1.20 The remainder of this Report is structured as follows:

- **Chapter 2** provides information on the EIA process and assessment methodology.
- **Chapter 3** provides a brief description of the Proposed Development and the Site.
- **Chapters 4 – 11** outline the topic areas proposed to be considered in the EIA.

1.21 This report is accompanied by the following figures:

- **Figure 1.1:** Site Location;
- **Figure 3.1:** Scoping Layout;
- **Figure 4.1:** Scoping Study Area and Proposed LVIA Study Area;
- **Figure 4.2a:** Blade Tip Height ZTV (200 m) and Visual Receptors;
- **Figure 4.2b:** Blade Tip Height ZTV (200 m) and Visual Receptors within 20 km;
- **Figure 4.3a:** Hub ZTV Height (118 m) & Visual Receptors;
- **Figure 4.3b:** Hub ZTV Height (118 m) & Visual Receptors within 20 km;
- **Figure 4.4a:** Blade Tip Height ZTV (200 m) & Landscape Character Types (LCTs);
- **Figure 4.4b:** Blade Tip Height ZTV (200 m) & Landscape Character Types (LCTs) Legend;
- **Figure 4.5:** Blade Tip Height ZTV (200 m), Designated Landscapes & Wild Land;
- **Figure 4.6:** Cumulative Wind Farm Developments;

- **Figure 5.1:** Ecological Survey Area;
- **Figure 5.2:** Ecologically Designated Sites within 5 km and 10 km of the Site;
- **Figure 6.1:** Ornithology Survey Areas;
- **Figure 7.1:** Heritage Assets within the Site;
- **Figure 7.2:** Non-designated Heritage Assets within the Inner Study Area;
- **Figure 7.3a-c:** Designated Heritage Assets within the Inner Study Area;
- **Figure 7.4a-d:** Designated Heritage Assets within the Outer Study Area;
- **Figure 7.5:** Cultural Heritage Visualisation Locations;
- **Figure 8.1:** Hydrology Overview;
- **Figure 8.2:** NatureScot Peatland Classification; and
- **Figure 8.3:** Peat Depths.

1.22 Additionally, the following appendices accompany this EIA Scoping Report:

- **Appendix A** lists the consultees that will be contacted by NAC to inform the scope of the EIA, as well as those that will be approached for information to inform the EIA;
- **Appendix B** provides a consolidated list of all questions for consultees;
- **Appendix C** provides a list of the turbine coordinates and indicative turbine specifications assumed in this Scoping Report; and
- **Appendix D** sets out the findings of the Phase 1 Peat Survey Report.

Chapter 2

The Environmental Impact Assessment

What is EIA?

2.1 EIA is the process of systematically compiling, evaluating and presenting all the likely significant environmental effects, both positive and negative, of a proposed development, to assist the determining authority (in this case the Local Planning Authority, i.e. NAC) in considering the application. It enables the significance of these effects, and the scope for reducing negative, or enhancing positive, effects to be clearly understood. The information compiled during the EIA is presented within an EIA Report to accompany the application.

2.2 EIA is an iterative process and runs in tandem with project design. As potential effects are identified, the design of the Proposed Development will be adjusted to reduce or avoid adverse effects where possible, and mitigation measures will be proposed as appropriate.

2.3 The EIA will be conducted with regard to current regulations, policy and guidance, including:

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017⁷;
- National Planning Framework 4 (NPF4)⁸;
- NatureScot (formerly Scottish Natural Heritage (SNH) (2018) (5th Edition), Environmental Impact Assessment Handbook⁹;
- Institute of Environmental Management and Assessment (IEMA) (now ISEP) (2017), Delivering Proportionate EIA; and
- PAN 1/2013 Environmental Impact Assessment (updated June 2017).

2.4 The EIA process will include the following key stages as set out below.

Scoping

2.5 The purpose of Scoping is to focus the EIA on the likely and relevant significant environmental effects associated with a proposal. On the basis of the expert judgement of the assessment team, experience from similar projects, as well as relevant policy, guidance and standards, each of the topic chapters within this report outline both:

- Potential likely significant effects associated with construction and operation of the Proposed Development, which will be assessed in detail in the EIA Report; and
- Effects which are considered unlikely to be significant and requiring no further assessment.

2.6 Additional objectives of the Scoping Report are:

⁷ The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Available [online] at: <https://www.legislation.gov.uk/ssi/2017/102/contents>

⁸ National Planning Framework (NPF) 4. Available [online] at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf>

⁹ NatureScot (2018). Environmental Impact Assessment Handbook V5. Available [online] at: <https://digital.nls.uk/pubs/e-monographs/2020/216527997.23.pdf>

- To establish the availability of baseline environmental data and its source;
- To define and agree a survey framework from which a comprehensive overall assessment can be produced;
- To invite comments on the proposed assessment methodologies;
- To invite consultees to identify any concerns that they might have in relation to the Proposed Development and respond to key questions asked throughout (see green text boxes);
- To provide and receive information relevant to the Proposed Development; and
- To consider the way in which the findings are presented in the EIA Report.

2.7 A number of statutory and non-statutory consultees will be consulted during the course of the EIA to agree assessment methodologies, and to discuss the design and mitigation where required. Additional suggestions of other stakeholders who may have an interest in the Proposed Development, and who may wish to be consulted for information to inform the EIA, are welcomed.

2.8 Questions are included throughout the Scoping Report to help focus the feedback and ensure the maximum value of the Scoping process is realised for both the Applicant and consultees. A consolidated list of all questions included in the Scoping Report is provided in **Appendix B**.

Baseline Conditions

2.9 Part 3 of Schedule 4 of the EIA Regulations states that an EIA Report should include: “*A description of the relevant aspects of the current state of the environment (the “baseline scenario”) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of relevant information and scientific knowledge*”.

2.10 The purpose of the EIA is to assess how environmental conditions may change as a result of the Proposed Development. To assess the potential environmental effects, it is important to identify the environmental conditions that currently exist within the Site and surrounding area, or will exist in the future, assuming there will be no development on the Site. These conditions are referred to as the ‘baseline’ and are usually established through a combination of desk-based research, site surveys, and empirical studies and projections. Together, these describe the current and future character of the Site and surroundings, and the value and vulnerability of key environmental resources and receptors. This baseline work has been ongoing for a number of the topics which will be assessed in the EIA, and will be further informed through a combination of consultation with stakeholders, field survey work and desk-based research.

2.11 Making predictions about how parameters such as land use, landscape, views and other environmental characteristics may change in the future relies on assumptions about future development and environmental trends. For this reason, the baseline adopted for the EIA is normally taken as the current character and condition of the proposal site and its surroundings. The likely significant environmental effects of the Proposed Development are then assessed in the context of the current conditions.

2.12 As natural processes and/or human activities can affect the baseline, it is also important to establish a future baseline scenario in the absence of the Proposed Development, i.e., the likely environmental conditions that would exist should the Proposed Development not be constructed. This is also a requirement of the EIA Regulations. Establishing the future baseline scenario requires professional judgement as to what natural process changes and/or changes as a result of human activity should be included or excluded from the future baseline scenario, informed by available environmental information and scientific knowledge.

2.13 Baseline conditions, and the means by which these have been established, will be considered by each specialist topic (where relevant) in the EIA Report. This will include consideration of the future baseline scenario which acknowledges the absence of the Proposed Development and the implications of climate change for existing conditions, including consideration of the way in which projected climate change

conditions may alter the current baseline conditions of the Site during the construction and operational phases of the Proposed Development.

Assessment of Effects

2.14 For each topic that is identified as requiring further study (i.e. 'scoped in' to the EIA Report) a detailed technical assessment will be carried out in line with the scope and methodology agreed upon with relevant consultees. Individual technical assessments will be undertaken by competent and appropriately qualified consultants, and will follow technical standards and adhere relevant guidance.

2.15 The assessment of potential effects, using a range of appropriate methodologies, will consider the construction and operational effects associated with the Proposed Development in relation to the Site and its environs.

2.16 It is proposed that decommissioning effects are not assessed in detail on the basis that effects are likely to be similar to or less than construction effects depending on the topic, and the baseline conditions at the time of decommissioning cannot be accurately known at the time of assessment. This approach is in line with Scottish Renewables Guidelines on Streamlining Environmental Impact Assessment for Onshore Wind Farms (September 2025)¹⁰. Further details on the approach to decommissioning are provided in **Chapter 3** below.

2.17 Study areas (including cumulative study areas) will be defined separately for each topic assessed in the EIA Report to reflect the likely extent of potential significant effects in accordance with professional judgement and guidance.

Assessing Significance

2.18 The significance of environmental effects is typically assessed by considering both the type of change (i.e. the size and duration of the impact) and the value/sensitivity of the environmental feature that experiences this impact (i.e. the receptor).

2.19 Effects may be direct, indirect, secondary or cumulative. Within these categories, they may also be described in terms of their duration (short, medium or long-term), permanence (temporary or permanent), and nature (beneficial or adverse). Direct effects are changes to the baseline arising directly from activities that form part of the Proposed Development, for example, a localised increase in noise during construction. Indirect effects are those that arise as a result of a direct effect, for example, deterioration of water quality due to a pollution event which could result in effects on aquatic biodiversity.

2.20 Each specialist chapter of the EIA Report will set out the topic specific criteria used to assess effects. This will be based on the following where appropriate to each topic:

- Nature of the effect, described as adverse, neutral or beneficial;
- Magnitude of impact, for example, based on a scale of high, medium, low or negligible;
- Likelihood of the effect, based on a scale of certain, likely or unlikely;
- Duration of the effect, based on a scale of long, medium or short term;
- Reversibility of the effect, being either reversible or irreversible;
- Value of the receptor, based on a scale of international, national, regional, local or negligible; and
- Sensitivity of the receptor based on a scale of high, medium, low or negligible.

2.21 Each of the assessment chapters will outline the specific criteria, including sources and justifications, for identifying the different levels of effect, based on good practice guidance, informed by professional judgement. Where possible, this will be based upon quantitative and accepted criteria together with the use

¹⁰ Available at
https://www.scottishrenewables.com/assets/000/005/061/Streamlining_EIA_Guidance_September_2025_original.pdf?1758009802

of value judgements and expert interpretations to establish to what extent an effect is considered significant. The threshold at which effects are likely to be 'significant' will be defined in each of the assessment chapters. Unless stated otherwise in methodologies set out in the topic chapters, '**Major**' or '**Moderate**' effects are considered to be 'significant' in the context of the EIA Regulations. A level of effect of 'Minor' or less is considered 'not significant'.

2.22 An example matrix considering both the sensitivity of a receptor and the magnitude of impact to determine the significance of an effect¹¹ is included as **Table 2.1** below.

Table 2.1 Example Matrix Used to Determine the Significance of Effect

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

Cumulative Assessment

2.23 As part of the EIA an assessment will be made of the likely significant cumulative effects of the Proposed Development in combination with other wind farms and large-scale developments where relevant, including:

- Schemes which have been submitted but not yet determined;
- Schemes which are consented; and
- Schemes which are under construction¹².

2.24 The purpose of the cumulative assessment will be to determine the 'additional' effects of the Proposed Development should it be considered within a future, albeit more speculative, baseline.

2.25 Cumulative study areas will be defined for each topic assessed the EIA Report and this will determine which schemes are included. Operational wind farms, and those under construction, will be included as part of the current baseline in line with current practice.

2.26 Operational, consented and proposed wind farm developments located within 45 km of the site boundary are listed in **Table 4.4** below and shown on **Figure 4.6**, with an indication of their status at the time of writing.

Interrelationships between Effects

2.27 Whilst the EIA Report will be structured in standalone separate assessment chapters, some topic areas, such as ecology and hydrology, can be interrelated. As such, the interrelation between effects will be considered in the relevant chapters of the EIA Report, where appropriate, in accordance with the EIA Regulations.

¹¹ The terms 'effect' and 'impact' are often used interchangeably to describe the changes experienced by a receptor following a particular event or activity. To ensure consistency, the term 'effect' is used throughout to describe any outcome that occurs where a pathway to a receptor exists

¹² Operational wind farms are considered in the baseline.

Approach to Mitigation and Monitoring

2.28 Part 7 of Schedule 4 of the EIA Regulations notes that the EIA Report should include “*A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phase*”.

2.29 The EIA will identify and assess likely significant effects prior to mitigation, and, where mitigation measures are proposed, their likely effectiveness will be examined, and the significance of the ‘residual’ effect then assessed. The Applicant will be committed to implementing all the mitigation measures identified in the EIA Report.

2.30 It is important to note that a number of measures will be integral to and/or considered as good practice during the design/construction process and will be taken into account prior to assessing the likely effects of the Proposed Development. These are termed ‘embedded mitigation measures’. Where necessary, any mitigation identified over and above the standard embedded or good practice measures will also be identified. These are termed ‘additional mitigation measures’.

2.31 On the assumption that a number of good practice measures will be in place, and secured by the conditions of any forthcoming consent or other legal requirements, it may be appropriate to scope out a number of impacts on this basis. This will be detailed in the relevant chapters of the EIA Report as appropriate, and some proposals for scoping out certain impacts on this basis are proposed in this Scoping Report.

2.32 Where appropriate, the mitigation measures implemented will be monitored for effectiveness. Where monitoring is proposed, this will be “*proportionate to the nature, location and size of the proposed development and the significance of its effects on the environment having regard in particular to the type of parameters to be monitored and the duration of the monitoring*”, pursuant to Regulation 22 of the EIA Regulations.

2.33 As well as being outlined in the technical chapters, a Schedule of Mitigation will be included as an appendix to the EIA Report, and will provide a consolidated list of all proposed mitigation and monitoring measures identified, including ‘embedded mitigation’.

Uncertainty and Assessment Limitations

2.34 The EIA process is designed to enable good decision-making based on the best possible information about the environmental effects of a proposal. There will, however, sometimes be uncertainty as to the exact scale and nature of the effects. These may arise through shortcomings in available information i.e. environmental surveys, or due to the limitations of the professional judgement process. As required in Schedule 4, Part 6 of the EIA Regulations, it is important that such uncertainty is explicitly recognised and that the EIA Report includes, “*A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved*”.

2.35 Each assessment chapter of the EIA Report will include details of the assumptions made and limitations identified before assessing the significance of effects.

Competent Experts

2.36 As per Regulation 5(5)(a) of the EIA Regulations, the EIA Report must be prepared by “competent experts”. LUC is accredited with The Institute of Sustainability and Environmental Professionals (ISEP)¹³ EIA

¹³ Formerly known as the Institute of Environmental Management and Assessment (IEMA).

Quality Mark. This award is independently reviewed each year and recognises commitment to excellence in EIA activities and sharing good practice.

2.37 This EIA Scoping Report, as well as the management of the EIA and preparation of the EIA Report, is being coordinated by LUC¹⁴, with support from a team of independent specialist consultants as detailed in **Table 2.1**, all of whom are competent experts in their field.

2.38 A 'statement of competence', setting out brief details of the qualifications and the professional expertise of the lead EIA coordinator and the topic leads will be provided as an appendix to the EIA Report.

2.39 The planning strategy and planning statement will be led by ReAMP Ltd.

Table 2.1 Proposed EIA Team

Topic	Team
Landscape and Visual Amenity	LUC
Ecology	
Cultural Heritage	
Ornithology	Ecology Consulting
Hydrology, Hydrogeology, Geology and Peat	Kaya Consulting Ltd and OWC Ltd
Noise and Vibration	Metrica Environmental Consulting
Access Traffic and Transport and Civils Design	Pell Frischmann
Socio-Economics	BiGGAR Economics
Aviation	WPAC

EIA Report Structure

2.40 The EIA Report will be structured as follows, subject to any changes to the scope identified through the consultation process:

- Introductory Chapters, which will include:
 - A description of the overarching EIA process and methodology, including consultation undertaken and the topics scoped out of the EIA.
 - Details of the design evolution of the Proposed Development, including an outline of the main alternatives considered during the design iteration process, the key reasons for the final design selection, and an explanation of how the design has sought to avoid, reduce, or minimise environmental effects as far as practicable.
 - A description of the Proposed Development, setting out its key details, including location, site context and main components for which planning permission is being sought.

2.41 Each individual environmental assessment topic chapter of the EIA Report, where practicable, will adopt a consistent format. This will ensure compliance with the EIA Regulations regarding completeness and accuracy. Each chapter will comprise an opening introduction to the topic followed by:

- Methodology, Consultation and Legislation/Policy/Guidance.
- Environmental Baseline (derived from desk studies and field surveys undertaken).

¹⁴ LUC has held the ISEP Quality Mark since its inception in 2011.

- Embedded Mitigation (detailing any regulatory good practice measures and design measures which are assumed to be in place, and which have informed the assessment of effects).
- Impact Assessment (identification of the likely effects and their significance).
- Additional Mitigation (setting out which additional mitigation is proposed to address significant effects, and any monitoring as appropriate).
- Residual Effects (assessment of effect significance once mitigation has been incorporated).
- Summary of Significant Effects.

2.42 Chapters will be accompanied by technical appendices and figures where relevant. All technical guidance and data sources used will be fully referenced, as required by Part 10 of Schedule 4 of the EIA Regulations. Where sensitive ecological or ornithological data is provided to support these assessments, this will be treated as confidential and only shared with NAC, NatureScot and the RSPB.

2.43 A consolidated list of all significant effects before and after mitigation will be included in a final chapter of the EIA Report for ease of reference.

2.44 A Non-Technical Summary (NTS) of the findings of the EIA Report will also be produced as required by Part 9 of Schedule 4 of the EIA Regulations.

2.45 At this stage, it is anticipated that there will be seven volumes of the EIA Report, namely:

- Volume 1: Non-Technical Summary (NTS);
- Volume 2: EIA Report Main Text;
- Volume 3: Figures;
- Volume 4: Technical Appendices;
- Volume 5: Landscape and Visual Amenity Visualisations (in accordance with NatureScot guidance);
- Volume 6: Cultural Heritage Visualisations; and
- Volume 7: Confidential Documents.

Supporting Application Documents

2.46 The planning application will also be accompanied by:

- A Planning Statement which will include details of the planning and renewable energy policy context relevant to the Proposed Development, and an appraisal of the Proposed Development's compliance with these policies.
- A Pre-Application Consultation (PAC) Report which will detail the public consultation which has been undertaken in accordance with statutory requirements, and how feedback received has shaped the proposals.
- A Design and Access Statement (DAS) which will discuss in detail the design rationale and process undertaken.
- A Socio-economic, Tourism and Recreation Impact Assessment providing details of the social and economic benefits that the Proposed Development will create.

Chapter 3

The Site and Proposed Development

Introduction

3.1 This chapter describes the Proposed Development, including its location, physical characteristics and proposed key components. It also provides an overview of the site-specific design principles that have been applied to date as part of the iterative design process, and which have informed the Scoping layout, as shown in **Figure 3.1: Scoping Layout**.

The Site and Surrounding Area

3.2 The Site is located approximately 3.8 km east of Largs and 3.2 km north-west of Kilbirnie within the administrative area of NAC as shown in **Figure 1.1**. The land cover of the Site comprises predominantly dry grassland and seasonally wet, and wet grassland across the south, west and north-west, with the north-east characterised by raised and blanket bog. The Site has one main burn flowing through it, the Routdane Burn, which drains into Camphill Reservoir. This in turn discharges into the Garnock River, south-east of the Site, via the Rye Water.

3.3 There are several scattered residential properties and farmsteads located in the wider surrounds of the Site, predominantly to the south and east and along the A760, including at Routdaneburn, Whitehill, Blairpark, Mutton Hall and Fechan. An elevated property, Howcraig, is located on the slopes of Windy Hill to the west of the Site. Residential properties are also located within Kilbirnie.

3.4 The Site is accessed via the A760, which passes along the southern boundary of the Site. A single farm track runs within the Site to the south and heads east into High Blaeberry Craigs and Coldgreen woodland, located outside of the Site to the east.

3.5 The Site does not contain any formal recreational routes.

3.6 The closest core path is NC15 in Largs, located approximately 3.8 km west of the Site, which starts at Largs Pier and heads east to Burnt Hill.

Grid Connection

3.7 The grid connection for the Proposed Development has yet to be determined and is subject to an application to the network operator. The precise route of the grid connection cabling (and form that will take, i.e. whether overhead lines, underground cables or a combination of both) has not been determined by the grid operator, meaning that its effects are not identifiable / assessable as it has yet to be designed and a planning application has not yet been made for the grid connection.

3.8 The final proposed grid connection will be subject to a separate consent by Scottish and Southern Energy Networks (SSEN) under Section 37 of the Electricity Act 1989, alongside a direction from the Scottish Ministers under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended) for deemed planning permission be granted for certain elements of the connection. Therefore, potential environmental effects resulting from the offsite grid connection will not be considered in the EIA Report unless details of the exact route are known.

Design Evolution

3.9 Part 2 of Schedule 4 of the EIA Regulations states that an EIA Report should include: “A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects”.

3.10 The Proposed Development has undergone an initial detailed design review following the results of the Phase 1 peat probing and hydrology walkover. Areas of deep peat were identified within the Site, and watercourse buffers were mapped in detail, enabling detailed design work to establish where turbines and associated infrastructure could be located. This has sought to avoid areas of deepest peat as far as practicable, whilst ensuring constructability given the presence of steep gradients within the Site. Careful consideration has been given to the need to minimising peat excavation and maximising opportunities for peat reuse. The proposed wind turbine locations, foundations and tracks have been optimised based on the information currently available, and the design will continue to evolve as further survey information and consultee feedback are received, including to incorporate potential habitat and wider ecological enhancement opportunities. The Scoping layout is presented in **Figure 3.1**.

3.11 During the design process, Zone of Theoretical Visibility (ZTV) models have been developed to inform understanding of the potential visibility of the turbines from viewpoints and nearby residential properties.

3.12 The following site-specific design principles have been applied as part of the iterative design process undertaken to date to refine the Scoping layout. These will continue to be considered during the ongoing design development process, and will be built upon as more constraints information, informed through field surveys and consultation feedback, becomes available:

- Minimise visual effects on the residential amenity of residents at the nearest properties located along the A760, by maintaining an offset distance of at least 1 km between turbines and these properties.
- Protect the residential amenity of the closest residents in relation to operational noise from turbines. Noise monitoring surveys will be undertaken to establish the background noise environment for the Proposed Development, the results of which will be considered in the next iteration of the design as necessary.
- Siting turbines to the east of the Routdane Burn, avoiding more distinctive and complex landform in the vicinity of Knockside Hills and Jock’s Castle, and setting turbines back in views from the Rye Water Valley and the A760 below.
- Avoid siting turbines and infrastructure on areas of higher quality peatland habitat and peat >1 m deep, as far as possible, informed by the results of the Phase 1 peat surveys, taking account of topography and other environmental sensitivities.
- Avoid other onsite constraints as far as possible, including hydrology (watercourses including 50 m buffer), ecology (including sensitive habitats), steep slopes and other technical constraints.
- Maintain an even spacing of turbines to reduce stacking in key views and optimise energy output, whilst addressing any other environmental and technical constraints.

3.13 The design evolution will be set out in detail in the design strategy that will form part of the EIA Report, and will demonstrate how the design of the Proposed Development has sought to avoid, reduce or minimise environmental effects as far as practicable.

The Proposed Development Description

3.14 The key elements of the Proposed Development include:

- Five wind turbines (indicative installed capacity of up to 35 MW with associated foundations, crane, hardstandings, transformers, and aviation lighting).

- New access junction including visibility splays at the A760 to the south of the Site.
- New access tracks.
- An electrical substation and control building.
- Power cables linking the turbines, laid underground in trenches typically along access tracks.
- Up to three borrow pits for sourcing stone for tracks and crane hardstandings, thereby reducing stone imports and improving opportunities for peat reuse.
- Permanent Meteorological Mast for measuring wind speed and direction.
- Temporary construction compound(s) and associated infrastructure.

3.15 Figure 3.1 shows an early infrastructure design based on an understanding of the known environmental constraints and site-specific design principles identified to date. The layout will be subject to change as part of the iterative design process.

Wind Turbines, Foundations and Crane Hardstandings

3.16 A candidate turbine manufacturer and representative ‘worst case’ turbine model will be identified for each technical and environmental discipline for the purposes of the EIA. Should consent be granted, a competitive procurement process would be undertaken prior to construction to select the turbine to be installed on Site.

3.17 A transformer will be required for each turbine. Depending upon the type of turbine selected, the turbine’s electrical transformers may be located either within or adjacent to the turbines. For the purposes of the EIA, it will be assumed that the transformers will be located adjacent to each turbine within the standard hardstanding areas to provide a maximum-case scenario assessment. The turbines will be installed on foundations comprising both stone and steel-reinforced concrete. The detailed design, sizing and specification for each foundation will depend on the final turbine selected and the specific ground conditions encountered at each turbine location, which will be confirmed during pre-construction surveys. Adjacent to each turbine, an area of hardstanding will be constructed for use as a crane pad. The exact geometry and position of the crane pads will depend on the turbine supplier’s specifications, the crane selected for erection and detailed ground investigations prior to construction.

3.18 Figure 3.1 shows the indicative Scoping turbine layout, and **Appendix C** provides the corresponding turbine coordinates for this layout.

Aviation Lighting

3.19 Article 222 of the Air Navigation Order (ANO) 2016 requires that all structures of 150 m or more above ground level should have medium intensity steady red lights installed as close as possible to the top of obstacles in the interests of aviation safety in periods of darkness. There are, however, exceptions that can be made under Article 222(7) where it is demonstrated to the Civil Aviation Authority (CAA) that a reduced lighting design would still be sufficient for the purposes of managing air safety. In addition, CAA policy¹⁵ also allows lights to be dimmed to no less than 10% of the required full intensity where meteorological visibility is beyond 5 km in all directions. This substantially reduces the operating time of full intensity lights at periods of darkness.

3.20 A Lighting Design and Assessment Report will accompany the planning application to address any effects on aviation. Within the report, further consideration will be given as to the feasibility of a reduced lighting scheme for the Proposed Development, and any design mitigation required to ensure effects on aviation are acceptable. The landscape and visual impact of the proposed aviation lighting design will be

¹⁵ CAA (2017). Policy Statement Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level.

assessed in the Landscape and Visual Impact Assessment (LVIA), as set out in **Chapter 4: Landscape and Visual Amenity**.

Access and Vehicle Movements

3.21 Access to the Site will be taken from the proposed new access to the south of the Site off the A760. It is anticipated that general construction vehicles (Heavy Goods Vehicles (HGVs) and staff vehicles) will travel to the Site via the A760 through a new junction that will be constructed approximately 400 m west of Routdaneburn Farm.

3.22 A preliminary internal access track layout has been developed as shown on **Figure 3.1**. This layout takes into consideration environmental constraints information gathered to date, informed by desk studies and field surveys, and will be refined as the design progresses. New tracks will be required to access the turbines and associated infrastructure. Limited existing tracks on site will be used where possible but will likely require upgrade to make them suitable for construction.

3.23 The Port of Entry (PoE) will be assumed to be Glasgow King George V (KGV) Docks for the purposes of the assessment.

3.24 For the transportation of abnormal indivisible loads (AIL), i.e. turbine components, it is assumed that AIL vehicles will exit the KGV Docks, join the M8 westbound then the A737 southbound, exiting at Hillend Roundabout. AIL vehicles will leave the A737 and travel through Dalry towards the B780 and travel west onto the B784 joining the A760 to access the Site access junction.

3.25 Where possible, construction materials will be sourced from onsite borrow pits.

3.26 The predicted number and type of vehicle movements will be assessed as part of the EIA process once the turbine and infrastructure layout is finalised. A Construction Traffic Management Plan (CTMP), Staff Travel Plan and Abnormal Loads Traffic Management Plan will be agreed and implemented in consultation with the local roads authority to manage traffic movements and minimise effects on local communities during construction.

3.27 An Abnormal Loads Route Survey Report will be prepared as part of the EIA Report setting out the proposed route and the extent of works likely to be required along the public road network to accommodate abnormal loads.

3.28 Further information on proposed traffic and transport arrangements is provided in **Chapter 10: Access, Traffic and Transport**.

Control Building and Substation

3.29 Electrical power from the turbine transformers will be transferred to the electricity network through a switchgear unit, housed within the control building. The control building will be within the same compound as the external substation equipment, which may also include electrical equipment owned by SSEN. Subject to grid operator requirements, the control building will house welfare facilities for visiting maintenance staff. An indicative location for the control building and substation compound is shown on **Figure 3.1**.

Borrow Pits

3.30 Where possible, stone required for the tracks, turbine bases and hardstandings will be predominantly sourced from the three proposed onsite borrow pits. This approach will minimise transportation movements of stone to the Site.

3.31 The transport implications of this will be assessed fully in the EIA Report. Indicative borrow pit locations have been identified through desk and field-study, and are shown on **Figure 3.1**. A Borrow Pit Appraisal Report will be provided in the EIA Report and will highlight the locations and volumes of borrow pits from where stone may be sourced. A conservative assumption on the volume of stone expected to be sourced from onsite borrow pits will be made when assessing the impacts of increased traffic.

Temporary Site Construction Compounds

3.32 At this stage, two potential construction compounds have been identified within the Site, and will comprise areas of hardstanding for temporary site offices, car parking, storage and welfare facilities for site staff. A temporary laydown area will also be established to store turbine components, plant and materials, for the duration of the works.

Micrositing

3.33 It is proposed that the turbines and other infrastructure will be subject to a 50 m micrositing allowance which will apply should adverse ground conditions be encountered during pre-construction ground investigations, or where more optimal ground conditions are available. Movement of infrastructure will be within the Site boundary and will be dependent on other onsite constraints and subject to advice from an Environmental Clerk of Works (EnvCoW).

3.34 This allowance will ensure that the final position of the turbines and associated infrastructure are not varied to such a degree as to cause a notable change in the predicted environmental effects outlined in the EIA Report. Beyond this distance, any relocation of components will require either written approval from NAC in consultation with statutory consultees, or will be treated as a formal variation to the application. The assessment chapters will provide detail on individual proposed directional restrictions on the overall micrositing allowance, where relevant, to ensure that no environmental effects occur that are greater than those identified within the EIA Report.

Construction Details

3.35 It is estimated that it would take approximately 18-24 months to construct the Proposed Development. Where possible, construction activities will be carried out concurrently to reduce the overall length of the construction programme. Phasing of the construction process may result in civil engineering works progressing in some areas of the Site whilst turbines are being erected elsewhere. To minimise disruption to land use, Site restoration would be undertaken as early as possible.

3.36 A detailed programme of works would be produced by the construction contractors prior to the commencement of works onsite, and an indicative programme will be included in the EIA Report to inform the traffic and transport assessment. Should consent for the Proposed Development be granted, it is likely that construction hours would be restricted by means of a consent condition.

3.37 Prior to the start of construction of the Proposed Development, the Applicant will develop a detailed Construction Environmental Management Plan (CEMP) with the appointed Principal Contractor, in line with the proposed outline CEMP to be provided as an appendix to the forthcoming EIA Report. This will be submitted to and agreed with NAC and SEPA prior to construction. The Principal Contractor is the contractor with control over the construction phase of a project involving more than one contractor, as defined under the Construction (Design and Management) Regulations 2015. The Principal Contractor will be appointed in writing by the Applicant to plan, manage, monitor and coordinate health and safety during construction phase. The CEMP will establish the project management structure and clearly detail measures to avoid or mitigate potential effects associated with the key construction activities of the Proposed Development. The CEMP will be used to ensure that all relevant planning conditions, mitigation and good practice construction procedures identified within the EIA Report to protect the environment are implemented through agreed procedures and working methods. An outline CEMP will be prepared as an appendix to the EIA Report.

Operational and Maintenance

3.38 It is proposed that consent will be requested to allow for an operational period of up to 40 years. Maintenance work will involve visiting the Site regularly to undertake scheduled maintenance and operational checks. Annual servicing will involve the undertaking of non-essential repairs on blades, gearboxes and generators.

Decommissioning

3.39 The expected operational life of the Proposed Development is up to 40 years from the date of final commissioning.

3.40 At the end of the operational life of the Proposed Development, it would either be decommissioned, or an application may be submitted to extend the operational lifetime or repower the development.

3.41 The ultimate decommissioning approach would be agreed with NAC and other appropriate regulatory authorities in line with best practice guidance and requirements of the time. This would be done through the preparation and agreement of a Decommissioning Environmental Management Plan (DEMP) / Decommissioning and Restoration Plan (DRP). Financial provision for the decommissioning stage would be provided for.

3.42 Over the period of operation of the Proposed Development there are likely to be changes to the future baseline conditions (environmental and other developments), legislation and guidance and stakeholder objectives that may affect decommissioning and restoration methodologies, which cannot be predicted accurately at this stage. It is understood, however, that generally, effects of decommissioning will be of no greater magnitude than construction related effects, and good practice measures will be implemented in accordance with best practice at the time. Following decommissioning, all infrastructure will be removed, and previously disturbed land will be restored to its former use, with the potential for some access tracks and other below ground infrastructure to remain in situ.

3.43 Environmental effects associated with the construction phase will therefore be considered to be representative of reasonable worst-case decommissioning effects, and no separate assessment of the decommissioning phase will be undertaken as part of the EIA. Decommissioning is therefore proposed to be scoped out of further assessment.

Questions for Consultees

Q3.1: Do consultees agree with the proposed approach to scoping out the assessment of decommissioning?

Chapter 4

Landscape and Visual Amenity

Introduction

4.1 This chapter sets out the proposed approach to assessing the potential effects of the Proposed Development on landscape and visual amenity during construction and operation.

4.2 The LVIA will consider direct and indirect effects on landscape resources and landscape character, and the implications for designated landscapes and wild land. The LVIA will also assess impacts on visual receptors (people), and cumulative effects, i.e. the incremental effects of the Proposed Development in combination with other existing and proposed wind farm developments. It will examine the nature and extent of effects arising from the introduction of the turbines, as well as the ancillary infrastructure (i.e. access tracks, masts, transformers etc.) which will be assessed during both the construction and operational phases of the Proposed Development.

4.3 The primary guidance for LVIA is the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)¹⁶. The assessment will also draw upon good practice guidance issued by NatureScot¹⁷ and the Landscape Institute¹⁸.

4.4 In accordance with GLVIA3, landscape and visual effects will be considered separately. GLVIA3 states that the nature of landscape and visual receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to change and the value attached to the existing landscape or views. The nature of the effect, commonly referred to as the magnitude of change, should be assessed in terms of the size and scale, geographical extent, duration and reversibility of the effect. These aspects will all be considered, to form a judgement regarding the overall significance of landscape and visual effects.

4.5 The LVIA will be undertaken by experienced Chartered Landscape Architects (Chartered Members of the Landscape Institute (CMLI)) at LUC.

Existing Conditions

4.6 The proposed Site occupies an area of sloping moorland and rounded hills located to the north-west of Kilbirnie within the south-eastern extents of the CMRP. The landform slopes up steeply from a low point of approximately 200 m Above Ordnance Datum (AOD) at the south-western boundary of the Site adjacent to the A760, to a high point of approximately 447 m AOD at the summit of Greenside Hill at the north-eastern edge of the Site. The Site includes other hill summits which rise above the Routdane Burn, including Knockside Hills (446 m AOD) and Jock's Castle (376 m AOD) which form the edge of an upland plateau which extends to the north. This plateau is punctuated by a series of hill summits including Irish Law (484 m AOD) immediately to the north of the Site and extending to Misty Law (510 m AOD) and Hill of Stake (522 m AOD) further north.

¹⁶ Landscape Institute and the Institute of Environmental Assessment (2013) Guidelines for Landscape and Visual Impact Assessment – 3rd Edition.

¹⁷ NatureScot (2017). [Visual Representation of Wind Farms Guidance, Version 2.2](#)

¹⁸ Landscape Institute (2019). [Technical Guidance Note 06/19 Visual representation of development proposals](#)

4.7 The landcover of the Site comprises rough pasture fields adjacent to the A760 with occasional field trees and riparian woodland along the lower reaches of watercourses. On upper slopes and the plateau edge the landcover transitions to rugged heather and grass moorland.

4.8 There are several watercourses and tributaries that run through the Site or adjacent to its boundaries. The Routdane Burn runs through the Site from north to south, becoming increasingly incised in its lower reaches and flowing into the Camphill Reservoir immediately to the south of the Site. The steeply incised Guillie Burn flows down the southern slopes of Knockside Hills in the west of the Site before draining into Muirhead Reservoir. The western edge of the Site is flanked by the head of the Rye Water valley which separates the Site from hill summits to the west, including Windy Hill (385 m AOD) and Rigging Hill (391 m AOD). The eastern edge of the Site is skirted by the Pitcon Burn which is a tributary of the River Garnock.

4.9 The closest settlement to the Site is Kilbirnie, located in the Garnock Valley approximately 3.2 km to the south-east. Within approximately 2 km of the Site, settlement is limited to scattered properties located along the A760, including at Routdaneburn, Whitehill, Blairpark, Mutton Hall and Fechan, and the elevated property of Howcraig, located on the slopes of Windy Hill to the west of the Site.

Scoping Study Area

4.10 The initial Scoping Study Area, shown in **Figure 4.1**, extends to a 45 km radius from the Site, reflecting NatureScot guidance on study areas for wind turbines over 150 m to blade tip height.¹⁹ The core of the Scoping Study Area is formed of the upland moorland plateau and associated valleys which comprise the CMRP, extending between the settlements of Greenock, West Kilbride, Lochwinnoch and Largs. The broad Garnock Valley lies immediately to the south-east of the Site, and includes the settlements of Kilbirnie, Dalry and Beith. The east of the Scoping Study Area is highly settled with major transport corridors extending from the Glasgow conurbation to settlements in Renfrewshire, Inverclyde and North Ayrshire. The north of the Scoping Study Area is more rural, extending across the Firth of Clyde to Loch Lomond and the sea lochs and uplands of Argyll and Bute including Gare Loch, Loch Long and Loch Goil. The west of the Scoping Study Area is largely coastal and marine, comprising the Firth of Clyde, Great Cumbrae, the Isle of Bute, the Kyles of Bute, Arran and the east coast of Kintyre between Crossaig and Tarbert. The south of the Scoping Study Area is characterised by the Firth of Clyde between the mainland and Arran and settlement and transport corridors located along the coastline. Inland, the south of the Scoping Study Area includes the farmed lowlands and plateau moorland of South Ayrshire and the western edge of South Lanarkshire.

Zone of Theoretical Visibility (ZTV)

4.11 ZTV plans will be used to identify which landscape and visual receptors within the Study Area require consideration in the assessment. Landscape and visual receptors which are likely to experience no, or very limited theoretical visibility of the Proposed Development will be scoped out of the assessment.

Landscape Character

4.12 In 2019, NatureScot made available online an updated national Landscape Character Assessment for Scotland.²⁰

4.13 The Site is located entirely within the Rugged Moorland Hills and Valleys (80) LCT.²¹ Key characteristics of the LCT include:

- *'Rounded hills and moors rising to form a dissected plateau;*
- *Combination of comparatively gentle hills/ shallow slopes and steeper craggy escarpments;*

¹⁹ NatureScot (2017) [Visual Representation of Windfarms. Version 2.2](#)

²⁰ NatureScot (2019, updated 2022) [Scottish Landscape Character Types Map and Descriptions](#)

²¹ NatureScot (2019) [Rugged Moorland Hills and Valleys LCT 80](#)

- *Exposed Red Sandstone dykes, sills and intrusions give the moorlands a degree of ruggedness. Land cover dominated by moorland vegetation, grading from heather and grass moorland, through rough grazing and abandoned pastures to improved pastures on the lower slopes;*
- *Higher moorlands have very extensive areas of coniferous forest;*
- *Field boundaries are marked by drystone dykes, post and wire fences and some hedges on lower slopes;*
- *Some Iron Age hut circles and hill forts occur within the hills, and a line of castles mark the boundary with Garnock Valley;*
- *Modern development is generally scarce, comprising little more than a scatter of farmsteads;*
- *Tall structures (masts, pylons and turbines) are beginning to erode some of the characteristics of remoteness from certain areas; and*
- *Where woodland does not foreshorten views they tend to be long distance and panoramic, focused towards the islands and peninsulas.'*

4.14 The Broad Valley Lowlands – Ayrshire (67) LCT²² is located approximately 1.9 km to the south-east of the nearest proposed turbine. Key characteristics of the LCT include:

- *'Broad, shallow breach valley;*
- *Moderately steep slopes which rise to the North Ayrshire Hills and which rise less dramatically to the south, blending into the Ayrshire lowlands;*
- *Underlain by millstone grit and crossed by igneous dykes, subsequently substantially modified by glacial erosion;*
- *Pasture or ley grassland with some arable predominates on the lower slopes;*
- *Abandoned fields and rough moorland on higher ground to the north;*
- *Dense network of woodland, comprising shelterbelts, hedgerow trees, trees along burns and gullies and associated with large houses and estates;*
- *Settlement predominantly located on drier slopes, many historic in origin though considerably expanded as a consequence of industrialisation;*
- *Older buildings constructed in stone and slate. Newer structures tend to be rendered and painted white or cream with orange pantile roofs;*
- *Quite heavily developed and subject to past heavy industrial use contrasting with large parts which are still very rural in character; and*
- *Where views open up the rugged moorland hills tend to form the enclosing ridge in views to the north'.*

4.15 The LVIA will consider the potential for effects on the character of both the Rugged Moorland Hills and Valleys (80) LCT and the Broad Valley Lowlands – Ayrshire (67) LCT and other LCTs within a c. 15 km radius of the Proposed Development from which potential visibility is indicated by ZTV mapping. LCTs within the Study Area are shown on **Figure 4.4**, with those located within 15 km listed in **Table 4.1** below.

²² NatureScot (2019) Broad Valley Lowlands – Ayrshire LCT 67

Table 4.1 LCT's within 15 km Scoped In/Out

LCT	Approximate Distance to Nearest Proposed Turbine (km)	Scoped in/Out Assessment
Rugged Moorland Hills and Valleys (80)	Host	Host LCT. To be considered within the assessment .
Broad Valley Lowlands – Ayrshire (67)	1.9	Extensive theoretical visibility indicated across the LCT within 10 km. To be considered within the assessment .
Rugged Moorland Hills (216)	2.9	With the exception of limited theoretical visibility at southern edge, theoretical visibility across the LCT is negligible. Not considered further.
Raised Beach Coast and Cliffs (59)	4.4	No theoretical visibility indicated. Not considered further.
Broad Valley Lowland – Glasgow & Clyde Valley (205)	4.8	Theoretical visibility indicated from the majority of the LCT within 5-15 km. To be considered within the assessment .
Pastoral Valleys – Ayrshire (72)	6.3	No theoretical visibility indicated. Not considered further.
Agricultural Lowlands – Ayrshire (66)	8	Widespread theoretical visibility indicated across the LCT within 15 km. To be considered within the assessment .
Coastal Fringe with Agriculture (61)	8.8	Theoretical visibility indicated from Site facing slopes and summits from approximately half of the LCT. To be considered within the assessment .
Lowland River Valleys – Ayrshire (68)	9.3	Theoretical visibility indicated from more elevated valley sides across the LCT, primarily beyond 10 km. However, views in the LCT <i>'tend to be enclosed, short distance and focused along the diverse river valley landscape.'</i> ²³ Not considered further.
Rugged Upland Farmland (202)	8.6	Intermittent theoretical visibility indicated from the LCT, primarily beyond 10 km. Actual visibility would be reduced by woodland within the LCT, with views towards the Site influenced by settlement and transport corridors. Not considered further.
Raised Beach – Glasgow & Clyde Valley (197)	11.8	No theoretical visibility indicated. Not considered further.

²³ NatureScot (2019) Lowland River Valleys – Ayrshire LCT 68

LCT	Approximate Distance to Nearest Proposed Turbine (km)	Scoped in/Out Assessment
Upland River Valley – Glasgow & Clyde Valley (207)	13.7	Very limited theoretical visibility at more elevated edges of LCT. Not considered further.
Low-Lying Coast (60)	14.2	Theoretical visibility indicated from the majority of the LCT, primarily beyond 15 km. The LCT and its surroundings are densely populated with longer distance outward views from the LCT focused seaward towards Arran. Not considered further.
Rolling Farmland with Estates – Argyll (46)	15.5	Consistent theoretical visibility indicated from Site facing terrain within the LCT on Bute and the southern edge of the Cowal Peninsula. To be considered within the assessment .

Designated Landscapes

Nationally Designated Landscapes

4.16 The Site is not located within any nationally designated landscapes. The closest nationally designated landscape is Loch Lomond & The Trossachs National Park (LLTNP), located approximately 23 km to the north of the nearest proposed turbine at its closest point.

4.17 Locally Designated Landscapes

4.18 The Site is located within the NAC Mainland Local Landscape Area (LLA). The boundaries of the LLA align exactly with the area of the CMRP that falls within the NAC area. The Great Cumbrae LLA is located approximately 8.9 km to the west of the nearest turbine at its closest point and the Little Cumbrae LLA is located approximately 12.4 km to the south-west of the nearest turbine at its closest point. The Bute and South Cowal LLA is located approximately 15.3 km to the west of the nearest proposed turbine. No formal descriptions of the special qualities of these LLAs have been published.

4.19 The Site is located entirely within the non-statutory CMRP, which is focused on the upland moorland plateau and associated valleys that extend between the settlements of Greenock, West Kilbride, Lochwinnoch and Largs, within the Inverclyde, North Ayrshire, and Renfrewshire Council Areas. Formally designated in 1990, the stated objectives of the CMRP are:

- *'To conserve and enhance the natural beauty, biodiversity and cultural heritage of Clyde Muirshiel Regional Park;*
- *To encourage and enable learning, understanding and enjoyment of Clyde Muirshiel Regional Park; and*
- *To promote and foster environmentally sustainable development for the social and economic well-being of the people and communities within the Clyde Muirshiel Regional Park area.'*²⁴

²⁴ <https://clydemuirshiel.co.uk/about/about-clyde-muirshiel/>

4.20 A number of recreational opportunities such as walking, running, cycling, and water sports within the CMRP are facilitated by a network of visitor centres.²⁵ Operational wind farms are located in the northern and south-western extents of the CMRP.

4.21 Nationally and locally designated landscapes within the 30 km of the Site, and an indication of theoretical visibility from these on the basis of the scoping layout, are listed in **Table 4.2** below and shown on **Figure 4.5**.

Table 4.2 Designated Landscapes within 30 km Scoped In/Out

Designated Landscape	Approximate Distance to Nearest Proposed Turbine (km)	Scoped In/Out Assessment
National Park		
Loch Lomond & The Trossachs National Park (LLTNP)	23	Theoretical visibility indicated from elevated areas of LLTNP beyond 25 km. Wind farm development is an existing feature in distant outward views towards the Site. Not considered further.
National Scenic Areas		
Kyles of Bute NSA	24.5	Theoretical visibility indicated from elevated terrain in the south-eastern and western part of the NSA beyond 25 km. Wind farm development is an existing feature in distant outward views towards the Site. Not considered further.
Loch Lomond NSA	25	Theoretical visibility indicated from elevated areas of NSA beyond 25 km. Wind farm development is an existing feature in distant outward views towards the Site. Not considered further.
North Arran NSA	26.4	Theoretical visibility indicated from elevated terrain and coastline in the eastern part of the NSA beyond 25 km. Wind farm development is an existing feature in distant outward views towards the Site. Not considered further.
Local Landscape Areas		
Clyde Muirshiel Regional Park	Host	The Site is located in the CMRP, with extensive theoretical visibility indicated across elevated terrain. To be considered within the assessment .
Mainland (North Ayrshire)	Host	The Site is located in the LLA, with extensive theoretical visibility indicated across elevated terrain. To be considered within the assessment .
Great Cumbrae (North Ayrshire)	8.9	Theoretical visibility indicated from approximately half of the LLA within 10 km. To be considered within the assessment .

²⁵ <https://clydemuirshiel.co.uk/>

Designated Landscape	Approximate Distance to Nearest Proposed Turbine (km)	Scoped In/Out Assessment
West Renfrew Hills (Inverclyde)	10.7	No theoretical visibility. Not to be considered within the assessment.
Little Cumbrae (North Ayrshire)	12.4	Theoretical visibility indicated from approximately half of the LLA within 15 km. To be considered within the assessment .
Bute and South Cowal (Argyll and Bute)	15.3	Consistent theoretical visibility indicated from Site facing terrain across the LLA within 15 – 30 km. To be considered within the assessment .
Horse Isle (North Ayrshire)	15.4	Limited theoretical visibility of blades only indicated beyond 15 km. Not considered further.
Kilpatrick Hills (West Dunbartonshire)	22.9	Widespread theoretical visibility along western and southern edges of the LLA beyond 23 km. Wind farm development is an existing feature in distant outward views towards the Site, foregrounded by urban development and infrastructure in the Firth of Clyde. Not considered further.
North Arran (North Ayrshire)	27.9	Theoretical visibility indicated from elevated terrain and coastline in the eastern part of the LLA beyond 25 km. Wind farm development is an existing feature in distant outward views towards the Site. Not considered further.
Kilpatrick Hills (East Dunbartonshire)	29.1	Negligible theoretical visibility indicated beyond 29 km. Not considered further.
Kilpatrick Hills (Stirling)	29.5	Negligible theoretical visibility indicated beyond 29 km. Not considered further.

Wild Land Areas

4.22 Wild Land Areas (WLA) are not statutory designations, though Policy 4g of NPF4²⁶ states that development within WLAs will only be supported where the proposal:

- 'will support meeting renewable energy targets; or
- is for small scale development directly linked to a rural business or croft, or is required to support a fragile community in a rural area.'

4.23 Policy 4g also states that any development located within WLAs must be accompanied by a Wild Land Impact Assessment (WLIA) '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.'

²⁶ Scottish Government (2023) [National Planning Framework 4](#) (page 41)

4.24 The majority of the Site and four turbines of the scoping layout are located within WLA 04: Waterhead Moor – Muirshiel²⁷ which is focused on the rolling plateau moorland which forms the high moorland core of the CMRP.

4.25 The key attributes and qualities of WLA 04: Waterhead Moor – Muirshiel include:

- 'A wild land area with a surprisingly strong sense of naturalness;
- Few human elements within the WLA, in contrast to the surrounding landscape; and
- An area where wild land qualities are restricted in extent, but which can be widely appreciated from the surrounding areas.'

4.26 The potential effects of the Proposed Development on the key attributes and wild land qualities of WLA 04: Waterhead Moor – Muirshiel will be considered in a standalone WLIA. Potential opportunities to mitigate effects on WLA 04: Waterhead Moor – Muirshiel will be a key consideration in the iterative design process.

4.27 WLA 03: North Arran is located approximately 29.4 km to the south-west of the nearest turbine at its closest point.

4.28 WLAs within the Study Area, and an indication of theoretical visibility on the basis of the scoping layout, are listed in the **Table 4.3** below and shown on **Figure 4.5**.

Table 4.3 Wild Land Areas within the Study Area Scoped In/Out

Wild Land Area (WLA)	Approximate Distance to Nearest Turbine (km)	Scoped In/Out of Assessment
WLA 04: Waterhead Moor – Muirshiel WLA	Host	Four turbines of the scoping layout are located within the southern extent of the WLA, with extensive theoretical visibility indicated across the WLA. To be considered within the assessment .
WLA03: North Arran WLA	29.4	Theoretical visibility limited to elevated terrain and hill summits at the eastern edge of the WLA beyond 29 km, from where wind farm development is an existing feature in distant outward views towards the Site. Not considered further.

Visual Receptors and Visual Amenity

4.29 Visual receptors to be considered will include:

- Local residents, in respect of settlements, scattered communities and individual residential properties (where relevant);
- People travelling on major roads and railways;
- People using promoted walking routes and cycle routes; and
- People visiting areas of interest such as visitor attractions, promoted scenic viewpoints, and hill summits.

4.30 The Site comprises part of the southern plateau edge of an extensive area of rolling moorland and hill summits at the core of CMRP, separated from an adjacent area of plateau by the Rye Water and Muirhead and Camphill Reservoirs. The Site forms part of the immediate enclosing landform and skyline to the north of

²⁷ NatureScot (2016) Waterhead Moor – Muirshiel WLA 04

the valley. The uplands of the CMRP are visible as an upland backdrop to the lower-lying area to the east and south-east, including the Garnock Valley and the agricultural lowlands of Ayrshire.

4.31 Within 5 km, the ZTV on **Figure 4.1** indicates theoretical visibility of the Proposed Development across the adjoining upland plateau, including the hill summits of Irish Law and Misty Law. Theoretical visibility extends to Kilbirnie and the A760 as it travels west of the settlement through the Rye Water valley immediately to the south of the Site towards Largs.

4.32 Between 5 – 10 km, the pattern of theoretical visibility is focused across the Garnock Valley to the east and south-east, including the settlements of Beith and Dalry and the surrounding transport network including the A737, A760, B777, B784 and the Ayrshire Coast Line railway. National Cycle Network (NCN) Route 7 travels between Paisley and Kilwinning traversing the elevated valley side east of the River Garnock towards Dalry. Theoretical visibility is also indicated across Kilbirnie Loch, Barr Loch, and Castle Semple Loch, the former of which acts as a hub for water based recreational activities and includes an RSPB Nature Reserve on its western shore. To the north-east through south-west of the Site theoretical visibility is absent or very limited due to intervening landform, obstructing views from the wider uplands of the CMRP and the settled coastline, including Largs and the A78. However, due to the open landform of the Rye Water valley to the west, theoretical visibility is indicated from the east side of Great Cumbrae and the coastal waters between the island and Kelburn.

4.33 Between 10 – 20 km a similar pattern of theoretical visibility continues, with theoretical visibility focused primarily to the east, south-east, south and west. To the east through south this includes settlement and transport corridors across the agricultural lowlands of Ayrshire, including Dunlop, Stewarton, Kilwinning and Stevenston, and the A735, A736 and connecting B roads and minor road network. To the west, theoretical visibility continues across Great Cumbrae, Little Cumbrae and the Firth of Clyde to Bute, including Rothesay, sections of the West Island Way and the western half of the ferry route from Wemyss Bay. Intervening landform obstructs views to the north, including settlement and transport corridors along the Firth of Clyde such as Gourock, Greenock and Port Glasgow, and to the south-west, including the coastline and immediate inland areas of West Kilbride and Ardrossan.

4.34 Between 20 – 45 km theoretical visibility is most extensive to the south-west and west across the Firth of Clyde to the east coast of Arran and elevated terrain on Bute, the Kyles of Bute and the east coast of Kintyre between Crossaig and Tarbert. To the south-east more intermittent theoretical visibility continues across densely settled areas and major transport corridors in East Ayrshire, including Kilmarnock and the A76 and parts of the western edge of South Lanarkshire, including East Kilbride. To the east theoretical visibility is indicated across much of the Glasgow conurbation and elevated terrain in the Kilpatrick Hills and Campsie Fells. To the north, theoretical visibility is intermittent due to intervening landform, limited to Site facing slopes and summits across elevated terrain above Loch Lomond, Gare Loch, Loch Long and Loch Goil.

Cumulative Wind farm Developments

4.35 Other operational, consented, and proposed wind energy developments in the Study Area are generally located within the moorland plateau of the CMRP, or on elevated terrain above coastal settlements.

4.36 The operational Radio City community wind turbine (110 m blade tip height) is located on the upper valley side of Glen Garnock approximately 1.8 km to the east of the Site, within the WLA 04: Waterhead Moor – Murshiel WLA. The operational cluster of development formed by Kelburn Estate Wind Farm (14 turbines at 100 m blade tip height), Millour Hill Wind Farm (6 turbines at 125 m blade tip height), Millour Hill Extension Wind Farm (2 turbines at 125 m blade tip height), and Wardlaw Hill Wind Farm (6 Turbines at 125 m blade tip height) is located on plateau moorland approximately 3.2 km to the south-west of the nearest proposed turbine. The consented Swinlees Wind Farm (6 turbines at 150 m blade tip height) is located approximately 3 km to the south-east of the nearest proposed turbine, and will extend the cluster to the east and introduce wind farm development into the Broad Valley Lowlands – Ayrshire LCT 67.

4.37 Crosbie Wind Farm (14 turbines at 200 m blade tip height, currently at PLI) is located to the south-west of the operational cluster, approximately 5.1 km to the south-west of the nearest proposed turbine.

4.38 The cluster of operational development formed by Ardrossan Phase 1 Wind Farm (12 turbines at 100 m blade tip height), Ardrossan Phase 2 Wind Farm (3 turbines at 100 m blade tip height) and Sorbie Farm Wind Farm (3 turbines at 125 m blade tip height) is located approximately 10 km to the south-west of the Site on elevated terrain to the north of Ardrossan.

4.39 To the south of Greenock, the operational Inverclyde Wind Farm (8 turbines at 110 m blade tip height) is located approximately 13.7 km to the north of the nearest proposed turbine. High Mathernock Farm (one turbine at 67 m blade tip height) and Priestside Farm (two turbines at 67 m blade tip height) are located on the opposite side of the B788 to the south of Port Glasgow.

4.40 More distant wind farm development within the Study Area includes the extensive Whitelee Wind Farm (215 turbines at up to 140 m blade tip height), located approximately 26 km to the south-east of the nearest proposed turbine.

4.41 Wind farm developments within the 45 km Study Area are shown on **Figure 4.6** and listed in **Table 4.4** below, with an indication of status at the time of writing.

Table 4.4 Cumulative Wind Farm Developments Within 45 km Study Area

Wind Farm Name	No. of Turbines	Blade Tip Height (m)	Approximate Distance from Proposed Development (km) ²⁸
Operational			
Radio City	1	110	2.1
Kelburn Estate	14	100	4.5
Millour Hill	6	125	5.1
Millour Hill Extension	2	125	5.5
Wardlaw Wood	6	125	5.7
Ardrossan Phase 2	3	100	11.1
Ardrossan Phase 1	12	100	11.6
Sorbie Farm	3	125	12.8
Inverclyde	8	110	15
Priestside Farm	2	67	15.1
Neilston Community	4	110	18.5
Middleton	6	105	22.1
GlaxoSmithKline2	2	149	22.5
GlaxoSmithKline (Irvine)	2	110	22.9
Sneddon Law	15	130	29.8

²⁸ Distances are calculated from the approximate centre point of the Proposed Development to the approximate centre point of the other wind farm.

Wind Farm Name	No. of Turbines	Blade Tip Height (m)	Approximate Distance from Proposed Development (km) ²⁸
Whitelee Extension Phase 1	36	140	30.8
Whitelee Extension Phase 2	39	140	31.1
Myres Hill	2	87	31.8
Over Enoch and Ardoch	5	110	32.1
Whitelee	140	110	32.5
West Browncastle	12	126.5	37.1
Calder Water	13	145	37.6
Cruach Mhor	35	72	37.9
Blantyre Muir	6	115	40.3
Freasdail	11	100	44.3
Under Construction			
Mill Rig	6	250	42.6
Consented			
Swinlees	6	150	4.6
Ardeer	2	149.9	17.1
Moorshield	3	149.9	25.9
Eascairt	13	100	43.9
Bankend Rig Extension	3	250	44.1
Hallsburn	3	149.9	44.5
Appeal / Public Inquiry			
Crosbie	14	200	7.2
Vale of Leven	10	220	27.3
Application Submitted			
Giant's Burn	7	200	24.5
High Knoweglass Farm	2	150	38.6
Mossmulloch	5	200	39.8
Design / Scoping			
Gryffe Wind Farm	7	99.7	14.9
Glenouther	5	200	22.7

Wind Farm Name	No. of Turbines	Blade Tip Height (m)	Approximate Distance from Proposed Development (km) ²⁸
Inverchaolain	13	200	23.6
Pappert Hill	4	76.5	25.9
Sauchrie Burn	9	200	42.9

Design Considerations

4.42 The design of the Proposed Development will be considered in the context of generic guidance provided by NatureScot²⁹ and the more detailed North Ayrshire Supplementary Landscape Wind Energy Capacity Study (2018). The EIA Report will present the rationale behind the final design strategy and document the iterative design process in response to the technical and environmental constraints identified through the EIA process. The objective in designing the wind farm will be to develop a layout that responds to its setting in terms of landform and pattern, and which presents a simple visual image, avoiding the clustering of turbines and the isolation of outlying turbines in views from key locations and views from sequential routes seen by a range of different receptors (people) of varying sensitivity. The final layout will need to balance a wide range of technical and environmental considerations.

4.43 All elements of the infrastructure will be considered in terms of location and design, and the LVIA will set out how the design of ancillary elements has evolved to minimise visual effects, especially from nearby and sensitive visual receptors.

Proposed Survey and Assessment Methodologies

Guidance and Policy

4.44 The following guidance and policy will be referred to where appropriate:

- Landscape Institute and the Institute of Environmental Management and Assessment (2013), Guidelines for Landscape and Visual Impact Assessment. Third Edition. (GLVIA3);
- Landscape Institute (2019) Technical Guidance Note 02/19 Residential Visual Amenity Assessment;
- Landscape Institute (2019) Technical Guidance Note 06/19 Visual Representation of Development Proposals;
- Landscape Institute (2021) Technical Guidance Note 02/21 Assessing landscape value outside national designations;
- Landscape Institute (2024) Technical Guidance Note 01/24 Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3);
- NatureScot (2020, revised August 2023) Assessing impacts on Wild Land Areas - technical guidance;
- NatureScot (2021) Assessing the cumulative landscape and visual impact of onshore wind energy developments;
- NatureScot (2024) Pre-application guidance for onshore wind farms;
- NatureScot (2025) Special Landscape Qualities – guidance on assessing effects;
- Scottish Government and NatureScot (2024) Guidance on Aviation Lighting Impact Assessment;
- Scottish Natural Heritage (2017) Siting and Designing Windfarms in the Landscape. Version 3a;

²⁹ SNH (2017) Siting and Designing Wind Farms in the Landscape – Version 3a.

- Scottish Natural Heritage (2017) Visual Representation of Windfarms (Version 2.2);
- Scottish Government (2023) National Planning Framework 4;
- NAC Adopted Local Development Plan 2 (2019)³⁰; and
- North Ayrshire Supplementary Landscape Wind Energy Capacity Study (2018).

Proposed LVIA Study Area

4.45 Figure 4.1 illustrates an initial Scoping Study Area of 45 km in accordance with NatureScot guidance in relation to turbines of 150 m or taller blade tip height. However, based on ZTV analysis and the predicted extent of significant landscape and visual effects on sensitive receptors presented in this Chapter, it is proposed that the Study Area for the LVIA will cover a radius of 30 km from the outermost turbines of the Proposed Development in all directions. It is judged that, due to the scale and location of the Proposed Development, significant effects on landscape and visual receptors over 30 km away are not likely.

4.46 This LVIA Study Area of 30 km will be used for the assessment of effects on visual amenity, and for the assessment of effects on designated landscapes. Within the LVIA Study Area, the assessment of effects on landscape character will focus on receptors within a 15 km radius of the Proposed Development, as experience shows that significant effects on landscape character are unlikely at greater distances, particularly given the location of the Proposed Development as noted below. The cumulative assessment will focus on wind energy developments within the 30 km LVIA Study Area that are considered to have potential to give rise to significant cumulative effects.

Field Survey

4.47 Field survey work will be carried out across several visits, and records will be made in the form of field notes and photographs. Field survey work will include visits to the Site, viewpoints, designated landscapes and wild land areas, and extensive travel around the Study Area to consider potential effects on landscape character and on experiences of views seen from designated landscapes, settlements, and routes.

Assessment of Effects

Landscape Effects

4.48 The LVIA will provide a baseline description of the physical landscape of the Site, relevant Landscape Character Types (LCTs) and their landscape characteristics identified in the (2019) NatureScot LCT descriptions, designated landscapes and wild land areas within the Study Area, and will focus on assessing the likely significant effects of the Proposed Development, including cumulative effects. The assessment of landscape effects will take account of the sensitivity of the landscape, acknowledging its susceptibility to the change proposed and any value placed on the landscape through formal designation at either a national or local level. Where no formal description of the special qualities of locally designated landscapes have been published, the characteristics of underlying LCTs will be considered instead.

4.49 The consideration of landscape sensitivity will also draw reference to the North Ayrshire Supplementary Landscape Wind Energy Capacity Study (2018), which identifies key sensitivities and opportunities for wind farm development within the LCTs.

4.50 The assessment of effects on landscape character will focus on LCTs within 15 km of the Proposed Development. Based on ZTV analysis and the settled and developed character of the majority of LCTs with theoretical visibility of the Proposed Development (and intervening outward views towards the Site), significant effects on landscape character are considered unlikely to occur beyond 15 km.

³⁰ North Ayrshire Local Development Plan 3 is in preparation and is expected to be adopted between January to March 2027

Visual Effects

4.51 Visual effects are experienced by people (visual receptors) at different locations across the Study Area, including at static locations (for example from settlements or promoted viewpoints) and transitional locations (such as sequential views experienced from routes, including roads, footpaths, cycle routes or ferry routes). Visual receptors are the people who will be affected by changes in views at these places, and they are usually grouped by what they are doing at those locations (for example residents, motorists, recreational users etc.).

4.52 Visual effects resulting from the Proposed Development will be considered within the context of the existing baseline conditions, including operational and under construction wind farms. The assessment of visual effects arising from the introduction of the Proposed Development will be based on analysis of turbine hub and blade tip height ZTVs, field studies and consideration of changes in views from representative viewpoints illustrated in wireline and photomontage visualisations.

4.53 The assessment of the visual effects of the Proposed Development will be based on analysis of ZTV's, field studies and assessment of representative viewpoints. **Figure 4.2a-b** illustrates a turbine blade tip height (200 m) ZTV of the proposed turbine layout with the proposed assessment viewpoint locations. **Figure 4.3a-b** illustrates a hub height (118 m) ZTV of the proposed turbine layout with proposed assessment viewpoint locations. Proposed representative viewpoints for the assessment are set out in **Table 4.5**, selected to provide a representative range of viewing distances and viewing experiences, including views from settlements, points of interest, sequential views from routes and views from protected areas (e.g. designated landscapes and wild land areas).

Table 4.5: Proposed Assessment Viewpoints

VP	Viewpoint Name	Gride Reference (NGR)	Approximate Distance to Nearest Turbine (km)	Reason for Selection
1	Irish Law	226004, 659050	1.0	Represents views experienced by recreational receptors at the summit of Irish Law, within the Mainland LLA, CMRP and WLA 04: Waterhead Moor – Muirshiel.
2	Catburn access road	226280, 656330	1.3	Represents views experienced by road users on the A760 and residential receptors, within the Mainland LLA and CMRP.
3	Pundeavon Reservoir, Garnock Valley	229716, 657751	2.3	Represents views experienced by recreational receptors at Pundeavon Reservoir, within the Mainland LLA and CMRP.
4	A760/B784 Junction	228299, 654313	2.9	Represents views experienced by road users on the A760 and B784, within the Mainland LLA and CMRP.
5	A760, Kelburn	223242, 657269	3.9	Represents views experienced by road users on the A760, within the Mainland LLA and CMRP. Proposed night-time viewpoint.

VP	Viewpoint Name	Gride Reference (NGR)	Approximate Distance to Nearest Turbine (km)	Reason for Selection
6	Misty Law	229496, 661994	4.1	Represents views experienced by recreational receptors at the summit of Misty Law, within the Mainland LLA, CMRP and WLA 04: Waterhead Moor – Muirshiel. Proposed night-time viewpoint.
7	Kilbirnie, Largs Road	231031, 654485	4.5	Represents views experienced by road users on the A760 and residential receptors in Kilbirnie
8	Kilbirnie Loch, Lochshore Park	232727, 653839	6.3	Represents views experienced by recreational receptors at Kilbirnie Loch, within the Mainland LLA and CMRP.
9	Auchengree, NCN 7	232399, 652175	7.0	Represents views experienced by road users on the minor road network and recreational receptors on NCN 7 in the vicinity of Auchengree.
10	Beith, Orr's Trust Public Park	234681, 654292	7.8	Represents views experienced by recreational receptors and residential receptors in Beith. Proposed night-time viewpoint.
11	Lochwinnoch RSPB Nature Reserve	235979, 658708	8.6	Represents views experienced by recreational receptors at the Lochwinnoch RSPB Nature Reserve, within CMRP.
12	Dalry Roundabout, A737	229327, 648297	9.0	Represents views experienced by road users on the A737, south of Dalry
13	B707 near Knollhead	233109, 649383	9.6	Represents views experienced by road users on the B707 traveling towards Dalry.
14	Barbay Hill, Great Cumbrae	216824, 657017	10.3	Represents views experienced by recreational receptors at the summit of Barbay Hill, within the Great Cumbrae LLA.
15	Kenmure Hill Temple	238516, 660396	11.3	Represents views experienced by recreational receptors at the summit of Kenmure Hill, within the CMRP.

VP	Viewpoint Name	Gride Reference (NGR)	Approximate Distance to Nearest Turbine (km)	Reason for Selection
16	Greenhills, B706	237476, 650852	11.9	Represents views experienced by road users on the B706 and residential receptors in Greenhills.
17	A735, north of Dunlop	241185, 651697	14.8	Represents views experienced by road users on the A735.
18	B881/West Island Way, Bute	208711, 662546	18.6	Represents views experienced by recreational receptors on the West Island Way, within the Bute and South Cowal LLA.

4.54 Effects on settlements and sequential effects from key routes are likely to focus on those receptors within 20 km and with actual visibility of the Proposed Development, which are more likely to be subject to significant visual effects.

Assessment of Visible Aviation Lighting

4.55 In the interests of aviation safety, structures including wind turbines, of ≥ 150 m require visible aviation lighting³¹. As discussed in **Chapter 3**, the Applicant will seek to negotiate a reduced aviation lighting scheme with the Civil Aviation Authority (CAA) and other aviation stakeholders prior to the assessment being undertaken, and the dusk/night-time visualisations will be prepared to illustrate the number and maximum lighting intensity of turbines to be lit.

4.56 Potential visual effects arising from the necessity for visible lighting will be a key consideration. Informed by current NatureScot visualisation guidance and scoping advice³² the assessment of visual effects will consider the effects of aviation lighting.

4.57 The assessment will be carried out as part of the LVIA and included within the assessment or as a technical appendix to the EIA Report, and will be informed by a hub height ZTV to illustrate the areas from which nacelle lighting may be visible. Visibility of turbine lighting from each LVIA assessment viewpoint will be considered, however the aviation lighting impact assessment will focus on key viewpoints from which significant effects may be anticipated.

4.58 Dusk/night-time photomontage visualisations will be prepared in accordance with NatureScot guidance³³ from up to three of the final LVIA assessment viewpoints, informed by the hub height ZTV for the final Proposed Development layout and informed by the final aviation lighting scheme design. Proposed night-time viewpoints are noted in **Table 4.5** above. The final viewpoints will be agreed with NatureScot and NAC.

4.59 The baseline dusk/night-time context and presence of existing artificial lighting at these locations will be described, with the related sensitivity identified and the magnitude of change arising from the proposed aviation lighting assessed. The predicted effects of aviation lighting on the visual amenity at these viewpoints will be drawn on to provide general comment on the likely effects across the wider Study Area.

³¹ Civil Aviation Authority (2016) CAA Policy and Guidelines on Wind Turbines CAP 764.

³² SNH (2017) Siting and Designing Wind Farms in the Landscape – Version 3a.

³³ NatureScot (2024) Guidance on Aviation Lighting Impact Assessment.

Cumulative LVIA Methodology

4.60 The cumulative landscape and visual assessment (CLVIA) will be carried out in accordance with the principles outlined in GLVIA3 and NatureScot: Assessing the cumulative landscape and visual impact of onshore wind energy developments (2021) guidance.

4.61 The LVIA will consider the potential effects of the addition of the Proposed Development to the existing landscape against a baseline that includes existing wind farms and those under construction. The CLVIA will consider the potential additional effects of the Proposed Development, against a baseline that includes wind farms that may or may not be present in the landscape in the future i.e. wind farms that are consented but unbuilt and undetermined applications (including those which may have been refused and are currently at appeal stage). Scoping stage schemes will only be included in the assessment if they would be located within 10 km of the Proposed Development and if sufficient information is available in the public domain, or where specifically requested by NAC.

4.62 A review of the existing pattern(s) of wind energy development will be undertaken building upon the list of cumulative schemes set out in **Table 4.5**, considering operational, consented, and proposed wind farms which are the subject of a valid application, up to a 45 km radius from the turbines of the Proposed Development, in accordance with current NatureScot guidance.

4.63 The CLVIA will focus on those wind energy developments considered to have potential to give rise to significant cumulative effects in conjunction with the Proposed Development. This is likely to primarily be those wind farms located in the more immediate landscape context of the Site, and in this instance, those located within an approximate 20 km radius. Turbines of less than 50 m to blade tip and single turbines beyond 5 km from the Proposed Development will not be included in the detailed assessment of cumulative effects.

4.64 **Figure 4.6** illustrates the locations of operational, consented, and proposed wind farms (including those at scoping) within 45 km.

Residential Visual Amenity

4.65 Effects upon residential visual amenity become a matter of public rather than private interest when properties or groups of properties become widely regarded as unattractive places to live. Several residential properties are located in the vicinity of the Site, situated along the A690 and immediately to the west of the upper Rye Water. Therefore, in line with the Landscape Institute RVAA Technical Guidance Note 2/19 (2019), a Residential Visual Amenity Assessment (RVAA) will be carried out and will accompany the LVIA.

4.66 A detailed assessment of potential visual effects on residential properties within a 2.5 km radius of the final Proposed Development (measured from the nearest proposed turbines) will be undertaken as follows:

- A ZTV for the proposed 2.5 km RVAA Study Area will be produced, including the location of all residential properties (with reference) indicated as having theoretical visibility of the Proposed Development.
- A detailed description of existing and proposed views from the primary orientation of residential properties (or groups of properties where they are close together) will be prepared, taking consideration of the distance and direction to the Proposed Development, proportion of attainable view occupied and the context/baseline situation at the residence (for example number of floors or the presence of vegetation within the curtilage) to determine the nature of the predicted change to residential visual amenity.
- The assessment of views from individual residential properties or groups of properties will be supported by baseline photography (where this can be obtained from publicly accessible locations) and accompanying wireline visualisations.

Visualisations

4.67 Wirelines and photomontage visualisations will be used to consider and illustrate changes to views. Photomontages will involve overlaying computer-generated perspectives of the Proposed Development over the photographs of the existing situation to illustrate how the views will change against the current baseline. Other wind farm developments visible from each of the viewpoints will be shown on the wirelines. Visualisations will be prepared in accordance with NatureScot guidance.³⁴

4.68 Ancillary elements such as permanent anemometer masts, access tracks and the onsite substation, and any proposal for energy storage systems should these be considered, will be shown in photomontages for viewpoints within 5 km when they would be visible. Beyond 5 km, it is considered unlikely that these ancillary elements would form more than a minor element of the entire development when compared to the turbines.

4.69 As mentioned above, dusk/night-time photomontages will be prepared from a selection of viewpoints to inform the assessment of visual effects of visible aviation lighting. Representative daytime assessment viewpoints will be agreed with NatureScot, NAC, Renfrewshire Council and Argyll and Bute Council.

Potential Significant Effects

4.70 The selection of receptors to include in the assessment is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely to be significant do not require assessment under the EIA Regulations.

4.71 The assessment will identify landscape and visual effects separately, as detailed in the approach to the assessment set out above and will set out any implications of these effects on designated landscapes. The assessment will focus on the identification and, wherever appropriate, the mitigation of potential significant landscape and visual effects.

4.72 The primary form of mitigation for landscape and visual effects arising from large scale wind farm development is through iterative design of the layout of the turbines and associated infrastructure, with reference to key views, viewpoints, and visual receptors. Design evolution will be set out in detail in the design strategy that will form part of the EIA Report and will demonstrate how the design of the Proposed Development has sought to avoid, reduce, or minimise landscape and visual effects wherever feasible.

4.73 Further mitigation will be considered where relevant and appropriate, and the residual effects taking account of the implementation of this mitigation will be presented in the assessment.

Potential Effects Scoped In

4.74 At this preliminary stage, potential landscape, and visual effects, including cumulative effects, associated with the construction and/or operation of the Proposed Development include:

Landscape Effects

- Effects on the landscape resource of the Site during construction and operation;
- Effects on the Rugged Moorland Hills and Valleys LCT 80, Broad Valley Lowlands - Ayrshire LCT 67 and other LCTs (refer to **Table 4.1**) within a 15 km radius where there may be potential for significant effects during operation of the Proposed Development (including cumulative effects and night-time effects where relevant);
- Effects on the special qualities of the Mainland LLA, Great Cumbrae LLA, Little Cumbrae LLA and Bute and South Cowal LLA (including cumulative effects and night-time effects where relevant);

³⁴ SNH (2017) Visual Representation of Windfarms (Version 2.2).

- Effects on the characteristics and purposes of the CMRP (including cumulative effects and night-time effects where relevant); and
- Effects on the key attributes and wild land qualities of Waterhead Moor – Muirshiel WLA 04 during operation of the Proposed Development (including cumulative effects and night-time effects where relevant).

Visual Effects

- Effects on people within settlements within 30 km during operation (including cumulative effects and night-time effects where relevant) such as Kilbirnie, Beith and Dalry;
- Effects on people travelling on major roads, railways and ferry routes within 30 km (including cumulative effects and night-time effects where relevant) including the A760, A735 A736, A737, B706, B707, B784, Ayrshire Coast Line railway and the Wemyss Bay to Bute ferry and Ardrossan to Brodick Ferry;
- Effects on people using promoted walking routes and cycle routes within 30 km during operation (including cumulative effects and night-time effects where relevant), including NCN Route 7 and the West Island Way;
- Effects on people visiting areas of interest such as visitor attractions, hill summits and scenic viewpoints within 30 km during operation (including cumulative effects and night-time effects where relevant);
- Effects on people using Core Paths and accessible uplands within 10 km during operation (including cumulative effects and night-time/hours of darkness effects where relevant); and
- Effects on the residential visual amenity of individual properties within 2.5 km of the nearest turbine (including cumulative effects and night-time effects where relevant).

Potential Effects Scoped Out

4.75 Based on the baseline conditions recorded and distance from the Proposed Development, it is proposed that the following effects are scoped out:

Landscape Effects

- Effects on the landscape resource beyond the Site boundary during construction given transient nature of effects;
- Effects on LCTs during operation beyond a 15 km radius of the Site, or where limited theoretical visibility is predicted, as set out in **Table 4.2**;
- Effects on the LLTNP due to intervening distance and limited theoretical visibility;
- Effects on all NSAs within the Study Area due to intervening distance and limited theoretical visibility; and
- Effects on all LLAs within the Study Area during operation due to intervening distance and/or limited theoretical visibility, with the exception of the Mainland LLA, Great Cumbrae LLA, Little Cumbrae LLA and Bute and South Cowal LLA.

Visual Effects

- Effects on visual amenity during construction given their transient nature; and
- Effects on views from individual residential properties beyond 2.5 km of the nearest turbine during operation.

Approach to Mitigation

4.76 The primary form of mitigation for landscape and visual effects, including cumulative effects, is through iterative design of the layout of the turbines and associated infrastructure, as seen from key viewpoints. Design development will be set out in detail in the design strategy that will form part of the EIA Report.

Consultation Proposals

4.77 It is proposed that the following stakeholders will be consulted in relation to the approach and scope of the LVIA, including the assessment of effects on designated landscapes, wild land and aviation lighting effects:

- NatureScot;
- NAC;
- Renfrewshire Council;
- Argyll and Bute Council; and
- Clyde Muirshiel Regional Park.

Questions for Consultees

Q4.1: Are consultees in agreement with the overall methodology proposed to assess effects on landscape and visual receptors, including cumulative effects?

Q4.2: Are there other recommended sources of information which should inform the baseline and assessment of potential effects on landscape character and designated landscapes?

Q4.3: Is the proposed list of representative assessment viewpoint locations, listed in **Table 4.5** and shown on **Figure 4.2a-b** and **Figure 4.3a-b**, considered to be appropriate?

Q4.4: Are there any other wind farms in addition to those shown on **Figure 4.6** and included in **Table 4.4** which should be considered as part of the cumulative assessment?

Q4.5: Are there any further landscape or visual receptors to be considered within the assessment (i.e. where it is expected that significant effects may occur)?

Q4.6: Are consultees in agreement with the proposed landscape character types to be scoped in and scoped out of the assessment, as listed in **Table 4.1**?

Q4.7: Are consultees in agreement with the proposed designated landscapes to be scoped in and scoped out of the assessment, as listed in **Table 4.2**?

Q4.8: Are consultees in agreement with the proposed 30 km Study Area for the LVIA?

Chapter 5

Ecology

Introduction

5.1 This chapter sets out the proposed approach to the Ecological Impact Assessment (EclA), which will present an assessment of potential effects on ecology during the construction and operation of the Proposed Development.

Ecological Baseline

5.2 This section outlines a preliminary interpretation of the Site's ecological baseline, based on a desk study and initial baseline surveys.

5.3 Surveys have been undertaken to date between April and May 2026 in the eastern portion of the Site, as shown on **Figure 5.1**. Surveys will continue throughout the 2026 survey season (from April through to September 2026 for vegetation, and to October 2026 for static bat detectors). On-going surveys include:

- Phase 1 Habitat Survey;
- National Vegetation Classification (NVC) survey;
- Protected species walkover; and
- Static bat detector survey.

5.4 Details of survey methodologies are provided below. **Figure 5.1** shows the Ecological Survey Area which will comprise the full extent of the Site.

5.5 All baseline data will be presented as Technical Appendices to the EIA chapter, setting out detailed methods, findings and interpretation.

Designated Sites

5.6 An initial desk study has been undertaken to inform this Scoping Report. The desk study included a review of statutory and non-statutory designated sites within 10 km and 5 km of Site respectively, using publicly available data sets.

5.7 The desk study included a search for ecologically designated statutory sites, which included:

- Special Areas of Conservation (SACs);
- Sites of Special Scientific Interest (SSSIs);
- Ramsar sites; and
- Local Nature Reserves (LNRs).

5.8 A search of non-statutory sites included a search for:

- Local Nature Conservation Sites (LNCS);
- Local Wildlife Sites (LWS);
- Royal Society for the Protection of Birds (RSPB) and Scottish Wildlife Trust (SWT) Reserves; and
- Ancient Woodland Inventory sites (AWI).

5.9 There are no statutory designated sites within the Site boundary. However, the Site is located within the Glengarnock Uplands, which is provisionally designated as an LNCS for neutral grassland and bog habitats.

5.10 Table 5.1 below, and Figure 5.2 present statutory and non-statutory sites, designated for their ecological value, within 10 km and 5 km of the Site boundary respectively.

Table 5.1 Statutory designated sites within 10 km and non-statutory sites within 5 km of the Site

Name	Designation	Qualifying Features	Distance at closest point and orientation from Site Boundary
Statutory Sites within 10 km			
Renfrewshire Heights	SSSI (also designated as a Special Protection Area; see Chapter 6).	Breeding aggregation of hen harrier <i>Circus cyaneus</i>	1.54 km north
Castle Semple and Barr Lochs	SSSI	Rare semi-natural eutrophic loch and wetland breeding bird assemblages	3.36 km east
Southannan Sands	SSSI	Intertidal sandflats supporting polychaete communities and important dwarf eelgrass <i>Zostera noltei</i> beds	5.10 km south-west
Ballochmartin Bay	SSSI	Intertidal sandflats supporting polychaete communities	6.60 km west
Skelmorlie Glen	SSSI	Botanically rich upland mixed deciduous valley woodland	8.03 km north-west
Kames Bay	SSSI	Intertidal environment important in informing understanding of marine biology	8.40 km west
Bankhead Moss, Beith	SAC & SSSI	High quality raised bog habitat	8.42 km south-east
Non-statutory Sites within 5 km			
Glengarnock Uplands	Provisional SWT Wildlife Site	Neutral grassland and bog habitats.	Within the Site Boundary
Muirhead and Camphill Reservoirs	LNCS	Reservoirs with marginal semi-natural woodland, scrub and swamp habitat supporting a variety of bird species	0.06 km south
Gogo Water, Greeto Water and Lower Gogo Water	LNCS	Provisional SWT Wildlife Site	0.83 km north-west
Long Plantation	LNCS	Broadleaved and conifer plantation with scrub	0.95 km south-east

Name	Designation	Qualifying Features	Distance at closest point and orientation from Site Boundary
Kelburn and Fairlie Glen	LNCS	Provisional SWT Wildlife Site	1.16 km west
Clyde Muirshiel Regional Park	LNCS	Large regional park consisting of freshwater lochs, broadleaved woodland and moorland habitat	1.56 km north-east
Clyde Muirshiel Regional Park	Country Park	Country Park comprising woodland, moorland and riverside landscapes	1.65 km north-east
Rye Water, Hindog Glen and North Burn Wood	LNCS	Diverse semi-natural riparian woodland	1.65 km south
Paduff Burn Woods	LNCS	Semi-natural broadleaved valley woodland forming local habitat network	1.72 km south-east
Burnside Wood and Pundeavon Burn Woods	LNCS	Floristically diverse semi-natural woodland	1.81 km south-east
Picton Burn	LNCS	Provisional SWT Wildlife Site	2.85 km south-east
Kilbirnie Place	LNCS	Floristically diverse semi-natural broadleaved woodland	3.09 km south-east
Noddsdale Water and Kilburn Glen	LNCS	Floristically diverse riparian woodland	3.11 km north-west
Swinlees Quarry	LNCS	Provisional SWT Wildlife Site	3.32 km south-east
Swinlees	LNCS	Semi-natural broadleaved woodland	3.76 km south-east
Caaf and Knockendon Reservoirs	LNCS	Reservoirs supporting otter and breeding bird species with marginal bogs, swamp and acid flush habitat	4.43 km south-west
Glen Burn (Crosbie to North Southannan)	LNCS	Floristically diverse semi-natural woodland	4.46 km south-west
Newside	LNCS	Floristically diverse semi-natural woodland	4.49 km south-east
Ladyland Castle Woods	LNCS	Floristically diverse semi-natural woodland	4.59 km east
Maich Water	LNCS	Woodland, marsh and grassland habitat	4.65 km east
Glen Road, Fairlie	LNCS	Broad-leaved woodland and scrub	4.90 km south-west
Kilbirnie Loch	LNCS	SWT Wildlife Site with loch supporting winter wildfowl and otter, with marginal swamp habitat	4.97 km south-east

Name	Designation	Qualifying Features	Distance at closest point and orientation from Site Boundary
Numerous blocks of named and unnamed woodlands	AWI	A range of ancient (of semi-natural origin) woodland and long established (of plantation origin) woodland are present within 10 km of the Site Boundary, many of which overlap with LNCS designations, as illustrated in Figure 5.2.	Widespread within 5 km

Habitats

5.11 Initial findings of the on-going habitat and vegetation surveys have been compiled for this Scoping Report. The southern section of the Site adjacent to the A760 and Muirhead Reservoir has the lowest elevation across the Site and is comprised of pasture grasslands of both acidic and neutral species. A single stand of woodland is present along the Routdane Burn in the south-east. With increasing elevation to the north, this grades into acid grassland or marshy grassland, with some areas of modified bog. The northern section of the Site is dominated by modified bog and heath habitats in a degraded condition. There are some localised habitats that suggest potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs), mainly comprising acid flush communities but these are confined to the drainage ditches which are frequent throughout the bog. A large watercourse, the Routdane Burn, flows north to south through the Site.

Protected and Notable Species

5.12 Protected species surveys are on-going at the time of submission of this Scoping Report, but an initial appraisal of the Site suitability for protected species has been compiled. Signs of otter activity have been recorded along the Routdane Burn and Pitcon Burn within the Site, with multiple spraints recorded along the main watercourse. It is likely that otter utilise the nearby Muirhead Reservoir for foraging and use the Routdane Burn for commuting through their wider territory.

5.13 The Routdane Burn and other watercourses on Site are judged to have low habitat suitability for water vole *Arvicola amphibius*. The grassland fields in the south of the Site provide suitable habitat for badger *Meles meles*, but no sign of badger activity has been recorded at the time of this Scoping Report submission. A small area of woodland is present in the south-east of the Site, and scattered trees are present throughout the lower slopes. Some of these trees provide suitable bat roost potential features.

Bats

5.14 Static bat detectors have been deployed at proposed turbine locations within the Site in accordance with guidance³⁵; these surveys are on-going and no data on bat activity is currently available, but this will accompany the EclA as part of the EIA Report.

Design Considerations

5.15 To ensure the avoidance and minimisation of impacts on key ecological receptors, the following design parameters have been identified that will protect sensitive ecological features:

- Where possible, maintaining a minimum 50 m buffer between turbine locations and watercourses/bodies shown on 1:50,000 scale Ordnance Survey mapping;
- Minimisation of water crossings;

³⁵ NatureScot (2021). Bats and onshore wind turbines – survey, assessment and mitigation. Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> [Accessed May 2026]

- The design of mammal-passable watercourse crossings;
- Avoidance of the most ecologically important habitats;
- Avoidance of deep peat deposits as far as possible; and
- Avoidance of protected species (including resting sites where appropriate).

Proposed Surveys and Assessment Methodologies

Guidance and Legislation

5.16 Ecological features scoped into the assessment have been informed by key legislative and policy drivers, as they relate to nature conservation in Scotland, and include:

- Sites designated for their nature conservation value via:
 - The Conservation (Natural Habitats, &c) Regulations (1994);
 - The Wildlife and Countryside Act (1991);
 - National/local planning policy; and
 - National/local nature conservation policy (including the Ancient Woodland Inventory).
- Species and habitats offered legislative or policy protection via:
 - The Conservation (Natural Habitats, &c) Regulations (1994);
 - The Wildlife and Countryside Act (1991);
 - The Protection of Badgers Act 1992 (as amended); and
 - National/local planning policy (including relevant Biodiversity Action Plans).

5.17 The assessment will follow the Chartered Institute of Ecology and Environmental Management Guidelines (CIEEM) for Ecological Impact Assessment in the UK (2024)³⁶.

Desk and Field Surveys

Desk Study

5.18 Initial desk studies have been undertaken to identify designated sites, the ecological features for which they are designated, and their proximity and potential connectivity to the Site as detailed above.

5.19 In addition, the desk study undertaken for the EclA will identify records of extant protected species populations within 5 km of the Site, and within 10 km for bat species (records from 2006 onwards).

Field Survey

5.20 Field surveys are currently ongoing to supplement the desk-based data collation. All field surveys are being carried out in accordance with best practice methods described and endorsed by CIEEM and NatureScot.

5.21 At the time of submission of this Scoping Report, field surveys have only been undertaken within the eastern portion of the Site Boundary; to the east of the Routdane Burn and the south-eastern extent of the Site adjacent to the A760. This extent is shown on **Figure 5.1**. The full Ecological Survey Area comprises the full Site extent, as shown on **Figure 5.1**, and surveys are ongoing to ensure a complete dataset is obtained. The results of this will inform both the assessment of impacts and the opportunity for provision of enhancement measures.

³⁶ CIEEM (2024). Guidelines for Ecological Impact Assessment in the UK and Ireland (v.1.3).

5.22 All field surveys are being undertaken by competent, professionally qualified ecologists, within accepted ecological survey windows and will include:

- Phase 1 habitat, and NVC³⁷ survey of habitats of conservation interest³⁸.
- Protected Species walkover³⁹, including:
 - otter – detailed survey including upstream and downstream of features within 200 m of the turbines and infrastructure;
 - water vole – detailed survey, including upstream and downstream of features within 50 m of the turbines and infrastructure;
 - badger – detailed survey of the turbines and infrastructure area and a 100 m buffer; and
 - pine marten – habitat suitability/field sign survey within the woodland area in the south of the Site.
- Bat activity surveys in compliance with current good practice methods³⁵, including the deployment of five static full-spectrum bat detectors for a minimum of ten nights in spring, summer and autumn 2026.

5.23 It is proposed that detailed surveys for fisheries and freshwater pearl mussel are scoped out of the assessment on the basis of the existing baseline data and good practice design considerations, subject to discussion and agreement with consultees (e.g. NatureScot).

5.24 All data collected through field surveys will be analysed and interpreted in compliance with good practice methods⁴⁰.

Assessment Methodology

5.25 Effects on non-avian ecology will be assessed following current best practice⁴¹.

5.26 The 'Ecological Importance' of the Site for each scoped-in ecological feature will be identified in geographical terms, before pathways to effect are considered and assessed against a range of standardised parameters, ultimately arriving at a consideration of 'significance'. Built-in mitigation, such as a CEMP and standard design features, will influence the assessment of significance.

5.27 Where effects are considered potentially significant in EIA terms, additional mitigation measures will be designed and applied as part of a residual significance assessment.

5.28 Within the context of the EclA methodology, ecological features for which the Site is considered to be of below 'County' Ecological Importance cannot experience significant effects (in EIA terms). As such, no subsequent assessment of potential effects on these features is required. The criteria for a Study Area (the Site) to be considered of 'County level' importance for a feature, is the following:

- County sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, e.g. LNCS;
- Viable areas of legally protected habitat/habitat identified in County BAP or smaller areas of such habitats that are essential to maintaining the viability of the resource at a county scale;
- Any regularly occurring population of an internationally/nationally important species in a relevant UK/Council BAP which is important for the maintenance of the county meta-population; and
- Semi-natural ancient woodland smaller than 0.25 ha.

³⁷ Rodwell et al. National Vegetation Classification (vols 1 – 5). 1991 – 2002.

³⁸ Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the North Ayrshire Local Biodiversity Action Plan, and potential Groundwater Dependent Terrestrial Ecosystems.

³⁹ Species-specific survey methods to comply with best practice, as defined by CIEEM and described on www.cieem.net, including appropriate buffers ranging from 50 m – 200 m.

⁴⁰ Kitchener A. C. (2012). UK BAP mammals. Interim guidance for survey methodologies, impact assessment and mitigation. Cresswell W. J., Birks J. D. S., Dean M., Pacheco M., Trehella W. J., Wells D. & Wray S. (Eds). The Mammal Society, Southampton.

⁴¹ CIEEM, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland. Available at <https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/> [Accessed May 2026].

5.29 The design process will initially avoid and then buffer sensitive features. Avoidance includes incorporating a 50 m buffer from all watercourses (excluding water crossings), which will ensure any potential impacts on features reliant on the aquatic environment are minimised (e.g. habitat loss or disturbance). Design considerations and the implementation of good practice mitigation will mean that the baseline conditions of watercourses will remain the same during and after the construction phase of the Proposed Development. Furthermore, a 50 m buffer from turbine blade tip to features such as treelines and watercourses will ensure foraging and commuting features used by bats are appropriately buffered, in line with guidance³⁵.

5.30 Where features cannot be avoided, good practice measures will be applied to reduce the significance of effects. Design and good practice mitigation measures will be applied, as well as the design of appropriate habitat compensation and enhancement measures.

5.31 Habitat compensation and enhancement measures will be captured in an Outline Biodiversity Enhancement Strategy (BES), which will form a Technical Appendix to the EIA chapter, and will demonstrate compliance with NPF4 Policy 3 and NatureScot priority peatland guidance⁴².

Potential Effects Scoped In

5.32 Based on the initial baseline conditions described above and professional judgement, the assessment will consider the following potential effects:

- Potential effects on designated sites structurally or functionally connected to the Site, during construction;
- Potential effects on habitats of conservation concern³⁸, during construction;
- Potential effects on protected species recorded within the Site, during construction; and
- Potential effects on bats, during operation.

Potential Effects Scoped Out

5.33 Based on the initial baseline conditions described above and professional judgement, the assessment will not consider the following:

- effects on designated sites where there is deemed to be no structural or functional ecological connectivity, or where hydrologically connectivity may be present but water originating or flowing through the Site does not flow through the designated site;
- effects on freshwater pearl mussel and fisheries during construction; and
- effects on ecological features during operation (excluding bats).

Cumulative Assessment

5.34 The effects of the Proposed Development will be assessed in isolation and in combination with predicted effects of other consented wind farm developments and relevant large-scale developments within 10 km of the Proposed Development, where ecological baseline data is available.

Approach to Mitigation

5.35 Ecological baseline data will be used to inform the emerging design process together with the design considerations set out above.

5.36 As part of embedded mitigation, an outline CEMP will establish the principles of environmental protection at the Site. A detailed CEMP will be developed post-consent. Irrespective of whether ecological

⁴² NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: <https://www.nature.scot/doc/advising-peatland-habitats-and-carbon-rich-soils-development-management> [Accessed May 2026].

features are scoped in/out of the EIA, the Proposed Development will comply with all relevant nature conservation legislation during the construction phase. Measures to protect species will be addressed in Species Protection Plans (SPPs), which will include a requirement for pre-construction survey updates and application of the mitigation hierarchy.

5.37 Where effects are assessed as being significant, within the context of the EIA regulations, mitigation measures will be identified and agreed with key stakeholders including NatureScot, SEPA, and NAC. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice, and its likely efficacy and success will be considered.

5.38 The implementation of the CEMP will include, but not be limited to, the following measures:

- Production of, and compliance with, SPPs;
- Production of, and compliance with, a Pollution Prevention Plan and adherence to guidelines on Pollution Prevention (GPP);
- Production of, and compliance with, Construction Method Statements, which will detail the timing of work in relation to protected species surveys and measures to protect statutory and non-statutory sites; and
- The appointment of an Advisory Ecological Clerk of Works to advise, monitor and report on compliance with relevant legislation, policy and project specific mitigation during construction.

5.39 Plans for biodiversity enhancement, deliverable as part of the Proposed Development, will be outlined within the EIA Report. The appropriateness and feasibility of plans will be confirmed with key stakeholders and relevant consultees over the course of the EIA, with a view to appropriate targeted measures being detailed within an outline BES, to be developed into a detailed plan post-consent. The BES will aim to demonstrate how the Site's wider ecological value can be enhanced through targeted intervention (in line with NPF4, Policy 3), with a focus on habitats of conservation interest, nature recovery and nature restoration. It will be developed in collaboration with the needs of other technical disciplines such as ornithology, and peat and hydrology. The measures within the BES will be developed in greater detail in a post-consent Biodiversity Enhancement Plan (BEP).

Consultation Proposals

5.40 It is proposed that the following stakeholders are consulted to inform the assessments:

- NatureScot;
- Scottish Environmental Protection Agency (SEPA); and
- NAC.

Questions for Consultees

Q5.1: Do consultees agree with the survey scope set out above?

Q5.2: Do consultees agree with the assessment method (including scoped in/scoped out features)?

Q5.3: Do consultees hold any existing ecological data relating to the Site that may further inform the ecological baseline?

Q5.4: Are consultees aware of any local nature conservation organisation or any other relevant consultees who should be consulted, or other sources of information that should be considered?

Chapter 6 Ornithology

Introduction

6.1 This chapter sets out the proposed approach to the ornithological impact assessment which will present an assessment of potential effects on ornithology during the construction and operation of the Proposed Development.

Existing Conditions

6.2 The core ornithological Study Area includes the Site plus a 500 m buffer. The desk study considered a wider buffer of 5 km for nationally important sites and 20 km for internationally important sites. A comprehensive range of bird surveys has also been undertaken at this Site to a wider 2 km buffer for key species including breeding raptors and owls. Specific surveys for the Proposed Development were undertaken in the winter of 2024 to 2025 and 2025 to 2026, and within the breeding bird seasons across 2024 and 2025, to provide two full years of baseline bird data, in line with the current NatureScot survey guidance⁴³.

Statutory Protected Sites

6.3 There are two statutory designated nature conservation sites with ornithological features in the search area around the Site (5 km for nationally important SSSI and 20 km for internationally important Special Protection Areas (SPA) and Ramsar Sites):

- Renfrewshire Heights SPA/SSSI – 1.9 km north of the Site – designated for its breeding population of hen harrier. Its citation notes that it supported an average of 10 breeding females annually between 1998 and 2004, equivalent to 2% of the British population. Given the distance from the Site, there could be connectivity with this SPA.
- Inner Clyde SPA/Ramsar site/SSSI – 17 km north-east of the Site – designated for its wintering population of redshank. Its numbers are internationally important (the SPA citation notes a 1992/93-96/97 winter peak mean of 2,107, 1% of the Eastern Atlantic Flyway, 2% of British totals), one of the highest-density wintering populations of redshank in Britain. The SSSI citation also notes important saltmarsh habitat and non-breeding populations of cormorant, eider, goldeneye, oystercatcher, red-breasted merganser and red-throated diver. Given the distance, none of these species would be expected to have any ecological connectivity with the Site.

Non-Designated Sites

6.4 The Site lies within the 'West Central Belt' (NHZ17) NatureScot Natural Heritage Zone.

Breeding Bird Baseline

6.5 The 2024 and 2025 breeding bird surveys show that the Site generally supports a typical regionally important breeding bird population, but with no high-value species specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act or EU Birds Directive Annex 1 species breeding

⁴³ Scottish Natural Heritage. 2017. Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH Guidance.

within the core area. One high-value species (osprey) was observed breeding within the wider Survey Area. Though it was breeding there in both years, it was only observed within the Site on two occasions.

6.6 The breeding bird populations included nine UK Biodiversity Action Plan priority species, three of which (red grouse, cuckoo and skylark) are open-ground species that could be vulnerable to effects as a result of the Proposed Development

6.7 Four additional high-value Schedule 1/EU Annex 1 species were seen during the surveys: marsh harrier, golden eagle, peregrine and short-eared owl. However, no evidence of nesting was found for any of these within the core or wider survey areas. However, recorded activity during the 2024 and 2025 surveys was found to be very low.

6.8 The Muirhead and Camphill Reservoirs were used by higher numbers of herring and lesser black-backed gulls in 2025 than in 2024, both as a roosting and bathing site. As a result, more flights were recorded, particularly over the southern part of the Site.

Wintering Bird Baseline

6.9 The Kilbirnie Survey Area supported a range of wintering bird populations in the 2024 to 2025 survey season (the 2025-26 surveys have yet to be analysed and reported), including six high value species (hen harrier, golden eagle, osprey, merlin, golden plover and common crossbill) that are EU Birds Directive Annex 1/Wildlife and Countryside Act Schedule 1 species. Five medium value species were recorded (teal, red grouse, lapwing, curlew and herring gull – these species present in regionally important numbers and/or are UK BAP Priority species). However, the Site itself is not considered particularly important for these as most were found in proximity to the reservoirs on the lower ground, and were just occasional visitors. No specific spatial wintering bird constraints for the Proposed Development were identified.

6.10 There was no evidence that the Site was important for any birds linked to any SPA/Ramsar sites.

Potential Sources of Impact

6.11 The key issues for the assessment of potential ornithological effects relating to the proposed development were identified as⁴⁴:

- Direct loss of bird habitat through the construction of the site infrastructure;
- Disturbance of birds during construction and operation (including displacement of flight activity through barrier effects);
- Mortality of birds through collision with turbine blades or towers during operation; and
- Cumulative effects of operational disturbance and collision mortality, on the national and Natural Heritage Zone (NHZ) populations of key target species.

Design Considerations

6.12 No specific spatial constraints for the development have been identified relating to ornithology.

Proposed Surveys and Assessment Methodologies

Legislation, Policy and Guidance

6.13 The ornithological assessment followed the guidance produced by NatureScot (SNH 2017⁵⁴). The following documents were also considered:

- The Wildlife and Countryside Act 1981, as amended;

⁴⁴ Scottish Natural Heritage. 2018b. Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. SNH.

- European Union (EU) Council Directive 79/409/EEC and 2009/147/EC on the Conservation of Wild Birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the 'Habitats Directive');
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 (as amended), which translates the Birds and Habitats Directives into Scottish Law;
- The Conservation of Habitats and Species Regulations 2017;
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive);
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended);
- National Planning Framework 4 (NPF4) – sets out the spatial principles, regional priorities, national developments and national planning policy;
- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment (Scottish Government 2013);
- PAN 51: Planning, Environmental Protection and Regulation (Scottish Government, revised 2006);
- PAN 60: Planning for Natural Heritage (Scottish Government 2000);
- Scottish Executive Circular 6/1995 EIR release (as amended June 2000). Information request and response under the Environmental Information (Scotland) Regulations 2004;
- Planning Circular 1/2017; Environmental Impact Assessment Regulations. Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (Scottish Government, 2017);
- 'Managing Natura 2000 Sites' (European Communities 2000);
- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018⁴⁵);
- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH 2017⁵⁴);
- Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al.* 2007⁴⁶);
- NatureScot guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (Band 2024⁴⁷).
- Avoidance rates for the onshore SNH collision risk model (SNH 2018a⁴⁸);
- Assessing the significance of impacts from onshore windfarms on birds outwith designated areas: version 2 (SNH 2018b⁴⁴);
- Assessing the cumulative impact of onshore wind energy developments (SNH 2018c⁴⁹);
- Assessing connectivity with SPAs (SNH 2016a⁵⁰);

⁴⁵ CIEEM. 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Winchester: Chartered Institute of Ecology and Environmental Management.

⁴⁶ Band, W., Madders, M., and Whitfield, D.P. 2007. Developing field and analytical methods to assess avian collision risk at wind farms. In: Janss, G., de Lucas, M and Ferrer, M (eds.) Birds and Wind Farms. Quercus, Madrid.

⁴⁷ Band, W. 2024. Using a collision risk model to assess bird collision risks for onshore wind farms. NatureScot Research Report 909.

⁴⁸ Scottish Natural Heritage. 2018a. Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. SNH.

⁴⁹ Scottish Natural Heritage. 2018c. Assessing the cumulative impacts of onshore wind farms on birds. Guidance. SNH.

⁵⁰ Scottish Natural Heritage. 2016a. Assessing Connectivity with Special Protection Areas (SPAs) - Version 3. Vol. Version 3. SNH Guidance.

- Environmental Statements and Annexes of Environmentally Sensitive Bird Information Guidance for Developers, Consultants and Consultees. Version 2 (SNH 2016b⁵¹);
- Good Practice during Wind Farm Construction (Scottish Renewables *et al.* 2019⁵²);
- Birds of Conservation Concern (BoCC) 5: the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury *et al.* 2021⁵⁸);
- The UK Post-2010 Biodiversity Framework; and
- The Scottish Biodiversity List (SBL) (NatureScot 2020⁵³).

Desk and Field Surveys

Desk Study

6.14 The ornithological assessment will include a full desk study detailing the designated sites that could be affected by the Proposed Development and available bird records from consultees including NatureScot, Royal Society for the Protection of Birds (RSPB) and the South Strathclyde Raptor Study Group.

Field Survey

6.15 Specific surveys for the Proposed Development were undertaken in the winter of 2024 to 2025 and 2025 to 2026, and within the breeding bird seasons across 2024 and 2025, to provide two full years of baseline bird data, in line with the current NatureScot survey guidance⁵⁴. No additional surveys are proposed ahead of the proposed planning application submission in 2027.

Vantage Point (VP) Surveys (year-round)

6.16 VP surveys determine flight activity within the Site to inform and assess collision risk, and quantify the bird numbers that could potentially be at risk of collision (including roost flight observations at dawn/dusk). All flight lines of target species were mapped, and the flight height of each flock recorded.

6.17 One VP was used, which gave sufficient coverage of the Survey Area. The computer-generated viewshed is shown in **Figure 6.1**. The following surveys were undertaken from the VP:

- Breeding season:
 - 2024 – April to August – 36 hours/VP; and
 - 2025 – April to August – 36 hours/VP.
- Autumn/Winter:
 - 2024-25 – September to March – 42 hours/VP; and
 - 2025-26 – September to March – 42 hours/VP.

Breeding Bird Surveys

6.18 The core breeding bird walkover survey follows the standard Brown and Shepherd⁵⁵ moorland survey method but with two additional visits as recommended in NatureScot guidance⁵⁴. Surveys cover the Site plus a 500 m buffer (**Figure 6.1**), where access was possible, were undertaken at the following times:

- 2024 – four visits, April to July; and

⁵¹ Scottish Natural Heritage. 2016b. Environmental Statements and Annexes of Environmentally Sensitive Bird Information Guidance for Developers, Consultants and Consultees. Version 2. SNH Guidance.

⁵² Scottish Renewables. 2019. Good Practice during Wind Farm Construction. V4.

⁵³ <https://www.nature.scot/doc/scottish-biodiversity-list>

⁵⁴ Scottish Natural Heritage. 2017. Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH Guidance.

⁵⁵ Brown, A. F., and K. B. Shepherd. 1993. A method for censusing upland breeding waders. Bird Study 40:189-195.

- 2025 – four visits, April to July.

6.19 All bird locations and behaviour were mapped to a 1:10,000 scale, using the standard British Trust for Ornithology (BTO) Common Birds Census notation. All species were recorded. In addition, the survey effort per unit area was standardised to make the surveys as repeatable as possible, recording systematically for approximately 2 hours per km². The chosen route ensured that the entire Study Area was covered to within about 100 m of the observer, where access was possible. The survey route was plotted onto the survey map as it is carried out.

6.20 The surveys avoided strong winds, heavy rain, fog and low cloud. Birds were located by walking, listening and scanning by eye and with binoculars. Standard BTO notation was used to record the birds' activities; singing, calling, carrying nest material, nests or young found, repetitively alarmed adults, disturbance displaying, carrying food or in territorial dispute.

Raptor and Owl Breeding Surveys

6.21 As the Survey Area may be used by a range of scarce raptors, species-specific surveys were undertaken during April to August 2024 and again in 2025. Surveys were undertaken within the Site and a 2 km buffer zone where access was possible where access was possible and potentially suitable breeding habitat for these species is present. This included surveys for hen harrier, osprey, goshawk, red kite, peregrine, merlin and short-eared owl, following the standard methodologies given in Gilbert *et al*⁵⁶ and Hardey *et al*⁵⁷.

Black Grouse Breeding Surveys

6.22 Black grouse surveys were undertaken following the methods outlined in Gilbert *et al*⁵⁶, covering all suitable black grouse habitat within the Site and a 2 km buffer, in April to mid-May 2024 and again in 2025. Areas of suitable habitat to which access was not possible were scanned with binoculars from the Site, from publicly accessible locations and from suitable vantage points within the Site.

6.23 A three-visit survey protocol was followed:

- Visit 1: site visit to assess habitat for black grouse suitability;
- Visit 2: areas of suitable habitat with the potential to support lekking black grouse were visited twice on different mornings to establish presence/absence; and
- Visit 3: any locations where black grouse were recorded as present during the second visit were revisited in order to provide an accurate count of the number of lekking birds present. These surveys were undertaken one hour prior to dawn until one hour after dawn.

Winter Walkover Surveys

6.24 Whilst the VP surveys provide information on key species' flight activity over the Site outside the breeding season, additional survey work was undertaken to provide further information on any important bird populations using the area during the winter.

6.25 This comprised walkover surveys within the Site and a 500 m buffer in accordance with NatureScot guidance⁵⁴. The survey focused on key target species, which included all EU Birds Directive Annex 1 species, Wildlife and Countryside Act (1981) Schedule 1 species and Red-listed birds of Conservation Concern, Stanbury *et al*⁵⁸. As well as counting and mapping each species, the behaviour of each flock was recorded, e.g. feeding/roosting. The surveys included work at dawn and dusk to check the area specifically

⁵⁶ Gilbert, G., Gibbons, D. W. and Evans, J. 1998. Bird Monitoring Methods: a manual of techniques for key UK species. RSPB /BTO/WWT/JNCC/ITE/The Seabird Group.

⁵⁷ Hardey, J., H. Q. P. Crick, C. V. Wernham, H. T. Riley, B. Etheridge, and D. B. A. Thompson. 2013. Raptors: a field guide to survey and monitoring. The Stationary Office Ltd, Edinburgh. Second Third Edition

⁵⁸ 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. British Birds 114:723-747.

for roosting hen harriers and other important raptors. Seven surveys were undertaken at approximately monthly intervals from September 2024 to March 2025 and a further seven from September 2025 to March 2026.

Assessment Methodology

6.26 The EIA assessment will include a full evaluation of the ornithological importance of the Site's bird populations and identification of any particularly sensitive areas.

6.27 Collision risk will be estimated for bird species of conservation importance regularly over-flying the proposed wind farm Site (based on the results of the vantage point surveys). This will be calculated using a standard modelling process, applying NatureScot-recommended avoidance rates.

6.28 Possible disturbance impacts will be assessed by determining the bird populations of importance within the Site and its surrounds (based on the field surveys and any additional information available), and by reference to the current literature on bird-wind farm interactions. The assessment will be carried out with reference to the assessment methodologies produced by NatureScot⁴⁴ for the wider countryside, and the Chartered Institute for Ecological and Environmental Management (2018).

6.29 The value (conservation importance; as defined in **Table 6.1**) of the receptors present in the Study Area will be identified, then the magnitude of the possible effect on those receptors determined (as described in **Table 6.2**).

Table 6.1 Value (conservation importance) of bird species

Conservation Value	Definition
Very High	Cited interest of SPAs, SACs and SSSIs. Cited means mentioned in the citation text for those protected sites as a species for which the Site is designated (SPAs/SACs) or notified (SSSIs).
High	Other species that contribute to the integrity of an SPA or SSSI. A local population of more than 1% of the national population of a species. Any ecologically sensitive species, e.g. large birds of prey or rare birds (<300 breeding pairs in the UK). EU Birds Directive Annex 1, EU Habitats Directive priority habitat/species and/or Wildlife and Countryside Act (W&C Act) Schedule 1 species (if not covered above). Other specially protected species.
Medium	Regionally important population of a species, either because of population size or distributional context. UK BAP priority species (if not covered above).
Low	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern not covered above.
Negligible	Green-listed species (Stanbury <i>et al</i> ⁵⁸ of favourable conservation status.

Table 6.2 Definition of terms relating to the magnitude of change from ornithological impacts

Magnitude	Definition
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that post development character/ composition/ attributes will be fundamentally changed and may be lost from the Site altogether. Guide: >80% of population/habitat lost.

Magnitude	Definition
High	Major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/habitat lost.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20% of population/habitat lost.
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/ composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/habitat lost.
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: <1% of population/habitat lost.

6.30 The combined assessment of the magnitude of an impact and the value of the receptor will be used to determine whether an adverse impact is significant. These two criteria have been cross-tabulated to assess the overall significance of that impact (**Table 6.3**). This gives a guide as to the determination of significance, though a final assessment should still be subject to professional judgment.

6.31 Table 6.3 is the matrix of magnitude of impact and conservation value used to test the significance of ornithological impacts. The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant impacts in terms of the EIA Regulations.

Table 6.3 : Magnitude of Impact and Conservation Value Matrix

MAGNITUDE	CONSERVATION VALUE				
		Very high	High	Medium	Low
	Very high	Major	Major	Major-moderate	Moderate
	High	Major	Major	Moderate	Minor
	Medium	Major	Major-moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

6.32 The interpretation of these significance categories is:

- **Negligible** and **minor** are not normally of concern, though normal design care should be exercised to minimise adverse effects;
- **Major** and **major-moderate** represent adverse effects on bird populations, which are regarded as significant for the purposes of EIA; and

- **Moderate** represents a potentially significant adverse effect on which professional judgment must be made, though mitigation should be able to reduce it below the significance threshold.

6.33 The NatureScot⁴⁴ wider countryside assessment guidance defines the key significance test as: “*An impact should be judged as of concern where it would adversely affect the favourable conservation status of a species, or stop a recovering species from reaching favourable conservation status, at international or national level or regionally.*” It notes that the key baseline population the assessment should be made against for breeding birds is the SNH NHZ population. This principle will be adopted in the ornithological assessment.

6.34 As the Survey Area supports species specially protected species Schedule 1 of the 1981 Wildlife and Countryside Act, information on the breeding sites and associated flight activity of the species listed on that Schedule will only be provided in a Confidential Appendix. It is important that their breeding locations are kept confidential to minimise the risk of persecution and disturbance. Following NatureScot guidance, the amount of information contained in that Appendix will be kept to a minimum, but will include any data that indicates breeding locations. The assessment of the effects that the proposed development may have on these species will be included in the main EIA Report ornithology chapter report (but without identifying nesting locations).

Cumulative Assessment

6.35 A cumulative ornithological assessment will be undertaken following the NatureScot guidance on ‘Assessing Significance of Impacts from Onshore Windfarms on Birds Outwith Designated Areas’, considering impacts on the favourable conservation status of key species within the relevant Natural Heritage Zone.

Potential Effects Scoped In

6.36 In accordance with NatureScot⁴⁴ guidance, the assessment will focus on the key species likely to be affected by the Proposed Development. Key species are defined using the following criteria:

- Species listed on Annex 1 of the EU Birds Directive;
- Species listed on Schedule 1 of the 1981 Wildlife & Countryside Act;
- Species identified by SNH 2018b⁴⁴ as ‘Priority bird species for assessment when considering the development of onshore wind farms in Scotland’. These include (a) species that are widespread across Scotland which utilise habitats or have flight behaviours that may be adversely affected by a wind farm, and (b) as ‘restricted range’ species; and
- Red-listed species on the Birds of Conservation Concern list.

Potential Effects Scoped Out

6.37 No ornithological issues have been scoped out from this assessment.

Approach to Mitigation

6.38 No specific spatial ornithological constraints for the proposed development have been identified to inform the design to date. However, ornithological sensitivities will continue to be reviewed when developing the design layout, with the adoption of appropriate buffers if required.

6.39 It is possible, given the habitats present, that the Site could support Schedule 1 species, such as hen harrier and merlin in the future. A range of ornithological mitigation measures are likely to be required, primarily for the construction phase to reduce impacts on breeding birds. These will include the production of a detailed CEMP to be agreed post-consent, to the satisfaction of NatureScot and other relevant stakeholders, setting out the timing of works to avoid more sensitive areas/times, and the development and

implementation of a Breeding Bird Protection Plan (BBPP) to ensure that no Schedule 1 species are disturbed during the breeding season and protect other nesting birds.

6.40 A Habitat Management Plan will likely be required to offset operational effects on ground-nesting birds and deliver the required net gain. This will be incorporated into the delivery of the Biodiversity Enhancement Scheme.

Consultation Proposals

6.41 It is proposed that the following stakeholders be consulted to inform the assessments:

- NatureScot;
- South Strathclyde Raptor Study Group; and
- RSPB.

Questions for Consultees

Q6.1: Do consultees agree with the survey and assessment methodologies, including all matters to be scoped in and out, are appropriate for the Site and Proposed Development?

Chapter 7

Cultural Heritage

Introduction

7.1 This section sets out the proposed approach to the assessment of likely significant effects on cultural heritage assets as a result of the Proposed Development, including physical effects, setting change and cumulative effects.

7.2 In this context, cultural heritage is held to be “*the physical evidence for past human activity. It connects people with place, and with the traditions, stories, and memories associated with places and landscapes*”.⁵⁹ It comprises tangible, physical assets, including: historic buildings and structures; archaeological assets; the remains of past environments shaped by human action; gardens and designed landscapes; historic landscapes and townscapes; and other sites, features or places in the landscape that have the potential to provide information on past human activity. It also incorporates non-tangible associations of place with events, such as historical battlefields, or with historical figures and folklore.

Study Area

7.3 The following Study Areas are proposed to inform the cultural heritage assessment:

- **The Site** – Comprises all land within the red line boundary, within which all previously recorded, designated and non-designated heritage assets and previous archaeological investigations ('events') will be identified. This will allow for assessment of the potential for direct effects on known heritage assets, and to assess the potential for hitherto unknown buried assets to survive in situ, and thus potentially experience physical effects. Effects arising from setting change will also be assessed for those assets within the Site.
- **Inner Study Area** – Covers an area which extends to 5 km from the Site. Within this area all designated heritage assets, comprising World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventory-listed Gardens and Designed Landscapes, Inventory-listed Battlefields and Conservation Areas will be identified to allow for the assessment of potential changes to their settings. Non-designated assets of more than local significance will also be reviewed and scoped in where significant effects as a consequence of setting change are anticipated.
- **Outer Study Area** – Covers an area which extends between 5 and 10 km from the Site. Here, a preliminary review will be undertaken to identify any designated assets, and non-designated assets of demonstrable national significance, which are likely to be susceptible to setting change.

7.4 Consideration will also be given to the potential for setting change to designated heritage assets beyond 10 km. The decision to include/exclude such heritage will be informed by a strategic review of the assets, their location with regard to a bare-ground ZTV model, knowledge of the heritage asset types, their sensitivity to setting change, and professional judgement.

⁵⁹ Scottish Government (2023) Our Past, Our Future. Edinburgh: The Scottish Government. p.8. Available online at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=79204155-9eb2-4d29-ab14-aff200ec2801> [accessed 22/09/2025]

Existing Conditions

7.5 The following data sources were consulted to inform an initial understanding of the existing historic environment conditions with the Site and the Study Areas:

- HES spatial datasets and database for designated heritage assets comprising:
 - Scheduled Monuments;
 - Listed Buildings;
 - Gardens and Designed Landscapes; and
 - Conservation areas⁶⁰.
- HES National Record of the Historic Environment (NRHE) database.
- West of Scotland Archaeology Service (WoSAS) Historic Environment Record (HER) data.
- Historic OS mapping (principally First and Second Edition 25-inch and 6-inch to the mile mapping where available for the Site and Inner Study Areas) as well as other published historic mapping held in the National Library of Scotland (NLS) and available online.
- Scottish Archaeological Research Framework (ScARF 2012).
- The still evolving South West Scotland Archaeological Research Framework (SWSARF 2020).

The Site

7.6 The bedrock geology across the Site is largely characterised by Mugearite of the Strathgryfe Lava member. In the far north of the Site there is an area of tuff and agglomerate belonging to the Misty Law Tachytic Member within which there is a smaller area of Trachytic rock which belongs to the Clyde Plateau Subsuite. These are all examples of volcanic igneous rocks which formed between 344,500,000 and 330,900,000 years ago during the Carboniferous period.⁶¹ These bedrocks can contribute to the poorly draining qualities of the soil above and result in waterlogging, gleization, and peat formation. These conditions are beneficial to the preservation of, organic archaeological material (see below). In such instances, the hydrology of the soil, and constituent plant matter may contribute to its chemistry more than underlying bedrock.

7.7 North of Muirhead Hill, along the Routdane Burn, is a relatively small area of alluvial clay, silt, sand and gravel. South of Muirhead Hill, typically below 360 m AOD, the superficial geology of the Site is characterised by poorly sorted glacial till. Till is likely to have been a hinderance for arable endeavours owing to the presence of boulders in the soil, and its poorly draining nature. This would likely have discouraged settlement in this area.

7.8 The most typical form of superficial deposit north of Muirhead Hill is peat.⁶² These deposits began forming c. 9,000 years ago and can provide important information about climate and environmental change since the early Holocene, which can include evidence of human activities and their interaction with the upland landscape. In addition, paleoenvironmental evidence (i.e., evidence of past environments and climate, such as seeds, pollen, insects, etc.) from peat deposits can help to reconstruct the environment in which human activities took place.⁶³ The visibility of archaeological sites within areas of peatland can often be limited due to peat growing over the assets. Detailed discussion of the peat is contained within **Chapter 8**.

⁶⁰ No World Heritage Sites or inventory-listed historic battlefields were identified within 15 km of the Site..

⁶¹ British Geological Survey (2025) BGS Geology Viewer. Available online at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> [accessed 30/03/2026]

⁶² British Geological Survey (2025) BGS Geology Viewer. Available online at: <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/> [accessed 30/03/2026]

⁶³ For more information, please see Gearey, B. and Fyfe, R. (2016) 'Peatlands as knowledge archives', in *Peatland Restoration and Ecosystem Services: Science, Policy and Practice*. Cambridge: Cambridge University Press. pp. 95-113

Designated Heritage Assets

7.9 There are no designated heritage assets within the Site.

7.10 The following designated heritage assets have been identified within the Inner Study Area and are shown in **Figure 7.3**:

- Four scheduled monuments comprising:
 - Glengarnock Castle (SM318);
 - Castle Hill, fort (SM10390);
 - Haylie House, chambered cairn (SM2482); and
 - Fairlie Castle (SM317).
- 98 listed buildings, of which ten are category A, 43 are category B, and 45 are category C. The majority of these relate to the post-medieval development of Kilbirnie, Largs and Fairlie.
- Kilbirnie Conservation Area (CA517).
- Kelburn Castle Inventory-listed Garden and Designed Landscape (GDL00233).

7.11 The following designated heritage assets lie within the Outer Study Area and are shown in **Figure 7.4**:

- Fifteen scheduled monuments comprising:
 - The Neolithic Blackshaw Quarry cup and ring marked stone (SM4429);
 - The Bronze Age Bushglen Mount funerary monument (SM3336);
 - Seven examples of later prehistoric settlement (SM2866; SM2178; SM305; SM12861; SM3305; SM12824; SM12887);
 - The Outerwards Roman fortlet (SM4377);
 - Four medieval fortifications (SM1650; SM7146; SM5644; SM3694); and
 - The post-medieval country house of Southannan Mansionhouse (SM333).
- 294 listed buildings, of which nine are category A, 136 are category B, and 149 are category C. These largely relate to the post-medieval development of towns and villages, many of which are conservation areas.
- Five conservation areas comprising:
 - Dalry (CA516);
 - Beith (CA66);
 - Lochwinnoch (CA302);
 - Millport (CA70); and
 - West Kilbride (CA405).
- The Blair Estate Garden and Designed Landscape (GDL00061).

Non-designated Heritage Assets

7.12 There are nine HER entries located within the Site, shown in **Figure 7.1**. These comprise:

- Two prehistoric cairns (HER ID: 5720; 5727);
- The post-medieval farmstead of Whitehill / Langdike (HER ID: 17695);
- The post-medieval farmstead of Ferralside (HER ID: 51411);
- The post-medieval Routdane Burn field (HER ID: 41542);

- A probable post-medieval building (HER ID: 12730);
- The site of a possible former stock enclosure containing evidence of peat cutting (HER ID: 5726) of probable post-medieval origin;
- The Whitehill rock carvings (HER ID: 21325) which may be post-medieval in date; and
- The accumulation of stones known as 'Greenside Castle' (HER ID: 12732) of unknown origin.

7.13 Within the Inner Study Area, there are 471 non-designated heritage assets within the WoSAS HER database and a further 125 non-designated heritage assets within the NRHE database. These assets are shown in **Figure 7.2** and will be included in the assessment based on their presence within the ZTV and their susceptibility to setting change (see 'Assessment Approach' section below).

Historic Site Context

7.14 The earliest examples of human activity within the Study Areas date to the Neolithic period.

Neolithic – Bronze Age (4,100 BC – 800 BC)

7.15 The Neolithic (4,100 BC – 2,500 BC) and Bronze Age (2,500 BC – 800 BC) periods are characterised by the development of agriculture, the settlement of upland sites and the construction of monumental funerary architecture, such as cairns and barrows, as well as other ritual monuments such as standing stones and stone circles.^{64 65}

7.16 A Neolithic stone axe (WoSAS HER Ref: 5776), recovered c. 2.1 km south of the Site, provides evidence of Neolithic occupation in the vicinity of the Site, with the Haylie House chambered cairn (SM2482), c. 4 km west of the Site, offering an example of a funerary monument that is likely to be Neolithic in origin.

7.17 Cairns were a common form of funerary monument throughout the Neolithic and Bronze Age. The western Knockside Hill cairn (HER ID: 5727), located within the Site, appears to comprise the remains of a round cairn, which is a type of monument typically associated with the Bronze Age. No date has been proposed for the other Knockside Hill cairn (HER ID: 5720) within the Site however, given their close proximity, c. 140 m, and similar proportions, it may be contemporary with the western example.

7.18 Typically of Neolithic and Bronze Age date, cup and ring marked stones can be found across Scotland, though, often focused within coastal regions within the west of Scotland. Situated within the south of the site the Whitehill cup-markings (HER ID: 21325) may represent an example of prehistoric rock art, although recent analysis suggests it is more likely to be of post-medieval origin, as opposed to an authentic example

7.19 Evidence of Bronze Age domestic architecture within the environs of the Site include the sub-circular earth or stone bank remains of small roundhouses known as hut circles.⁶⁶ Examples of these can be found at Feuars Ward (HER ID: 5728) and Wooy Hill (HER ID: 41284) c. 1 km east and c. 3.2 km west of the Site respectively. Such assets are thought to have been in use throughout later prehistory (Bronze Age and Iron Age)⁶⁷ but are largely undated and may include, or obscure, earlier Neolithic settlement remains. In addition, the possibly higher status fortified settlements of Castle Hill (SM3305) and Knockmade Hill (SM12861) c. 6.6 km north-east and c. 8.4 km south-east of the Site, respectively, may date to either the Late Bronze Age or the Early Iron Age.

⁶⁴ Scottish Archaeological Research Framework (2012) ScARF National Framework. Neolithic: 6.2.3 The chronological framework and overview of monuments. Available online at: <https://scarf.scot/national/scarf-neolithic-panel-report/6-identity-society-belief-systems/6-3-2-neolithic-cosmology/6-2-3-the-chronological-framework-and-overview-of-monuments/> [accessed 16/09/2025]

⁶⁵ Scottish Archaeological Research Framework (2012) ScARF National Framework. Bronze Age: 5.4.2 Cosmology and Bronze Age monuments. Available online at: <https://scarf.scot/national/scarf-bronze-age-panel-report/5-identity-society-belief-systems/5-4-belief-systems-and-ceremony-in-bronze-age-scotland/5-4-2-cosmology-and-bronze-age-monuments/> [accessed 16/09/2025]

⁶⁶ Perth and Kinross Archaeological Research Framework (n.d.) Iron Age: 5.1 Introduction. Available [online] from: <https://scarf.scot/regional/pkarf/5-iron-age/5-1-introduction/> [accessed 16/09/2025]

⁶⁷ South West Scotland Archaeological Research Framework (n.d.) Chalcolithic & Bronze Age. Available [online] from: <https://scarf.scot/regional/swsarf/swsarf-chapters/6-chalcolithic-bronze-age/> [accessed 31/03/2026]

Iron Age (800 BC – AD 400)

7.20 In contrast to earlier prehistory, monumental architecture in the Iron Age appears focused on domestic structures, with high status settlements in the form of complex roundhouses and hillforts⁶⁸ characterising our understanding of contemporary settlement.

7.21 Hillforts, a form of hilltop settlement featuring defensive banks and ditches, have a broad date, but the majority appear to date from the Iron Age, with some likely to have continued in use into the early medieval period. Examples of such fortified settlements include the Castle Hill fort (SM10390) and the Knock fort (SM2178) located c. 3.4 km west and c. 6.3 km north-west of the Site, respectively. Although Knock fort is the smaller of the two examples, it may have had two concentric rings of defences ('multi-vallate') compared to Castle Hill's (SM10390) single defensive line ('uni-vallate'). The Knock (SM2178) has also produced pieces of vitrified stone, suggesting that there may have been an attempt to set the fort's timber-laced ramparts on fire, intentionally reaching temperatures high enough to fuse stone together and alter its texture to a glassy appearance. Although believed to be a broadly Iron Age to early medieval practice, the purpose and meaning of this is not well understood.⁶⁹

7.22 The Aitnock dun (SM2866) located c.5.1 km south of the Site provides an example of another form of high-status dwelling in the form of an Atlantic roundhouse. These large drystone structures are located along the Atlantic fringe of Scotland and are often thought to be related to brochs⁷⁰ and represent the role of the house in defining and reinforcing status during the Iron Age.⁷¹

Roman (AD 77 – 211)

7.23 The Roman period in Scotland was characterised by a series of military campaigns, the first major examples of which began in AD 77 during the Flavian Dynasty and ended in AD86/90 with a staged withdrawal.⁷² Either as a means of resolving his lack of military experience or in response to genuine local political developments, Antoninus Pius led a new military campaign to regain southern Scotland from AD 139 to 165, culminating in the construction of the Antonine Wall, bisecting Scotland at the Forth-Clyde isthmus, during the 140s.⁷³ The last major military campaign in Scotland was that of the Severan dynasty dating to AD 208-211⁷⁴. After which, the role of Rome in Scotland is poorly understood, but evidently its political, military, and social relevance waned in the face of emerging local polities.⁷⁵

7.24 As is typical in lowland Scotland, the evidence for Roman activity within the wider landscape of the Site is characterised by remnants of military campaigns. This includes the Outerwards fortlet (SM4377) located c. 7.9 km north-east of the Site, which dates to Antonius Pius' invasion and was likely constructed as part of the operation of the Antonine Wall. In addition, a possible Roman road extends northwards from Largs between c. 2.5 km and c. 4.6 km north-west of the Site (HER ID: 12354; 12356; 22753; 22754) and would have supported the movement of troops, likely to and from the Outerwards fortlet.

⁶⁸ Scottish Archaeological Research Framework (2012) ScARF National Framework. Iron Age: 1 Introduction. Available online from: <https://scarf.scot/regional/higharf/iron-age/7-3-settlement-evidence/> [accessed 31/03/2026]

⁶⁹ Scottish Archaeological Research Framework (2012) ScARF National Framework. Iron Age: 6.6 Enclosing Works. Available online from: <https://scarf.scot/regional/higharf/iron-age/7-3-settlement-evidence/> [accessed 31/03/2026]

⁷⁰ Another form of Atlantic roundhouse, most typically located in the north of Scotland, including Orkney and Shetland, and which may feature more complex intra-mural features.

⁷¹ Regan, R., and Campbell, E. (2022). Discussion of the two dun sites. *Scottish Archaeological Internet Reports*, 99, 95-104. p.100

⁷² Scottish Archaeological Research Framework (2012) ScARF National Framework. Roman 3.3 Flavian Scotland (c. AD 77-86/90). Available at: <https://scarf.scot/national/roman-scotland-panel-report/3-the-time-and-place-of-roman-scotland/3-3-flavian-scotland-c-ad-77-86-90/> [Accessed March 2025]

⁷³ Scottish Archaeological Research Framework (2012) ScARF National Framework. Roman 3.4 Antonine Scotland (c. AD 139-165). Available at: <https://scarf.scot/national/roman-scotland-panel-report/3-the-time-and-place-of-roman-scotland/3-4-antonine-scotland-c-ad-139-165/> [Accessed March 2025]

⁷⁴ Scottish Archaeological Research Framework (2012) ScARF National Framework. Roman 3.7 Severan activity (c. AD 208-211). Available at: <https://scarf.scot/national/roman-scotland-panel-report/3-the-time-and-place-of-roman-scotland/3-7-severan-activity-c-ad-208-211/> [Accessed March 2025]

⁷⁵ Scottish Archaeological Research Framework (2012) ScARF National Framework. Roman 3.10 Late Roman activity. Available at: <https://scarf.scot/national/roman-scotland-panel-report/3-the-time-and-place-of-roman-scotland/3-10-late-roman-activity/> [Accessed March 2025]

Medieval (AD 400 – 1500)

7.25 The early medieval period is characterised by the often-violent process of early state formation. At this point in history, the Site would have been located within the Kingdom of Alt Clud, later Strathclyde. Although this was potentially the main military power in Atlantic Scotland at points throughout the 7th century, rivalling the neighbouring Kingdoms of Pictland, Dál Riata and Northumbria,⁷⁶ it would eventually weaken. Caught between Pictland and the Northumbrian Kingdoms, it was likely to have been forced to accept client status.⁷⁷ Ayrshire would eventually be integrated into the new Kingdom of Scotland in the 11th century.⁷⁸ In 1262, Alexander III, King of Scotland, instigated a war with Norway to gain control of the Hebrides, which lasted until 1266. This war was largely characterised by skirmishes with the only battle occurring on the 2nd of October 1263 on the firth of Clyde, at Largs, 5 km to the west of the Site.

7.26 The nature of medieval rural settlement in Scotland is still not well understood. This is partly due to a lack of coordinated research, and the re-use of earlier settlements, monuments and landscapes⁷⁹ resulting in evidence of medieval occupation being ‘over-written’ – often with very similar post-medieval structures and settlements.⁸⁰ However, rock carved artwork and defensive structures often survive in various conditions throughout the landscape.

7.27 The site of two mounds which may have been the site of mottes (earthwork castle mounds) at Larabank (SM5644) and Castle Knowe (SM3694), provide examples of early medieval defensive structures and are located c. 5.2 km north-east and c.8.2 km south-west of the Site, respectively. The siting of these structures was strategic, ensuring that they were defensible, but also reflects the desire, and need, to project authority across the surrounding landscape. In addition, they served as the administrative centre of the surrounding land and acted both as a symbol and an instrument of Scotto-Norman power. Later examples of medieval defensive architecture include the 15th century keep and courtyard of Glengarnock Castle (SM318) and the rectangular tower of Fairlie Castle (SM317) located c. 3.2 km east and c. 4.7 km south-west of the Site, respectively. These structures continued to function as political and administrative centres and hint at the political instability and violence experienced throughout the medieval period.

Post-medieval (AD 1500 - 1899)

7.28 Political instability continued into the post-medieval period, with Barr Castle (SM1650) and Castle Semple (SM7146) both representing early 16th century tower houses c. 6.9 km and c. 8.5 km of the Site, respectively. Such structures were typically built into the 17th century, were occupied by social elites, and represent both the continued need for fortified residences as well as the interest in projecting status by those who lived in them.

7.29 Around this time, it had also become fashionable for landowners and entrepreneurs to develop the grounds or ‘policies’ immediately around their residences for pleasure. This employed the creation of parklands, water features, formal avenues and paths in ways that reflected popular and contemporary artistic styles and movements, for example ‘style Anglais’ in the mid-18th century and the Picturesque and Romantic movements in the later 18th and early 19th centuries. One of the earliest, and largest, examples of such a designed garden and landscape is that of Kelburn Castle (GDL00233), located c. 1.8 km west of the Site. Here, the mid-18th century mapping of Roy’s Military Survey depicts extensive woodland planting and formalised avenues around Kelburn Castle (LB7294). The current overall form of the grounds still resembles that depicted in first edition OS mapping.^{81 82}

⁷⁶ Fraser, J. E. (2009) *From Caledonia to Pictland: Scotland to 795*. Edinburgh: University Press. p.207

⁷⁷ Fraser, J. E. (2009) *From Caledonia to Pictland: Scotland to 795*. Edinburgh: University Press. p.317

⁷⁸ Britannica (2026) Ayrshire. Available online at: <https://www.britannica.com/place/Ayrshire-former-county-Scotland> [accessed 31/03/2026]

⁷⁹ Highland Archaeological Research Framework (n.d.). Early Medieval: 8.3.2 Identifying the Settlements. Available online at: <https://scarf.scot/regional/higharf/early-medieval/8-3-settlement/8-3-2-identifying-the-settlements/> [accessed 16/09/2025]

⁸⁰ Highland Archaeological Research Framework (n.d.) Medieval: 9.3 Settlement Evidence. Available online at: <https://scarf.scot/regional/higharf/medieval/9-3-settlement-evidence/> [accessed 16/09/2025]

⁸¹ Ordnance Survey, six-inch to a mile, Ayrshire Sheet III (Survey date: 1855, Publication date: 1857)

⁸² Ordnance Survey, six-inch to a mile, Ayrshire Sheet VI (Survey date: 1855, Publication date: 1857)

7.30 Roy's map suggests that arable activity was present along the low ground of the Rye Water in the mid-18th century, with the Muirhead and Ferralside (HER ID: 51411) farmsteads represented within the Site by three small buildings. By the time of the first edition OS map, Ferralside would be reduced to just one building while the new farmhouse of Langdike (HER ID: 17695) would be constructed to its south-west. Both Langdike and Ferralside were noted as sheep farms in the OS Name Book^{83 84} with a sheepfold present in historic mapping near Langdike.⁸⁵ This suggests that the primary land use within the Site during the 19th century was sheep grazing. This land use either replaced, or made marginal, arable cultivation within the Site, of which there is evidence near Langdike. As such, the Site was likely considered to be wasteland and pasture at the time of the new Statistical Account, which amounted to nearly a third of the available land within the parish.⁸⁶ The New Statistical Account also states that land used for sheep grazing was, on average, rented for between 7 and 15 shillings per acre.⁸⁷

7.31 A rectangular building stance identified by OS surveyors in the south-east of the Site on Lairdsie Hill (HER ID: 12730) does not appear in historic OS mapping and, as such, probably predates the mid-19th century but is still likely to be of post-medieval origin.

7.32 In addition to agriculture, land within the Site was also clearly used for relatively small-scale extraction. This is evidenced by the two disused whinstone quarries near Langdike and the operational whinstone mine by Ferralside which all appear in the first edition OS map.⁸⁸ Additionally, there appears to be evidence for peat cutting, likely for fuel, within a former livestock enclosure in the far east of the Site near Pitcon burn (HER ID: 5726).

7.33 By the time of the second edition OS map, Ferralside (HER ID: 51411) was no longer present, but Muirhead had been slightly expanded.⁸⁹ This comprises the most notable change within the Site between the mid- and late 19th century.

7.34 Beyond the Site, to its south, the establishment of the Camphill Reservoir in the late 19th century represents a substantial change to the post-medieval landscape.

Modern (AD 1900 – Present)

7.35 Within the Site, Langdike (HER ID: 17695) would appear as unroofed in mid-20th century mapping while Muirhead would no longer be depicted. The above-ground remnants of Langdike farmhouse and associated enclosures can still be seen today, as can a small mid-20th century building of unknown function located on the eastern bank of the Routdane Burn to the north of Langdike.⁹⁰

7.36 The Camphill Reservoir was later followed by the creation of the Muirhead Reservoir in the early 20th century. Large blocks of rotational commercial forest were also established to immediate east of the Site, as well as to its south.

7.37 Owing to increased demand for electricity and a push by the Scottish Government for this demand to be met via renewable energy generation, wind farms have become a common feature of rural Scotland. Examples of operational and consented wind farms in close proximity to the Site include Kelburn Estate, Millour Hill, and Swinlees which are located approximately 4.5 km south, c. 5.1 km south, and c. 4.6 km south-east of the Site respectively⁹¹.

⁸³ Ordnance Survey, Ayr county, OS Name Books - Ayr county - Volume 20 - Parish of Dalry, OS1/3/20, p.41

⁸⁴ Ordnance Survey, Ayr county, OS Name Books - Ayr county - Volume 20 - Parish of Dalry, OS1/3/20, p.33

⁸⁵ Ordnance Survey, six-inch to a mile, Ayrshire Sheet VII (Survey date: 1856, Publication date: 1858)

⁸⁶ New Statistical Account of Scotland (1845) Volume V, Dalry, County of Ayrshire, p.224

⁸⁷ New Statistical Account of Scotland (1845) Volume V, Dalry, County of Ayrshire, p.225

⁸⁸ Ordnance Survey, six-inch to a mile, Ayrshire Sheet VII (Survey date: 1856, Publication date: 1858)

⁸⁹ Ordnance Survey, six-inch to a mile, Ayrshire Sheet IV.SW (Revision date: 1895, Publication date: 1897)

⁹⁰ This structure is not identified in the HER or NRHE dataset and is located at NS268569.

⁹¹ Measurements stated represent the shortest distance between turbines of the Proposed Development and those of the stated wind farms.

Design Considerations

7.38 Design considerations relevant to cultural heritage include the inclusion of appropriate buffers from heritage assets to avoid direct physical effects during construction, avoidance of areas of elevated archaeological potential, and measures to minimise the intrusion of wind turbines and associated infrastructure within the setting of heritage assets. Similarly, design principles to minimise intervisibility, changes in views to, from and of assets will be implemented in parallel with wider parameters intended to conserve landscape and visual amenity.

Proposed Surveys and Assessment Methodologies

Guidance and Legislation

7.39 The assessment of effects will be conducted in line with current national and regional policy and guidelines as well as established best practice:

- Town and Country Planning (Scotland) Act 1997;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Legislation pertaining to the designation of heritage assets and the protections afforded to them including the Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
- National Planning Framework 4 (2023) Policy 7: Historic assets and place;
- Historic Environment Policy for Scotland (HEPS) (2019);
- NAC Local Development Plan 2 (LDP2) (2019);
- HES Designation Policy and Selection Guidance (2016; 2019);
- HES (2016) 'Managing Change in the Historic Environment Guidance Notes – Setting';
- HES and Scottish Natural Heritage (2018) 'Environmental Impact Assessment Handbook' (particularly the framework for Cultural Heritage Impact Assessment provided in Appendix 1);
- ClfA (2025) 'Code of Conduct';
- ClfA (2020) 'Standard and guidance for historic environment desk-based assessment'; and
- ClfA, Institute of Historic Building Conservation and Institute of Environmental Management and Assessment (2021) 'Principles of Cultural Heritage Impact Assessment (PCHIA) in the UK'.

Desk and Field Surveys

Desk Study

7.40 A full desk-based assessment will be undertaken in line with the ClfA guidance to determine, as far as is reasonably possible from existing records, the nature, extent and significance of the historic environment within the Site and the Inner and Outer Study Areas, and to establish the impact of the Proposed Development on their cultural significance.

7.41 The following data sources will be consulted to inform the desk-based assessment:

- HES spatial datasets and database for designated heritage assets comprising:
 - Scheduled Monuments;
 - Listed Buildings;
 - Conservation Areas;

- Inventory-listed Gardens and Designed Landscapes;
- Inventory-listed Historic Battlefields; and
- World Heritage Sites.
- HES National Record of the Historic Environment (NRHE).
- Historic Land-use Assessment (HLA) data.
- WoSAS HER data.
- Historic OS mapping (principally First and Second Edition 6-inch to the mile mapping where available for the Site and Inner Study Areas) as well as other published historic mapping held in the National Library of Scotland (NLS) and available online.
- Publicly available satellite imagery and vertical aerial photography, Aerial photographs (oblique and vertical) held by the National Collection of Aerial Photography (NCAP), and Britain From Above, available online.
- Available grey literature reports from recent archaeological work undertaken in the area, the Excavation Index for Scotland, and archaeological journals and monographs.
- The Scottish Archaeological Research Framework (ScARF 2012).
- The still evolving South West Scotland Archaeological Research Framework (SWSARF 2020).
- Relevant archive material held by the WoSAS, HES, NLS and Registers of Scotland available online.
- Visualisations and 3-D turbines modelled and viewed in relevant software.
- Findings of other relevant topics, including Landscape and Visual, Geology, Hydrology, Hydrogeology and Peat.

Field Survey

7.42 A walkover survey of the Site will be conducted to inform the production of the Historic Environment Assessment (HEA) Technical Appendix which will support the submission of the EIA Report. This walkover will target the locations of turbines and associated infrastructure, as well as known heritage assets within the Site. This survey will assist in the establishment of a baseline understanding of the historic environment by confirming the presence, location, interpretation, and sensitivity to physical and setting change of heritage assets.

7.43 Selected heritage assets located within the Inner and Outer Study Areas will also be visited to assess their potential to experience setting change. This selection will be informed by the ZTV for the Proposed Development and professional judgement related to the likely sensitivity of an asset to setting change. The presence of the Proposed Development within in-combination views that contribute to the cultural significance of assets which are not themselves present within the ZTV, has also been considered.

Assessment Methodology

Types of Effects

Physical Impact

7.44 Direct physical effects to assets occur when the fabric of known or previously unrecognised assets is removed or damaged as a result of development. This will be permanent and generally occurs during the construction phase.

7.45 Indirect physical effects occur as an indirect consequence of the development, such as increased/decreased erosion or damage from vibration of piling or haulage movements. Again, such impacts are likely to be permanent.

Setting Change

7.46 'Setting' is the way the surroundings of an asset or place contribute to how it is understood, appreciated and experienced in the present landscape.

7.47 All assets have a setting, but the contribution that this makes to their cultural significance varies in line with the location, form, and function of the asset, and its surroundings. Setting can be integral to the cultural significance of an asset, therefore a change in an important element of an asset's setting represents a direct impact to its significance. Equally, depending on the type of asset, setting may make little or no contribution to cultural significance.

7.48 Effects arising from setting change are usually direct and result from the development causing change within the setting of a heritage asset that affect its cultural significance, for example, through the ability for the asset to be understood, appreciated and experienced within the context of the surrounding landscape. This is often related to visual effects resulting from the appearance of the development in the surroundings of the asset, but can also relate to disruptions of historical, functional or symbolic relationships (including intervisibility between assets or historic patterns of land use) or sensory factors such as noise, odour or emissions. Indirect impacts on setting can also occur away from the development, such as changes in traffic around an asset. This type of impact can occur at any stage of development and may be permanent, reversible or temporary. When considering setting change, visual change is not to be equated directly with adverse impact (i.e., the ability to see the development from/in-combination with the asset does not necessarily equate to an adverse effect). Rather, the impact should be assessed with reference to the degree that the proposal affects those aspects of setting that contribute to the asset's cultural significance. Assessment of setting impacts of the Proposed Development will be based on analysis of the ZTVs, field visits and assessment of representative viewpoints.

Integrity of Setting for Scheduled Monuments

7.49 NPF4 Policy 7h (ii) states that development proposals affecting the setting of scheduled monuments will only be supported where "*significant adverse impacts on the integrity of the setting...are avoided; or exceptional circumstances have been demonstrated to justify [a different conclusion]*". 'Integrity of setting' in this context depends on the adequate retention of the ability to understand, appreciate and experience the factors of an asset's setting that contribute to its cultural significance.⁹² 'Significant adverse impacts' on the integrity of setting would therefore only be judged to occur when the level of change is such that the ability to understand, appreciate and experience said factors are not 'adequately retained'.

7.50 'Significant effects' for the purposes of the EIA Regulations and 'significant adverse impacts on the integrity of setting' for the purposes of NPF4 Policy 7h are different concepts. The former is an EIA metric while the latter is a policy test. A significant adverse effect for the purposes of EIA may or may not breach the 'integrity' policy test, as has been recognised by HES in numerous consultation responses to applications for consent.

7.51 The integrity of a monument's setting will be considered as part of the holistic assessment of the level of impact upon its cultural significance. Where 'significant adverse impacts' for the purposes of the Policy 7h(ii) integrity test are identified, a specific assessment to inform the planning judgement on 'integrity' will be undertaken.

Cumulative Impacts

7.52 Impacts of a cumulative nature can relate to the physical fabric or setting of assets. This can be a result of interactions between different impacts of the development, or between impacts of other projects. Alternatively, they may be additive impacts from incremental changes caused by the proposal together with other projects already in the planning system. The cultural heritage assessment will consider the potential effects to heritage assets against a baseline that includes existing and consented/application wind farms.

⁹² Working definition of 'integrity of setting' established between HES and the Appellant at the Rigg Hill PLI (PPA-310-2034): "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 affect the integrity of setting."

Visualisations and photomontages will be used to aid this assessment, if appropriate. A preliminary list of proposed cultural heritage viewpoints is presented in **Table 7.1** below.

Assessment Approach

7.53 Once baseline data has been compiled, all heritage assets within the Site and Study Areas will be identified and the ZTV intersection analysis detailed above will be revisited and updated. Those assets identified as being likely to experience significant effects will be scoped into the assessment, and a full description of their cultural significance will be outlined with reference to:

- HES's Designation Policy and Selection Guidance (2019), which sets out cultural values that vary according to asset type; and
- The Burra Charter (Australia ICOMOS 2013) values (e.g., aesthetic, historic, scientific or social) which are referenced by the Historic Environment Policy for Scotland (2019).

7.54 The importance of the assets' cultural heritage significance will be ascribed under the following criteria:

- High: assets of national importance, comprising designated heritage assets and non-designated assets of demonstrably equal value;
- Medium: assets of regional importance, for example those identified by regional research priorities, via engagement with relevant consultees or through the assessment of their significance;
- Low: assets of local importance; and
- Uncertain: assets of uncertain importance.

7.55 Sensitivity ratings to change, including setting change (i.e., high, medium and low), will also be ascribed to each asset. This will include the contribution that setting makes to the significance of the asset and its potential for change, given the nature of and likely interaction with the Proposed Development.

7.56 The contribution made by setting to cultural significance will be set out narratively with reference to HES's setting guidance. NPF4 (2023) defines the setting of heritage assets as being: *"...more than the immediate surroundings of a site or building, and may be related to the function or use of a place, or how it was intended to fit into the landscape of townscape, the view from it or how it is seen from areas round about, or areas that are important to the protection of the place, site or building"*.

7.57 All heritage assets within the Site will be assumed to be of high sensitivity to direct physical change, unless otherwise stated.

7.58 A full assessment of the significance of effects will then be undertaken. All such effects will be assessed to reflect the way in which the Proposed Development has the potential to affect the cultural significance of an asset either through direct physical effects, setting change, or, if relevant, indirect physical (or secondary) effects.

7.59 In articulating effects, a judgement will be made on the level of harm or benefit a heritage asset will experience as a result of the Proposed Development, supported by an appropriate narrative explaining how the cultural significance of the asset will be changed. The criteria for the assessment for determining the significance of effect will be informed by guidance published in Principles of Cultural Heritage Impact Assessment (PCHIA) in the UK, and Appendix 1 of SNH and HES' 'EIA Handbook' and HES' 'Managing Change in the Historic Environment: Setting' guidance note.

7.60 Only assets identified as likely to experience significant effects will be assessed in the main EIA Report chapter. Effects to assets that are not significant in EIA terms will still be fully considered and reported upon in a HEA Technical Appendix.

7.61 The assessment of potential effects related to both direct and indirect physical effects will consider the footprint of the Proposed Development, proposed construction methodology (where information is available) and wider environmental mitigation plans (e.g. peat restoration).

7.62 The assessment of effects as a result of setting change, will be informed by review of ZTVs for the Proposed Development, site visits, and visualisations such as wirelines and photomontages. The proposed visualisations are outlined below in **Table 7.1** and mapped in **Figure 7.5**. These are based on a review of the current ZTV, and professional judgement regarding the sensitivity of assets within the Study Areas to setting change. This list will remain under review and will be refined as the development progresses. The final list of visualisations will be informed by consultation with statutory consultees.

Table 7.1 Proposed Cultural Heritage Visualisations

Visualisation ID	Relevant Heritage Asset	Visualisation method	Easting	Northing
CHVP01	Barr Castle (SM1650)	Wireframe	234668	658152
CHVP02	Glengarnock Castle (SM318)	Wireframe	231180	657377
CHVP03	Castle Semple Loch (SM7146)	Wireframe	236163	658760
CHVP04	Kelburn Castle (GDL00233)	Wireframe and Photomontage	223134	657097
CHVP05	Blair Estate / House (GDL00061/ LB1196)	Wireframe	230422	648036
CHVP06	Ladyland House (LB7532)	Wireframe	232190	657831
CHVP07	Knockside Hills, cairn (WoSAS ID: 5720)	Wireframe and Photomontage	225777	658291
CHVP08	Knockside Hills, cairn (WoSAS ID: 5727)	Wireframe and Photomontage	225688	658201
CHVP09	Wolly Hill, cairn (possible) (WoSAS ID: 5858)	Wireframe	222435	660185
CHVP10	Ladyland Castle (WoSAS ID: 6725)	Wireframe	232303	657911
CHVP11	Kilbirnie House / Castle (WoSAS ID: 6777)	Wireframe	230350	654116
CHVP12	Aitnock, dun (SM2886)	Wireframe	227879	650874

7.63 The use of photomontages to support reporting of effects to particular assets will be agreed in the course of the assessment with the relevant consultees.

Potential Effects Scoped In

7.64 At this stage, potential effects, including cumulative effects, associated with the construction and/or operation of the Proposed Development scoped into the assessment include:

- Physical impacts to heritage assets within the Site;
- Setting change to susceptible heritage assets with theoretical visibility within the Site, Inner and Outer Study Areas;
- Setting change to particularly susceptible designated heritage assets of national significance with theoretical visibility out to 15 km;

- Susceptible non-designated assets with theoretical visibility within the Inner Study Area identified as being of high sensitivity to setting change;
- Indirect physical effects; and
- Cumulative effects.

Potential Effects Scoped Out

7.65 Based on baseline conditions, theoretical visibility and distance from the Site, it is proposed that the following are scoped out:

- Direct physical effects on cultural heritage assets outside of the Site boundary;
- Impacts as a consequence of setting change to non-designated heritage assets beyond 5 km. Non-designated assets identified as being of regional or national importance, and highly susceptible to setting change may be scoped in based on consultation and the review process noted above; and
- Impacts on the setting of all heritage assets located outside the ZTV. These assets are unlikely to be adversely impacted by the Proposed Development. However, assets will be routinely checked to ensure that in-combination views with the Proposed Development will not result in effects. Where any such views are identified as being central to the significance of assets, and the potential for significant effects identified, they will be scoped in.

Approach to Mitigation

7.66 Where adverse effects to assets within the Site are identified, measures to avoid, reduce and/or offset these effects will be proposed. Where necessary, to prevent accidental damage or potential destruction of assets, appropriate measures will be put in place through a CEMP.

7.67 Where practicable, the design iteration process will aim to avoid or minimise impacts upon the setting of designated heritage assets.

Consultation Proposals

7.68 It is proposed that the following stakeholders are consulted to inform the assessment:

- Historic Environment Scotland; and
- West of Scotland Archaeological Service on behalf of NAC.

Questions for Consultees

Q7.1: Are there any additional sources of baseline information which should be referred to, to inform the assessment of effects on cultural heritage?

Q7.2: Do consultees agree with the proposed methodology set out?

Q7.3: Do consultees agree with assets and matters scoped out of the heritage assessment?

Q7.4: Are there further specific heritage assets that should be considered in the impact assessment?

Q7.5: Are there further assets or locations where visualisations would be helpful?

Chapter 8

Hydrology, Hydrogeology, Geology and Peat

Introduction

8.1 This chapter sets out the proposed approach to the assessment of potential effects on hydrology, hydrogeology, geology and peat during construction and operation (including cumulatively) of the Proposed Development. The assessment will be carried out in line with relevant legislation and standards.

Existing Conditions

8.2 A desk-based review of 1:25,000 scale Ordnance Survey maps, 1:50,000 scale British Geological Survey (BGS) Geology maps, 1:250,000 scale Soils Maps of Scotland and the 1:250,000 NatureScot Carbon and Peatland 2016 Map has been undertaken. Additionally, a Phase 1 peat survey was completed in February 2026 by Kaya Consulting. An initial hydrology and GWDTE survey was also undertaken during the same period in February 2026 to identify watercourses, GWDTE and ground conditions within the Site. Existing conditions at the Site are described below, based on the desk-based review and surveys undertaken to date.

Topography and Hydrology Overview

8.3 The topography at the Site slopes downhill towards the south and south-west towards Muirhead and Camphill Reservoirs. There are undulations in slope angle and orientation, particularly around watercourses, with ground west of Knockside Hills sloping west towards Rye Water and ground around the Routdane Burn sloping east/west to the watercourse, but generally the terrain slopes consistently within the Site to the south and south-east. Topography in the south-west and west of the Site generally sits on a steeper incline. The highest ground levels within the Site are located in the western area at Knockside Hills at 446 m AOD, with similar levels present on the east boundary at Greenside Hills of approximately 447 m AOD.

8.4 The Site is mainly situated within the wider catchment of the Rye Water, a tributary of the River Garnock. A small part of the east of the Site drains to the Pitcon Burn catchment, which is a tributary of the Mains Burn, which then enters the River Garnock. The Rye Water flows in a southerly direction along the western Site boundary before entering Muirhead Reservoir. The area of the Site containing the proposed infrastructure is located in the east of the Site and is within the Routdane Burn and Pitcon Burn sub-catchments (**Figure 8.1: Hydrology Overview**)

8.5 The Routdane Burn drains south through the Site and lies within a steep valley channel. This watercourse is artificially diverted west to the Muirhead Reservoir via a weir and buried diversion pipe, located in the lower portion of the catchment. The reach downstream of the weir drains to the Camphill Reservoir.

8.6 The Pitcon Burn runs along the eastern Site boundary and does not flow to either of the reservoirs south of the Site. The Pitcon Burn eventually joins the River Garnock approximately 6 km downstream of the Site.

8.7 Other smaller watercourse catchments within the Site include the Guillie Burn in the west of the Site and the Black Burn and its tributaries, the Well and Bannock Burns, which drain a small area in the south-east of the Site. The Guillie Burn enters the Muirhead Reservoir, while the Black Burn flows south to a perimeter channel adjacent the Camphill Reservoir. This channel routes flows around the reservoir where they join the Rye Water close to the reservoir outfall.

8.8 Several groundwater springs, identified through review of historical mapping, and groundtruthed during February 2026 hydrology walkover surveys, are located in the south-west and west of the Site.

Flood Risk

8.9 A review of SEPA Future Flood Map⁹³ indicates that there are some minor areas at risk of flooding during a 1 in 200-year plus climate change event within the Site. These flood risk areas are almost entirely constrained to watercourse valleys, with indicative areas of surface water and small watercourse flood risk within the Gullie Burn, Rye Water, Bannock Burn and other small unnamed watercourses and their respective headwater areas. Fluvial flood risk is present within the Routdane Burn but is limited to the steep channel valley.

Water Quality

8.10 SEPA has characterised surface water quality status under the terms of the Water Framework Directive. Classification by SEPA considers water quality, hydromorphology, biological elements including fish, plant life and invertebrates and specific pollutants known to be problematic. The classification grades watercourses as High, Good, Moderate, Poor or Bad Status. This provides a holistic assessment of ecological health. The Rye Water (Waterbody ID 10390) was classified as having overall 'Moderate Ecological Potential' in 2024⁹⁴. It has been designated by SEPA as a heavily modified water body '*on account of physical alterations that cannot be addressed without significant impact on water storage for public drinking water.*' This is in relation to the Muirhead and Camphill Reservoirs within the Rye Water catchment. The other watercourses within the Site are not large enough to be classified by SEPA.

Geology and Peat

8.11 A review of the online British Geological Survey (BGS) geology maps shows the underlying bedrock geology is largely comprised of the Strathgryfe Lava Member Mugearite and Macrophyrlic Basalt⁹⁵. These are igneous rocks of volcanic (extrusive) origin, poor in silica and formed by fluid lava flows with feeder dykes and sills. The Strathgryfe Lava Member units underly the vast majority of the east, central, south and west areas of the Site. The central and north areas of the Site are underlain mainly by Misty Law Trachytic Member Tuff and agglomerate (extrusive igneous rocks formed by pyroclastic flows) with smaller areas of Clyde Plateau Subsuite Trachytic rock, Rye Water Head Sills Felsite and Dinantian Dyke Felsite and microdioritic rocks. The superficial geology is comprised of glaciogenic Devensian Diamicton Till and Peat, with a small area of alluvium clay, silt, sand and gravel around the Routdane Burn.

8.12 The NatureScot Carbon and Peatland (2016) Map indicates that the south-east, central and north areas of the Site are largely underlain by Class 1 peat⁹⁶ (**Figure 8.2: NatureScot Peatland Classification**). Additionally, there are indicative areas of Class 3 and 5 peat in the east of the Site around Greenside Hill, areas of Class 4 and 5 peat on Knockside Hill in the west of the Site and some sections of Class 4 peat on the hillside sloping towards the reservoirs in the south of the Site. Areas closest to the southern and western Site boundary are classified as Mineral Soil. The descriptors for the Carbon and Peatland classes within the Site are listed below:

- Class 1 – Nationally important carbon-rich soil, deep peatland priority peatland habitat. Areas likely to be of high conservation value;
- Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbo-rich soils, with some areas of deep peat;

⁹³ SEPA Future Flood Map, [SEPA Flood Maps](#)

⁹⁴ SEPA Water <https://informatics.sepa.org.uk/WaterClassificationHub/ClassificationHub> [online] <https://informatics.sepa.org.uk/WaterClassificationHub/>

⁹⁵ British Geological Survey (2025) BGS Geology Viewer [online]. <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

⁹⁶ NatureScot (2016) Carbon and Peatland 2016 map [online] <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

- Class 4 – Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon rich soils;
- Class 5 – Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soils. Soils are carbon-rich and deep peat; and
- Mineral Soil – Peatland habitats are not typically found on such soils (Class 0).

8.13 A Phase 1 peat survey on a 100 m x 100 m grid across the whole site was undertaken in February 2026 to determine peat depths. The results are presented in **Figure 8.3: Peat Depths** and **Appendix D: Phase 1 Peat Survey Report** and show the presence of peat across approximately half of the Site, with large areas in the west and south-west of the Site and on the flanks of Knockside, Greenside and Lairdside Hills where peat is generally absent on steeper ground. The deepest peat areas are generally concentrated within the Class 1 area in the east, centre and north-east with some probes exceeding 2.5 m depth.

8.14 A review of satellite imagery and the Site survey confirmed the presence of extensive artificial drainage (>100 km) across the Site, including within the Class 1 peat areas. Drains are closely spaced and have likely modified habitat in these areas. Where the drains are sufficiently shallow in gradient, drain blocking may assist in recovery of habitat to better condition.

8.15 While drainage is extensive, evidence of erosion and bare peat is very limited, no cuttings have been identified and accordingly there is limited opportunity to reuse excavated peat to restore degraded peat. In recognition of the relatively steep terrain and in the absence of these opportunities, avoidance and / or minimisation of overlap with peat for permanently excavated infrastructure has been identified as a key requirement for the proposals. The moderate to steep slopes would also facilitate transmission of landslide debris to watercourses, and therefore peat landslide risk has also been identified as a key focus. Much of the Site shows potential evidence of spring lines in the mid-slopes, this possibly explaining the extensive artificial drainage network, however water sources may also contribute to instability.

Groundwater

8.16 The Site is underlain by the Routdaneburn groundwater body (Waterbody ID 150532) which was classified by SEPA as being in 'Good' condition in 2024. The aquifer underlying the Site belongs to the Igneous Volcanic aquifer group of Scotland and is an extrusive Dinantian unit classified as a 2C low productivity aquifer through which flow is virtually all through fractures and other discontinuities.

Water Supplies and Protected Areas

8.17 Private Water Supply (PWS) and groundwater abstraction data within a 1 km buffer of the Site has been requested from NAC and SEPA. SEPA's response indicates that there are no known groundwater abstractions within 1 km of the Site.

8.18 NAC's Data indicates that there are nine properties within or near the 1 km buffer of the Site that have a PWS. Of these, the council data includes information on the private water supply sources for seven of the properties. PWS source locations and supplied properties are shown on **Figure 8.1**.

8.19 Six of the seven properties with known source locations are supplied by the same source at Blairpark Farm. The source lies outwith the Site boundary, adjacent to the Rye Water, and is approximately 1.9 km from the Proposed Development infrastructure. The remaining known source lies on the opposite side of the Rye Water valley and associated reservoirs, lying approximately 1 km from the Proposed Development infrastructure.

8.20 PWS questionnaires will be sent to the remaining two properties to identify and locate the PWS sources to inform the effects assessment during the EIA process.

8.21 The Site is located within two surface water Drinking Water Protected Areas (DWPAs); the Rye Water (Waterbody ID 10390) and the Mains Burn (Waterbody ID 23727). As such, the downstream receiving water environment is considered to be of high sensitivity.

8.22 There are no designated conservation sites (e.g. SSSI), SPA or SAC within or downstream of the Site.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

8.23 During a combined hydrology, peat and GWDTE initial walkover in February 2026, several groundwater features were identified through ground-truthing of historically mapped springs and the identification of unrecorded upwellings. In-situ analytical groundwater chemistry tests were used to identify upwellings with elevated or unique groundwater characteristics.

8.24 At least 12 groundwater spring/flush upwellings were identified exclusively in the west and south-west of the Site and regularly aligning with geological boundaries and linear faultline features. These point source upwellings each displayed distinct groundwater chemistry and are consistent with fracture-based groundwater flow.

8.25 Hydrology surveys indicate that it is likely that there are GWDTE within the Site, however none are located within 250 m of proposed infrastructure. The National Vegetation Classification (NVC) data collected at the recent 2026 ecology surveys will be analysed to understand whether there are GWDTE habitats present on the Site. The findings of these results will inform the design of the Proposed Development to further minimise indirect impacts on these ecosystems as far as possible.

Pre-Application Advice, Consultation Responses and Other Consultation to Date

8.26 Scottish Water has been consulted with regard to the nature of the diversion weir on the Routdane Burn within the Site, as well as what other associated Scottish Water infrastructure may be present within the Site. Scottish Water responded on 12 May 2026 and provided shapefiles of their infrastructure within the Site, which will be considered during design and the assessment.

Design Considerations

8.27 A 50 m buffer has been applied to mapped watercourses and surface water areas (e.g. bog pools) to minimise the risk of potential impacts due to changes in runoff, sedimentation, or water quality. In addition, flood risk areas based on SEPA future flood maps will be avoided where practicable.

8.28 There are limited existing tracks on the Site, which can be used for the Proposed Development, however these will be used (and upgraded) where possible to minimise land take and new watercourse crossings. Any new permanent watercourse crossings will be sensibly designed to account for local fluvial geomorphology and will be designed for the 200-year + climate change flow.

8.29 Infrastructure has avoided areas of deeper (> 1 m) peat, where possible. This reduces the volume of peat required to be excavated (reducing displaced carbon) and limits effects on peatland hydrology. Where depths > 1 m cannot be avoided, opportunities to minimise impacts through choice of construction methodology will be considered (e.g. floating track), although the use of these alternative methodologies is likely to be limited due to the moderate to steep slopes present on the Site. The Phase 2 peat survey will provide a more detailed depiction of peat depths to allow further micro-siting of turbines and tracks away from deeper peat.

8.30 Where possible, proposed excavations < 1 m will be over 100 m away from any groundwater abstractions, PWS or GWDTEs as per SEPA guidance. Excavations > 1 m (e.g., turbine bases) will be over 250 m away from these receptors, if present.

Proposed Surveys and Assessment Methodologies

Desk and Field Surveys

Desk Study

8.31 To consolidate information on nearby PWS, PWS questionnaires will be distributed to residences within 1 km of the proposed Site boundary. Residents who do not respond to the initial PWS questionnaire will be contacted again with a second questionnaire or a visit to the property if required.

Field Survey

8.32 A detailed hydrology survey of the Site will be carried out to supplement the desk-based work and data collection already undertaken. The hydrology survey will include identifying and documenting all watercourse crossings (proposed and existing), ground truthing ecology data on potential GWDTE, ground truthing flow-paths, identifying areas of wetland/marsh or groundwater features, and undertaking an overview assessment of areas identified as floodplain within the SEPA Flood Maps.

8.33 A Phase 2 peat survey (peat probing and coring) will be undertaken following relevant guidance⁹⁷, as follows:

- Targeted high-density probing will be undertaken along proposed tracks, at turbine hardstanding, turning points and passing places, site construction compounds and any required borrow pits or met mast locations;
- Probes will be undertaken at 25 m spacing along the centreline of any access tracks and at 10 m offsets;
- Detailed probing survey on a 10 m x 10 m grid basis will be undertaken around the centre of each proposed turbine base and additional proposed infrastructure, with a wider area probed for potential micro-siting; and
- Cores will be undertaken at representative locations, including each turbine, to verify the actual peat depth, the thickness of the acrotelm and catotelm, determine the mineral soil characteristics and allow for Von Post test to be undertaken.

8.34 The data obtained from the site investigations will be used to produce maps of peat depths within the Site and around proposed infrastructure. A shaded contour interval of 0 – 0.3 m, 0.3 - 0.5 m, 0.5 – 1 m, 1 -2 m, 2 – 3 m, etc. will be used to demonstrate the occurrence of peat and show peat depths across the Site.

8.35 The findings of the survey work and baseline assessment will contribute to environmental constraints mapping and will inform design iterations and subsequent environmental assessment.

8.36 The peat survey results will also be used to inform the preparation of an outline peat management plan (OPMP) and peat landslide hazard and risk assessment (PLHRA).

8.37 The OPMP will follow relevant guidance and identify potential excavation volumes of peat (both acrotelm and catotelm) and peaty soil. Early calculations have been used to optimise infrastructure locations with respect to peat depth (in balance with other constraints). Detailed calculations of excavation and reuse of acrotelmic and catotelmic peat will be undertaken using the design-freeze layout, and opportunities to reuse peat will be explored based on infrastructure and Site conditions. This may include integration of peat reuse measures with habitat management proposals to improve Site conditions where there is benefit in so doing.

8.38 The PLHRA will be undertaken in accordance with Scottish Government guidance and will assess the likelihood of peat instability in association with wind farm construction. Early calculations have been used to minimise overlap with probable areas of higher natural likelihood, and as further probing and site understanding is acquired, calculations will be updated to inform the layout design. Assessment of the

⁹⁷ Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland

design-freeze layout will consider all relevant receptors and provide mitigation measures and good practice recommendations to minimise risks associated with peat landslides.

Assessment Methodology

8.39 The assessment area will include the Site boundary, all watercourses, waterbodies and catchments within and downstream of the Proposed Development. The PWS Survey Area will extend up to 1 km from the Site boundary, with all sources within 250 m of infrastructure included within any detailed assessment. All GWDTE identified within 250 m of infrastructure will be included within the detailed assessment.

8.40 The assessment will be undertaken in accordance with key legislation, policy and guidance.

8.41 The sensitivity of the hydrological, geological and hydrogeological receptors will be defined separately in the assessment on a scale of high, medium and low. The magnitude of effect on each receptor will be defined taking into account factors such as timing, scale, size and duration of the effect and will use a scale of major, moderate, minor and negligible. Significance of effect will be determined through a combination of the above two factors, using a standard matrix and professional judgement. Major and moderate effects will represent significant effects in the context of the EIA Regulations.

8.42 The EIA Report assessment will be supported by the following technical appendices: Watercourse Crossing, Private Water Supply, GWDTE, and Peat Survey, including a Peat Management Plan (PMP) and PLHRA.

Potential Effects Scoped In

8.43 Potential effects on hydrology, hydrogeology and peat will be assessed as part of the EIA process. This will include the identification of both generic effects of construction and operation (e.g. sediment release, pollution, fuel spills etc.) on the downstream receiving environment and effects on specific locations, such as sensitive habitats (i.e. PWS, peatland habitats or watercourse crossings, which are sensitive to pollution risk and / or disturbance from required engineering works).

8.44 Taking account of the findings of the work undertaken to date, and professional experience, whilst still adopting a precautionary approach at this preliminary stage, potential effects associated with the construction and operation of the Proposed Development include:

- Pollution of surface water caused by releases of sediment to watercourses from any excavated/stockpiled material, stream crossings or works near watercourses;
- Pollution of surface water and groundwater through operation of machinery (e.g., spillage of fuels, oils etc.) during site preparation and construction;
- Effects on PWS quality and quantity during construction and operation (if relevant buffers cannot be achieved);
- Effects on GWDTE (if relevant buffers cannot be achieved);
- Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk during construction and operation;
- Effects on peat (including potential peat instability); and
- Cumulative effects during construction and operation on surface and ground water quality, hydrology and peat. Potential impacts of the Proposed Development will be assessed in combination with relevant developments (submitted and consented applications) to determine any significant effects.

Potential Effects Scoped Out

8.45 Potential effects on bedrock geology are scoped out of the assessment.

8.46 Potential effects in catchments within the Site where no infrastructure is proposed will be scoped out of the assessment⁹⁸.

Approach to Mitigation

8.47 In addition to the careful siting of infrastructure components (see **Design Considerations**), and given the Applicant's commitment to, and prior experience of, implementing accepted good practice measures during construction and operation, together with the current regulatory context, many potential effects on the water environment can be avoided or reduced.

8.48 With respect to the current regulatory context, authorisations under the Environmental Authorisation (Scotland) Regulations 2018 (EASR) will be required in relation to a number of activities e.g., engineering works in inland waters and wetlands and surface water run-off management and pollution control during construction. Consultation with SEPA throughout the EIA process will be undertaken in relation to those activities for which an EAS permit or registration is required.

8.49 Good practice pollution prevention and control measures will be put in place during construction. These will reflect best practice guidance and recognised Industry standards (e.g., SEPA guidance, including their Guidance for Pollution Prevention (GPPs), CIRIA SUDS Manual⁹⁹ and Control of Water Pollution from Construction Sites Guidance¹⁰⁰ and the joint publication: Good Practice during Windfarm Construction¹⁰¹ amongst others).

8.50 Therefore, a number of measures are not considered to be mitigation as such, but rather an integral part of the design/construction process as part of good practice; and it is proposed that these will be considered as 'embedded mitigation' and taken into account prior to assessing the likely effects of the Proposed Development. However, where appropriate, more tailored 'additional' mitigation measures will be identified and proposed where significant effects are likely.

Consultation Proposals

8.51 It is proposed that the following stakeholders are consulted to inform the assessments:

- SEPA;
- NatureScot;
- Scottish Water; and
- NAC.

Questions for Consultees

Q8.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, geology and peat?

Q8.2: Do consultees agree that the proposed methodology is appropriate?

Q8.3: Do consultees agree the proposed list of effects which are scoped in are appropriate?

Q8.4: Do consultees agree the proposed approach to mitigation is appropriate?

⁹⁸ Scottish Renewables (2025) Guidelines on Streamlining Environmental Impact Assessment for Onshore Wind Farms

⁹⁹ CIRIA SUDS Manual (2015) C753

¹⁰⁰ CIRIA Control of water pollution from construction sites. Guidance for consultants and contractors, (2001) C532

¹⁰¹ Forestry Commission Scotland, Historic Environment Scotland, Scottish Renewables, Scottish Environment Protection Agency, NatureScot et al. (2024): Good Practice during Wind Farm Construction Version: July 2024

Chapter 9

Noise and Vibration

Introduction

9.1 This chapter presents the potential effects of noise and vibration during the construction and operation of the Proposed Development.

Existing Conditions

9.2 The Site lies between the towns of Kilbirnie (approximately 3.2 km to the south-east) and Largs (approximately 3.8 km to the west). The majority of noise sensitive receptors (NSRs) in the local area are concentrated to the west, south and east of the Site, with the closest NSR located approximately 1.1 km south-west of the nearest turbine, based on the Scoping Layout.

9.3 It is anticipated that baseline noise levels around the Site are relatively low due to the rural setting, however, there will be a degree of road traffic noise for NSRs in close proximity to the A760 main route between Lochwinnoch, Kilbirnie and Largs, along with noise from operational cumulative wind farms within the vicinity (see below for further details on existing wind farm noise).

9.4 An initial cumulative search has identified the following wind energy developments which are considered to have the potential for cumulative effects:

- Radio City Community Turbine (operational) – approximately 1.7 km to the west of the Site;
- Kelburn Wind Farm (operational) – approximately 3.4 km to the southwest of the Site;
- Swinlees Wind Farm (consented) – approximately 3.0 km to the south of the Site;
- Millour Hill Wind Farm (operational) – approximately 3.8 km to the south of the Site;
- Millour Hill Extension Wind Farm (operational) – approximately 3.8 km to the south of the Site; and
- Wardlaw Wood (also known as Dalry) Wind Farm (operational) – approximately 4.8 km to the south of the Site.

9.5 As part of the EIA process, a full updated cumulative search will be undertaken to ensure that any further developments with the potential for cumulative noise effects are identified and assessed accordingly.

Design Considerations

9.6 Operational noise from the cumulative wind developments outlined above will be a key consideration in the design of the Proposed Development in terms of noise. The Proposed Development will be designed to ensure that the ETSU-R-97¹⁰² limits are achieved at all relevant NSRs, both in isolation and cumulatively.

¹⁰² ETSU (1996) ETSU-R-97 The Assessment and Rating of Noise from Wind Farms. Energy Technology Support Unit (ETSU) for the Department of Trade and Industry (DTI).

Proposed Surveys and Assessment Methodologies

Desk and Field Surveys

Desk Study

9.7 As an initial step, a desktop review of the satellite imagery and Ordnance Survey AddressBase data has been undertaken to identify potential NSRs surrounding the Proposed Development and determine the requirement for an ETSU-R-97 background noise survey as detailed further below. To identify the precise locations for monitoring, the initial study will be supplemented by detailed noise modelling in line with the requirements of ETSU-R-97 and the Institute of Acoustics' (IOA) Good Practice Guide (GPG)¹⁰³. Consultation will then be carried out with the Environmental Health Officer (EHO) at NAC to agree the precise number and location of the baseline survey positions, as well as agreeing the wider details of the assessment methodology.

Field Survey

9.8 The results of the initial desktop review described above indicate that a baseline noise survey is likely to be required based upon the Proposed Development's Scoping layout. Once the survey locations have been identified and agreed with the EHO, they will be invited to attend installation of the survey equipment which will also be agreed with the relevant property owners. The Noise and Vibration chapter will include full details of the noise monitoring survey, including but not limited to locations, times and photographs of the equipment in situ.

9.9 Upon completion of the survey, the resulting data will be filtered and analysed in accordance with the GPG, to derive the respective ETSU-R-97 noise limits.

9.10 ETSU-R-97 makes it clear that baseline noise levels from which the noise limits are derived should not include noise from existing wind turbines. The GPG provides a number of options for measures that can be taken to ensure that noise from existing operational turbines. This includes use of previously measured background noise levels, implementation of directional filtering or correcting measured levels for the influence of the existing turbines. Further investigation will be carried out regarding each of the above measures and agreement sought with the EHO as to the approach to be adopted.

Assessment Methodology

Legislation, Policy and Guidance

Construction Noise and Vibration

9.11 The following legislation, guidance and standards are of particular relevance to construction noise:

- The Control of Pollution Act 1974 (CoPA 1974)¹⁰⁴;
- The Environmental Protection Act 1990 (EPA 1990)¹⁰⁵; and
- British Standard BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'¹⁰⁶.

9.12 Further details of the above legislation and guidance will be provided in the EIA Report. Where construction noise effects are anticipated, the above guidance and legislation will form the basis of the assessment.

¹⁰³ Institute of Acoustics (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

¹⁰⁴ UK Government (1974) The control of Pollution Act 1974, available at: <http://www.legislation.gov.uk/ukpga/1974/40>.

¹⁰⁵ UK Government (1990) The Environmental Protection Act 1990. Available at: <http://www.legislation.gov.uk/ukpga/1990/43/contents>.

¹⁰⁶ BS 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise and Part 2: Vibration.

Operational Noise and Vibration

9.13 ETSU-R-97 provides a framework for the assessment and rating of noise from wind turbine installations. The Scottish Government's Onshore Wind: Policy Statement¹⁰⁷ explicitly requires that all applicants adopt the methodology described in ETSU-R-97 to assess and rate noise from wind energy developments, alongside the GPG. The GPG was published by the IOA in May 2013 and has been explicitly recognised by the Scottish Government as current industry good practice. The guide presents current good practice in the application of ETSU-R-97 assessment methodology for wind energy developments at the various stages of the assessment and will be followed throughout the assessment.

9.14 The specific methodologies involved in applying ETSU-R-97 to a proposed new development will be detailed in full in the EIA Report but, in summary, these provide recommendations for noise limits relating to the existing levels of background noise for defined quiet daytime and night-time periods. The specified noise limits outlined in ETSU-R-97 relate to the cumulative effects of all turbines that affect a particular location.

9.15 To carry out a noise assessment in accordance with ETSU-R-97, the following steps are required:

- Specification of the number and locations of the wind turbines;
- Identification of the locations of the nearest, or most sensitive, NSRs;
- Determination of the background noise levels as a function of site wind speed at the nearest NSRs, or a representative sample of the nearest NSRs;
- Determination of the quiet day time and night-time criterion curves from the background noise levels identified;
- Specification of the type and noise emission characteristics of the proposed wind turbines;
- Calculation of the noise immission levels due to the operation of the wind turbines as a function of site wind speed at the nearest NSR; and
- Comparison of the calculated noise immission levels with the derived criterion curves and assess in the light of relevant planning requirements.

9.16 Whilst it is noted that updated guidance for the assessment of wind turbine noise is currently in draft form¹⁰⁸, there is no confirmation of formal publication and adoption following the consultation period. This will be kept under review as the EIA progresses, however, use of the draft guidance is not appropriate at this time, with the guidance itself stating that:

"This draft guidance update does not represent a final position from government. It should not be used by local planning authorities during or after the consultation period in relation to ongoing planning applications. Following this consultation, we will analyse responses and issue a formal government response. Until this time, the current guidance remains suitable for assessing wind turbine noise. Planning authorities should continue to use existing guidance and are advised not to delay planning decisions on the basis of this consultation."

Study Area

9.17 The Noise Study Area will be defined as described in the GPG. This states that wind turbine noise should be considered for all NSRs where the predicted cumulative noise levels from the Proposed Development together with any other wind energy developments that are operational, under construction, consented or the subject of a current valid planning application are at least 35 dB LA90,10min and the difference between the predicted noise level for the Proposed Development and those for the other turbines is less than 10 dB. Once the Proposed Development's Study Area has been defined, a detailed location-specific

¹⁰⁷ Scottish Government (2022) Onshore wind: policy statement [online] Available at <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/pages/4/>.

¹⁰⁸ UK Government Department for Energy Security & Net Zero (2025) Assessment and Rating of Wind Turbine Noise (DRAFT) [online] Available at: <https://www.gov.uk/government/consultations/assessment-and-rating-of-wind-turbine-noise-guidance-proposed-updates> (Accessed 8/5/2026)

assessment will be undertaken for all NSRs (or a representative selection thereof) located within the Study Area as part of the operational noise assessment in the EIA Report.

Potential Effects Scoped In

9.18 The Proposed Development has the potential to result in significant effects at NSRs under certain circumstances, as discussed in the following sections.

Construction Noise

9.19 Due to the large separation distances typically required from wind turbines to the nearest NSRs, it is anticipated that the large majority of working areas will be sufficiently remote that a detailed assessment of construction noise effects will not be required. This will be investigated further as the Proposed Development design progresses. In the event that a specific construction noise assessment is not required, the EIA Report will nevertheless provide a summary of relevant guidance and best practice construction methods, along with a commitment to adhere to best practice means of controlling noise from construction activities, as advocated by BS 5228.

9.20 The increase in noise due to construction traffic on public roads will be assessed using the traffic flow data provided in the Traffic and Transport assessment of the EIA Report.

Operational Noise

9.21 The operational noise assessment will be limited to the effects on human receptors at residential properties or other NSRs such as hospitals, nursing homes etc., as necessary. Noise effects will be assessed on the basis of the level of noise produced by the Proposed Development relative to ETSU-R-97 noise limits.

Cumulative Effects

9.22 As detailed above, a comprehensive cumulative search will be undertaken to identify operational, consented or in planning wind energy developments which may require consideration in the assessment process. A screening exercise will be carried out to identify which of these require detailed consideration, and will be assessed accordingly.

Potential Effects Scoped Out

Low Frequency Noise and Infrasound

9.23 A number of studies have been carried out relating to low frequency noise and infrasound^{109,110,111}. These studies concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines, but that complaints attributed to low frequency noise were, possibly due to a phenomenon known as Amplitude Modulation (AM) (see below). It is widely accepted that specific assessments of low frequency noise and infrasound are not necessary, on the basis of there being no reasonable prospect of a significant effect. However, supporting information and further detail on these subjects will be provided in the EIA Report.

Amplitude Modulation

9.24 In its simplest form, AM, is the regular variation in noise level of a given noise source. This variation (the modulation) occurs at a specific frequency, which, in the case of wind turbines, is defined by the rotational

¹⁰⁹ Hayes Mckenzie, The Department for Trade and Industry, URN 06/1412. (2006). The measurement of low frequency noise at three UK wind farms.

¹¹⁰ Environment Protection authority (2013) Infrasound levels near wind farms and in other environments [Online] Available at: http://www.epa.sa.gov.au/xstd_files/Noise/Report/infrasound.pdf (Accessed 8/5/2026).

¹¹¹ Bowdler et al. (2009). Prediction and Assessment of Wind Turbine Noise: Agreement about relevant factors for noise assessment from wind energy projects. Acoustic Bulletin, Vol 34 No2 March/April 2009, Institute of Acoustics.

speed of the blades, i.e., it occurs at the rate at which the blades pass a fixed point (e.g., the tower), known as Blade Passing Frequency.

9.25 There is a distinction between 'normal AM' of wind turbine noise, characterised as blade swish and Enhanced AM (EAM) or Other AM (OAM), sometimes characterised onomatopoeically as 'thump'. It should be noted that ETSU-R-97 describes and makes allowance for normal AM or blade swish. A number of studies have been carried out on OAM^{112,113} which found that the generation of OAM is based upon the interaction of a number of factors, the combination and contributions of which are unique to each site. With the current state of knowledge, it is not possible to predict whether any particular site is more or less likely to give rise to OAM, and the incidence of OAM occurring at any particular site is low.

9.26 In 2016, the IOA proposed a measurement technique¹¹⁴ to quantify the level of AM present in any particular sample of wind farm noise. This technique is supported by the Department of Business, Energy & Industrial Strategy (now Department for Energy Security and Net Zero) who published guidance¹¹⁵ which seeks to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition. Notwithstanding this, the suggested outline planning condition is as yet invalidated, and remains in a draft form. Section 7.2.1 of the GPG therefore remains current, stating:

"The evidence in relation to 'Excess' or 'Other' Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM."

9.27 In line with widely accepted best practice, it is therefore not necessary to carry out specific assessments of AM.

Ground-Borne Vibration

9.28 Research undertaken by Snow¹¹⁶ in 1996 found that levels of ground-borne vibration 100 m from the nearest wind turbine were significantly below criteria for 'critical working areas' given by British Standard BS 6472:1992 'Evaluation of human exposure to vibration in buildings' (1Hz to 80Hz), and were lower than limits specified for residential premises by an even greater margin.

9.29 Ground-borne vibration from wind turbines can be detected using sophisticated instruments several kilometres from a wind farm site as reported by Keele University¹¹⁷. This report clearly shows that, although detectable using highly sensitive instruments, the magnitude of the vibration is orders of magnitude below the human level of perception and does not pose any risk to human health.

Approach to Mitigation

9.30 Mitigation of noise effects will be embedded into the design and layout of the Proposed Development as part of the design process as far as possible, given other on site constraints. Following completion of the background noise monitoring and detailed modelling, should further mitigation be required, this will be managed through use of noise reducing operational modes with an example mitigation strategy provided in the EIA Report, in line with current best practice.

Consultation Proposals

9.31 It is proposed that the following stakeholders are consulted to inform the assessments:

- NAC Environmental Health Department.

¹¹² The Department for Business, Enterprise and Regulatory Reform, URN 07/1235 (2007). Research into aerodynamic modulation of wind turbine noise'. Report by University of Salford.

¹¹³ Wind Turbine Amplitude Modulation: Research to improve understanding as to its Cause and effects, Renewable UK, 2013.

¹¹⁴ Institute of Acoustics, (2016) A Method for Rating Amplitude Modulation in Wind Turbine Noise.

¹¹⁵ BEIS, (2016), Review of the evidence on the response to amplitude modulation from wind turbines.

¹¹⁶ ETSU (1997), Low Frequency Noise and Vibrations Measurement at a Modern Wind Farm, prepared by D J Snow.

¹¹⁷ Keele University, 2005. Microseismic and infrasound monitoring of low frequency noise and vibrations from wind farms: recommendations on the siting of wind farms in the vicinity of Eskdalemuir, Scotland.

Questions for Consultees

- Q9.1:** Do consultees agree with the proposed methodology and scope of the assessment?
- Q9.2:** Does the Council have details of any further cumulative developments in the locality which they consider may raise significant issues within the EIA process for the Proposed Development?
- Q9.3:** Are consultees aware of any additional potential NSRs, such as new housing developments?
- Q9.4:** Do consultees agree that low frequency noise and infrasound, amplitude modulation and ground-borne vibration can be scoped out of the EIA?
- Q9.5:** Are there any other relevant consultees who should be contacted with respect to the noise assessment, or any additional potential NSRs that should be considered?

Chapter 10

Access, Traffic and Transport

Introduction

10.1 The Chapter sets out the predicted transport and access issues that may arise from the construction of the Proposed Development, the proposed methodology for assessing these effects and what suitable mitigation can be put in place to avoid, minimise or offset any adverse impacts.

10.2 The Access, Traffic and Transport EIA Report Chapter will be supported by a Transport Assessment (TA) report, AIL Route Survey Report (RSR) and technical figures.

10.3 The key issues for consideration as part of the assessment will be:

- The temporary change in traffic flows and the resultant, temporary effects on the Study Area road network during the construction phase;
- The physical mitigation associated with the delivery of AILs;
- The design of new access infrastructure; and
- The consideration of appropriate and practical mitigation measures to avoid, minimise or offset any temporary effects.

10.4 The potential effects of these will be examined in detail within the Access, Traffic and Transport Chapter and supporting TA.

Study Area

10.5 The Site will be accessed by construction delivery vehicles via the A760, to the south of the Site boundary. A new junction will be constructed approximately 400 m to the west of Routdaneburn Farm which is located on the southern side of the A760 on the northern bank of Camphill Reservoir. The junction will be the sole point of access into the Site and will be used by both general construction traffic and AILs. This will form the main Site during both construction and operational phases.

10.6 For the purposes of the assessment the PoE will be assumed to be KGV Docks. AILs would route to the Site by exiting the KGV Docks, joining the M8 westbound then the A737 southbound, exiting at Hillend Roundabout. AIL vehicles will leave the A737 and travel through Dalry towards the B780 and travel west onto the B784 joining the A760 to access the Site access junction.

10.7 Loads will then proceed to the proposed turbine locations using a combination of upgraded and new access tracks.

10.8 A detailed RSR will support the planning application and will identify the necessary access improvements that will be required to enable loads to access the Site. This will include an initial Electronic Service Delivery for Abnormal Loads (ESDAL) weight review for structures on the proposed access route.

10.9 Locally sourced material or materials won on Site will be used wherever feasible and traffic will avoid impacting on local communities as far as possible. The majority of bulk material sources are expected to either won on site or extracted from existing, licensed facilities located within the Study Area road network.

10.10 Based on the access review undertaken to date, the suggested Study Area for the assessment of access, traffic and transport effects is therefore defined by the following road links, which are considered to be where increased construction traffic volumes will occur:

- The A760, between the A78 and Kilbirnie;
- The A737, between Junction 29 of the M8 and Hillend Roundabout south of Dalry;
- The A737, between Hillend Roundabout and Kilwinning;
- The A78, between north of Largs and Southannan Roundabout south of Fairlie;
- The B714, between Hillhead Roundabout and the B780;
- The B780, between the B714 and B784; and
- The B784, between the A760 and B780.

Existing Conditions

10.11 A review of the existing conditions of the Study Area road network has been undertaken and is detailed below.

10.12 Within the Study Area, the A760 is a rural two-way single carriageway road predominantly subject to the national speed limit. This reduces to 30 mph to the east of the B784 and remains at 30 mph through to Kilbirnie. Similarly, the speed reduces to 30 mph on approach to Largs in the west. The A760 appears to be in reasonable condition, from online imagery and is maintained by NAC. A shared path is located along the eastern side of the A760 starting from Geirston Road until the town of Kilbirnie.

10.13 The A737 trunk road within the Study Area is a combination of dual carriageway and single carriageway sections. The road has seen significant investment over the last two decades providing bypasses to relieve congestion in towns such as Johnstone, Beith and Dalry. For the most part the road is subject to the national speed limit (70 mph on dual carriageway sections and 60 mph on single carriageway sections), reducing to 30 mph on approach to town such as Beith and Kilwinning. The road appears to be in reasonable condition, from online imagery and is maintained by Amey within the South West Trunk Road network.

10.14 The A78 trunk road within the Study Area is a two-way single carriageway road. Within the Study Area, the A78 is subject to 30 mph through Fairlie and Largs, however, this increases to the national speed limit (60 mph) between the two towns and to 40 mph to the north of Fairlie. The road appears to be in reasonable condition, from online imagery and is maintained by Amey within the South West Trunk Road network. Within the Study Area, a shared path is provided on both sides in Largs and Fairlie and on the eastern side in between towns.

10.15 The B784 is a two-way single carriageway road which connects the A760 to the north and B780 to the south, providing access to the Swinlees Quarry and agricultural land uses. The road is subject to the national speed limit throughout and appears to be in reasonable condition. The road is maintained by NAC.

10.16 The B714 within the Study Area is a single carriageway road with one lane operating in each direction. Between Hillhead Roundabout and Dalry there is a 40 mph speed limit in place, reducing to 30 mph on entering the town. Through Dalry there are footways present on both sides of the carriageway and pedestrian facilities including drop kerbs and dedicated crossing points. The is maintained by NAC and appears to be in reasonable condition from online imagery.

10.17 The B780 within the Study Area connects with the B741 in Dalry before continuing north-east toward Kilbirnie. Within Dalry there is a 30 mph speed limit in place and as with the B741 there are pedestrian facilities along its length. On exiting Dalry, the speed limit increase to the national speed limit at Pitcon Mains. The is maintained by NAC and appears to be in reasonable condition from online imagery.

10.18 There are no Core Paths within the Site boundary. The closest Core Paths are located north-east of Kilbirnie, east of the Site. In addition, there are no National Cycle Network Routes on any road sections within the proposed Study Area.

10.19 Traffic accident data will be obtained from Crashmap UK for the Study Area road network to inform the accident review for the immediate road Study Area. Five years' worth of data will be collated and assessed.

Design Considerations

10.20 An appropriate access junction will be provided on the A760 to cater for general construction traffic, AIL deliveries and ongoing operational access to the Proposed Development. The junction will be described in the EIA description of development chapter, as well as within the traffic and transport EIA Report chapter and technical appendices, and a drawing of the junction will be provided.

10.21 AILs associated with the wind turbines will be examined in a RSR that will be appended to the EIA Report. Swept path assessments and traffic management requirements necessary for the safe and efficient delivery of the loads will be detailed in this report.

Proposed Surveys and Assessment Methodologies

Desk and Field Surveys

Desk Study

10.22 A desk study has been undertaken to review existing sources of traffic survey data, accident data and to review the AIL access from KGV Docks to the Proposed Development.

10.23 Traffic data for the A737, A760 and A78 will be obtained from UK Government Department for Transport (DfT) traffic count data and the Transport Scotland databases. National Road Traffic Forecast (NRTF) Low Traffic Growth assumptions will be used to provide a common future year baseline to coincide with the expected construction traffic peak.

Field Survey

10.24 A Site visit will be held to review the AIL access route in detail and routes for general construction traffic.

10.25 New Automatic Traffic Count (ATC) surveys will be undertaken at the following locations to supplement the traffic count information detailed above within the Desk Study section:

- The A760 (Site entrance);
- A737 (South of Hillend Roundabout);
- B714 (Townsend Street in Dalry);
- B780 (Roche Street in Dalry); and
- The B784 (North of Swinlees Quarry).

Assessment Methodology

Guidance and Legislation

Policy and Guidance

10.26 The following policy and guidance documents will be used to inform the Access, Traffic and Transport Chapter:

- Transport Assessment Guidance (Transport Scotland, 2012);
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
- Guidelines for Environmental Impact Assessment (Institution of Sustainability & Environmental Professionals (formerly IEMA, 2005));

- Environmental Assessment of Traffic and Movement (Institution of Sustainability & Environmental Professionals (formerly IEMA, 2023));
- LA104, Environmental assessment and monitoring, the Design Manual for Roads and Bridges (DMRB) (2020);
- Table 2.2 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) (2008);
- Design Manual for Roads and Bridges, Volume 15, Part 5 “The NESMA Manual” (2013);
- National Planning Framework (NPF) 4 (Scottish Government, 2023); and
- North Ayrshire Local Development Plan 2 (NAC, 2019)

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

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

10.28 The following rules taken from the guidance will be used as a screening process to define the scale and extent of the assessment:

- Rule 1 – Include highway links where traffic flows will increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2 – Include any other specifically sensitive areas where total traffic flows are predicted to increase by 10% or more.

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

10.30 The estimated traffic generation of the Proposed Development will be compared with future baseline traffic flows for each road link in the Study Area in order to determine the percentage increase in traffic. The future baseline traffic flows will take into account NRTF Low Growth factors, which will be applied to the anticipated construction year.

10.31 Potentially significant environmental effects will then be assessed in detail for identified sensitive receptors within the Study Area where the thresholds defined above are exceeded. The significance of effects will be determined via a combination of a defined set of sensitivity and magnitude criteria in accordance with The Environmental Assessment of Traffic and Movement (ISEP formerly IEMA 2023). Suitable mitigation measures will be proposed, where appropriate.

10.32 Committed development traffic, i.e. those developments with planning consent, will be included in baseline traffic flows, where traffic data for these schemes is considered significant and is publicly available. Developments that are proposed or at Scoping will not be included, as TA Guidance from the UK Government advises that only those projects with extant planning permission or local development plan allocations within an adopted or approved plan require to be included in any assessment. Those projects in scoping or at the application stage should not be included in cumulative assessments as they have yet to be determined, and when considering traffic impacts specifically in relation to the construction phase of a project, the potential traffic impact is highly speculative and as such, cannot be included in the assessment.

10.33 It is not anticipated that a formal TA will be required as these are not generally considered necessary for temporary construction works. A reduced scope TA is therefore proposed.

10.34 Each turbine is likely to require between 11 and 14 AILs to deliver the components to Site (depending on the final turbine selection). The components will be delivered on extendable trailers which will then be retracted to the size of a standard HGV for the return journey. Detailed swept path analyses will be undertaken for the main constraint points on the route from the PoE through to the Site access junction to demonstrate that the turbine components can be delivered to Site, and to identify any temporary road works which may be necessary. The findings will be set out in the RSR.

Potential Effects Scoped In

10.35 As previously advised, the key issues for consideration as part of the assessment will be:

- The temporary change in traffic flows and the resultant, temporary effects on the Study Area road network during the construction phase;
- The physical mitigation associated with the delivery of AILs;
- The design of new access infrastructure; and
- The consideration of appropriate and practical mitigation measures to avoid, minimise or offset any temporary effects.

10.36 Potential effects that may arise from increased traffic for users of the roads within the Study Area and those residents along the delivery routes include:

- Severance;
- Driver delay;
- Pedestrian delay;
- Non-motorised user amenity;
- Fear and intimidation; and
- Road safety.

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

Potential Effects Scoped Out

10.38 Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits will be made to the Site for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the Site for specific maintenance and/or repairs. It is considered that the effects of operational traffic will be negligible and; therefore, no detailed assessment of the operational phase of the Proposed Development is proposed.

Approach to Mitigation

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

- Production of an outline CTMP;
- The design of suitable access arrangements with full consideration given to the road safety of all road users;
- A Staff Travel Plan; and
- A Framework AIL Transport Management Plan.

10.40 Additional mitigation will be included should the assessment identify significant effects following the application of the above standard mitigation measures.

10.41 Site specific physical improvements, based upon experience of other schemes in the surrounding area, will include:

- Section 96 Agreement of the Roads (Scotland) Act to protect the public road against abnormal wear and tear; and
- Enhanced temporary construction warning and direction signage.

10.42 Details of these measures will be detailed in the TA and Chapter.

Consultation Proposals

10.43 It is proposed that the following stakeholders will be consulted in relation to the assessment:

- NAC as local roads authority;
- Transport Scotland as trunk roads agency; and
- Structures owners / operators along the site access route via the ESDAL database will be undertaken as part of the AIL assessment.

Questions for Consultees

Q10.1: Do consultees agree that the proposed methodology set out is acceptable?

Q10.2: Do consultees agree that the proposed methods for obtaining traffic flow data are considered acceptable?

Q10.3: Is the use of Low NRTF acceptable for the whole of the Study Area?

Q10.4: What cumulative traffic flows from committed development should be included in the assessment?

Q10.5: Are consultees happy with the approach to scope out operational traffic as a result of the Proposed Development from the assessment?

Chapter 11

Other Issues

Introduction

11.1 This chapter sets out the proposed approach to the following other topics typically considered for a wind farm proposal, and how these will be considered in the EIA Report:

- Aviation Safeguarding;
- Climate Change (incorporating carbon balance);
- Telecommunications;
- Shadow Flicker;
- Population and Human Health (including dust); and
- Major Accidents and Disasters.

11.2 Consideration of the socio-economic benefits and implications for tourism and recreation will be set out in a standalone Socio-economic, Tourism and Recreation Impact Assessment of Whitehill Wind Farm report prepared by BiGGAR Economics, which will be submitted in support of the Section 36 application.

Aviation Safeguarding

11.3 Wind turbines have the potential to affect civil and military aviation. This section covers the methodology that will be used to undertake the aviation safeguarding assessment, lists the aviation references to be used and describes the aviation baseline, consultation requirements and mitigation to be applied, if required.

11.4 The aviation assessment will be undertaken by Wind Power Aviation Consultants Ltd (WPAC) and will be appended to the EIA Report.

11.5 The aviation assessment of the proposed turbines will be based upon the guidance included in Civil Aviation Authority (CAA) Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6, dated February 2016.

Existing Conditions

11.6 The Proposed Development is located 22 km to the south-west of Glasgow Airport and is within Class D regulated airspace known as the Glasgow Control Zone (CTR), which extends from ground level to 6000ft above mean sea level (AMSL). Above the Glasgow Control Zone there is additional controlled airspace designated as the Scottish Terminal AREA (TMA) which is also Class D regulated airspace, but controlled by National Air Traffic Services (NATS) at the Scottish Area Control Centre. The Proposed Development is also 32 km to the north-west of Glasgow Prestwick Airport (GPA), however, GPA are unlikely to be providing radar services within the Glasgow CTR. In military terms, the closest MOD Air Traffic Control (ATC) radars are at MOD Leuchars Base 134 km to the north-east and West Freugh 104 km to the south.

Licensed Aerodromes

11.7 As noted above, Glasgow Airport is 22 km to the north-east. Air traffic services provided by NATS who will be consulted through the EIA Scoping process. Some turbines within the Proposed Development are

likely visible to Glasgow Airport's radar and therefore will require consultation. GPS is 32 km to the south, therefore the Proposed Development is far enough away from the airport to ensure there is no physical safeguarding impact. However, GPA will consider the impact of any proposed wind farm on their communication, navigation and surveillance (CNS) systems out to the extent of the coverage of their radars.

Unlicensed Aerodromes

11.8 There are no unlicensed aerodromes, gliding sites, parachute drop zones or microlight sites marked on aviation charts or known to exist within the required consultation distance of the Proposed Development.

Ministry of Defence (MOD)

MOD Air Traffic Control (ATC) Radars

11.9 As mentioned above, the closest MOD ATC radars are at MOD Leuchars Base to the north-east and West Freugh, 104 km to the south. Radar modelling has confirmed that there is no possibility of either radar being affected by the Proposed Development.

MOD AIR Defence Radars

11.10 The closest AD radars are at Benbecula and Brizlee Wood near Alnwick. Radar modelling has been undertaken which shows there is no radar line of sight below 500 metres AGL over the Site.

MOD Low Flying

11.11 The Proposed Development sites within Low Flying Area (LFA) 16 and in an areas designated as 'Green' on the MOD wind farm and low flying consultation chart.

UK Met Office Weather/Rainfall Radars

11.12 The Met Office safeguards its network of radars using a European methodology known as OPERA (Operational Programme for the Exchange of Weather Radar Information). In general, they will object to any proposed turbine within 5 km in line of sight and will examine the impact of any turbines within 20 km. Where a site is within 20 km, the Met Office will undertake an operational assessment based on three main criteria, having determined if there is a technical effect on the radar. The factors they will consider include:

- Proximity to airports;
- River catchment response times; and
- Population density.

11.13 In this case the closest Met Office radar is at Holehead, north of Glasgow and 42 km to the north-east of Kilbirnie and therefore well beyond the Met Office's 20 km safeguarding distance.

NATS En Route Ltd (NERL)

11.14 An initial assessment has been conducted to determine any effect of the Proposed Development on NERL communications, navigation and surveillance (CNS) infrastructure. The closest radar in the system is Lowther Hill radar. The turbines will also be visible to the Orchardton radar. The Applicant will consult with NERL and the findings will be reported in the Aviation Report which will be an appendix to the EIA Report.

Aviation Lighting

11.15 A wind farm with tip heights in excess of 150 m need to be illuminated at the hub of selected turbines with medium intensity red aviation obstruction lighting. WPAC will design a lighting layout which minimises the number of lit turbines whilst fulfilling flight safety requirements and gain approval for the lighting layout from the CAA. This will be reported in the EIA Report within a technical appendix to describe the effect of aviation lighting on the environment and to inform the LVIA in accordance with the latest NatureScot Guidelines issued in November 2024. It will also articulate the mitigation techniques available taking into account the extant legislation and guidance.

11.16 An infra-red lighting layout to fulfil MOD requirements will also be designed and approval obtained from the MOD and reported in the EIA Report.

Climate Change Mitigation and Adaptation (incorporating Carbon Balance)

11.17 By its very nature, the Proposed Development will reduce demand for fossil fuel electricity generation and support the electrification the grid using renewable electricity, therefore contributing to the Scottish Government's carbon reduction targets.

11.18 Whilst there is no prescribed way in which climate change should be incorporated into an EIA Report, current IEMA guidance recommends that an integrated approach is taken¹¹⁸. As such, a separate climate change chapter will not be included in the EIA Report.

11.19 With respect to climate adaptation, an assessment of the effects of development on the ability of receptors to adapt to future climatic conditions will include the identification of the likely consequences of climate change for baseline conditions/assessment findings, and the resilience of proposed mitigation measures to any projected changes in extreme weather, including heavy rainfall events informed by the latest climate change projections (UKCP). Each of the technical chapters of the EIA Report will include an 'Implications of Climate Change' subheading under the baseline information section which will consider how the current baseline conditions are likely to change under the UKCP projections.

11.20 A carbon balance assessment for the Proposed Development will also be undertaken using the latest version of the Scottish Government guidance to produce a carbon calculator assessment report. This will detail input parameters and methodology, sensitivity analysis and presentation of results (carbon payback period and emissions intensity of the units generated) using SEPA approved metrics.

11.21 The main aims of the calculation are:

- To quantify sources of carbon emissions associated with the Proposed Development (e.g. from the manufacture of turbines and other construction materials as well as site-based ecological carbon losses from peat and/or forestry);
- 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.

Telecommunications

11.22 Wind turbines can cause electromagnetic interference through physical and electrical interference. Physical interference can cut across electromagnetic signals resulting in a 'ghosting' effect which largely affects television signals and radar. Electrical interference arises as a result of the operation of the generator within the nacelle of the turbine and can also affect communication equipment in proximity to the turbines.

11.23 Consultation will be undertaken with telecommunications stakeholders to identify any links crossing the Site which could act as a constraint to design.

Shadow Flicker

11.24 Under certain combinations of geographical position and time of day, the sun may pass behind rotors of a wind turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as a window), briefly reducing the

¹¹⁸ The Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (updated 2022); and The Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (updated 2020).

intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects only occur inside buildings where the blade casts a shadow across an entire window opening.

11.25 A proportionate assessment of the potential for the Proposed Development to cause shadow flicker effects at nearby sensitive receptors will be undertaken with the findings presented in a supporting appendix to the EIA Report.

11.26 There is no adopted formal guidelines in Scotland which quantify what exposure levels are acceptable, or what would constitute a significant effect in EIA terms. In the absence of such guidelines, the Department for Environment Northern Ireland (2009) Best Practice Guidance for Planning Policy Statement 18 (PPS18): Renewable Energy¹¹⁹ provides an indication of what may be an acceptable duration of shadow flicker, stating that *“It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day”* (page 29).

11.27 This limit has also been used in the rest of the UK, Republic of Ireland, Germany and Belgium. As this limit is widely accepted as a suitable metric in shadow flicker analysis for wind farms, it is considered to be an appropriate threshold in which to make a professional judgement on the significance of the Proposed Development's effects on shadow flicker.

11.28 Ordinarily, the Scottish Government's web-based renewables advice on Onshore Wind Turbines (2014)¹²⁰ advocates that shadow flicker modelling should include properties within x 10 rotor diameters and within 130 degrees either side of north. As such, the Study Area will include all receptors within a distance of 1,640 m and within 130 degrees either side of north relative to the final turbine positions.

11.29 The modelling as part of the forthcoming assumes a set of worst case (unrealistic) parameters such as: the sun is shining at all times, there is always a receptor at the properties which will experience shadow flicker, the turbines operate constantly etc. These assumptions will be fully reported within the assessment.

11.30 Should effects exceed the 30 hours per year / 30 minutes per day threshold under a worst case (unrealistic) scenario, mitigation measures will be put in place to reduce shadow flicker impacts to acceptable levels. These include screening or blocking the flicker through the planting of trees or switching the turbine(s) off during periods when conditions are such that long periods of shadow flicker effects occur. Any mitigation would form part of the Proposed Development description. It is therefore unlikely that significant effects as a result of shadow flicker will occur.

Population and Human Health (Including Dust)

11.31 A proportionate approach will be taken with regards to the assessment of effects on health, and based on experience, published studies and professional judgement. At this stage, it is anticipated that the assessment of potential health effects will be undertaken in the context of noise and shadow flicker. 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). This will be determined as the EIA progresses.

11.32 Dust emissions will arise from construction activities and could be experienced by nearby residential receptors both as a result of construction activities within the Site or through traffic movements. The Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment Techniques, Part 1, Air Quality states that dust generated during construction should be mitigated, and that the locations of 'sensitive receptors' within 200 m of construction activities should be identified and mitigation measures to reduce dust effects be applied. It is likely, however, that standard dust suppression measures, such as ensuring construction vehicles are sufficiently covered when transporting transferrable materials and

¹¹⁹ Department for Northern Ireland (2009) Best Practice Guidance for Planning Policy Statement 18 (PPS18): Renewable Energy. Available [online] at: <https://www.infrastructure-ni.gov.uk/publications/best-practice-guidance-pps-18-renewable-energy>.

¹²⁰ Scottish Government (2014). Onshore Wind Turbines: Planning Advice. Available [online]: <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>

wheel washing facilities are in place (which will be secured by the CEMP) will be sufficient to address dust emissions such that no significant effects are likely, and dust effects will be scoped out of the EIA.

Major Accidents and Disasters

11.33 The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events. Peat slide risk will be covered fully in the Hydrology, Hydrogeology, Geology and Peat chapter, and the risk of traffic accidents will be assessed in the Access, Traffic and Transport chapter. The construction and operation of the Proposed Development will also be managed within the requirements of a number of health and safety related legislation, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974.

11.34 As the Proposed Development is not considered vulnerable to any major accidents or disasters that could result in likely significant environmental effects, it is proposed that this topic is scoped out from further assessment within the EIA Report.

Consultee List

11.35 It is proposed that the following stakeholders will be consulted in relation to the topics above:

- BT;
- Joint Radio Company (JRC);
- NAC Environmental Health Officer;
- NATS En Route Ltd;
- Ministry of Defence;
- Glasgow Airport; and
- Prestwick Airport.

Questions for Consultees

Q11.1: Do consultees agree with the proposed scope of the aviation safeguarding, shadow flicker and climate change assessments?

Q11.2: Do consultees agree that Telecommunications, Population and Human Health, and Major Accidents and Disasters can be scoped out of detailed assessment?

Q11.3: Are there any other stakeholders that should be consulted in relation to these assessments?

Appendix A

Proposed Scoping Consultees

The following consultees are proposed to be consulted with as part of the EIA process:

Consultation Bodies

- NAC (including relevant internal teams, i.e. Landscape, Environmental Health, Archaeology, Roads etc.);
- NatureScot;
- Scottish Water;
- Scottish Environmental Protection Agency (SEPA);
- Historic Environment Scotland;
- Fairlie Community Council; and
- Kilbirnie & Glengarnock Community Council.

Additional Consultees

- Ayrshire Rivers Trust;
- British Horse Society (BHS) Scotland;
- BT;
- Clyde Muirshiel Regional Park;
- Fisheries Management Scotland
- Glasgow Airport;
- John Muir Trust;
- Joint Radio Company (JRC);
- Ministry of Defence;
- NATS En Route Ltd (in relation to Lowther Hill);
- Prestwick Airport;
- RSPB Scotland;
- Scottish Gas Networks (SGN);
- ScotWays;
- Scottish Water;
- South Strathclyde Raptor Study Group;
- Structures owners / operators along the site access route via the ESDAL database will be undertaken as part of the AIL assessment;
- Transport Scotland as trunk roads agency;
- Visit Scotland; and
- West of Scotland Archaeological Service on behalf of NAC.

Appendix B

Summary of Questions for Consultees

Chapter	Question
Chapter 3: The Site and Proposed Development	Q3.1: Do consultees agree with the proposed approach to scoping out the assessment of decommissioning?
Chapter 4: Landscape and Visual Amenity	Q4.1: Are consultees in agreement with the overall methodology proposed to assess effects on landscape and visual receptors, including cumulative effects? Q4.2: Are there other recommended sources of information which should inform the baseline and assessment of potential effects on landscape character and designated landscapes? Q4.3: Is proposed list of representative assessment viewpoint locations listed in Table 4.5 and shown on Figure 4.2a-b and Figure 4.3a-b, considered to be appropriate? Q4.4: Are there any further wind farms, in addition to those shown on Figure 4.6 and included in Table 4.4 which should be considered as part of the cumulative assessment? Q4.5: Are there any further landscape or visual receptors to be considered within the assessment (i.e. where it is expected that significant effects may occur)? Q4.6: Are consultees in agreement with the proposed landscape character types to be scoped in and scoped out of the assessment, as listed in Table 4.1? Q4.7: Are consultees in agreement with the proposed designated landscapes to be scoped in and scoped out of the assessment, as listed in Table 4.2? Q4.8: Are consultees in agreement with the proposed 30 km Study Area for the LVIA?
Chapter 5: Ecology	Q5.1: Do consultees agree with the survey scope set out above? Q5.2: Do consultees agree with the assessment method (including scoped in/scoped out features)? Q5.3: Do consultees hold any existing ecological data relating to the Site that may further inform the ecological baseline? Q5.4: Are consultees aware of any local nature conservation or any other relevant consultees who should be consulted, or other sources of information that should be considered?
Chapter 6: Ornithology	Q6.1: Do consultees agree with the survey and assessment methodologies, including all matters to be scoped in and out, are appropriate for the Site and Proposed Development?
Chapter 7: Cultural Heritage	Q7.1: Are there any additional sources of baseline information which should be referred to, to inform the assessment of effects on cultural heritage?

Chapter	Question
	Q7.2: Do consultees agree with the proposed methodology set out? Q7.3: Do consultees agree with assets and matters scoped out? Q7.4: Are there further specific heritage assets that should be considered in the impact assessment? Q7.5: Are there further assets or locations which you wish to see visualisations for?
Chapter 8: Hydrology, Hydrogeology, Geology and Peat	Q8.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, geology and peat? Q8.2: Do consultees agree that the proposed methodology is appropriate? Q8.3: Do consultees agree the proposed list of effects which are scoped in are appropriate? Q8.4: Do consultees agree the proposed approach to mitigation is appropriate?
Chapter 9: Noise and Vibration	Q9.1: Do consultees agree with the proposed methodology and scope of the assessment? Q9.2: Does the Council have details of any further cumulative developments in the locality which they consider may raise significant issues within the EIA process for the Proposed Development? Q9.3: Are the consultees aware of any additional potential NSRs, such as new housing developments? Q9.4: Do consultees agree that low frequency noise and infrasound, amplitude modulation and ground-borne vibration can be scoped out of the EIA? Q9.5: Are there any other relevant consultees who should be contacted with respect to the noise assessment, or any additional potential NSRs that should be considered?
Chapter 10: Access, Traffic and Transport	Q10.1: Do consultees agree that the proposed methodology set out is acceptable? Q10.2: Do consultees agree that the methods proposed for obtaining traffic flow data are considered acceptable? Q10.3: Is the use of Low NRTF acceptable for the whole of the Study Area? Q10.4: What cumulative traffic flows from committed development should be included in the assessment? Q10.5: Are consultees happy with the approach to scope out operational traffic as a result of the Proposed Development from the assessment?
Chapter 11: Other Issues	Q11.1: Do consultees agree with the proposed scope of the Aviation Safeguarding, Forestry, Climate Change and Shadow Flicker assessments? Q11.2: Do consultees agree that Telecommunications, Population and Human Health, and Major Accidents and Disasters can be scoped out of detailed assessment? Q11.3: Are there any other stakeholders that should be consulted in relation to these assessments?

Appendix C

Scoping Turbine Coordinates

Turbine	Easting	Northing	Indicative Tip Height (m)	Indicative Rotor Diameter (m)	Indicative Hub Height (m)
1	227347	657034	200	164	118
2	227422	657468	200	164	118
3	227106	657950	200	164	118
4	227386	658411	200	164	118
5	226964	658781	200	164	118

Appendix D

Peat Survey Report

Eurowind Energy Ltd.

Whitehill Wind Farm

Phase 1 Peat Survey Report

Final

June 2026

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<i>Author</i>	David Jalil

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1 Introduction

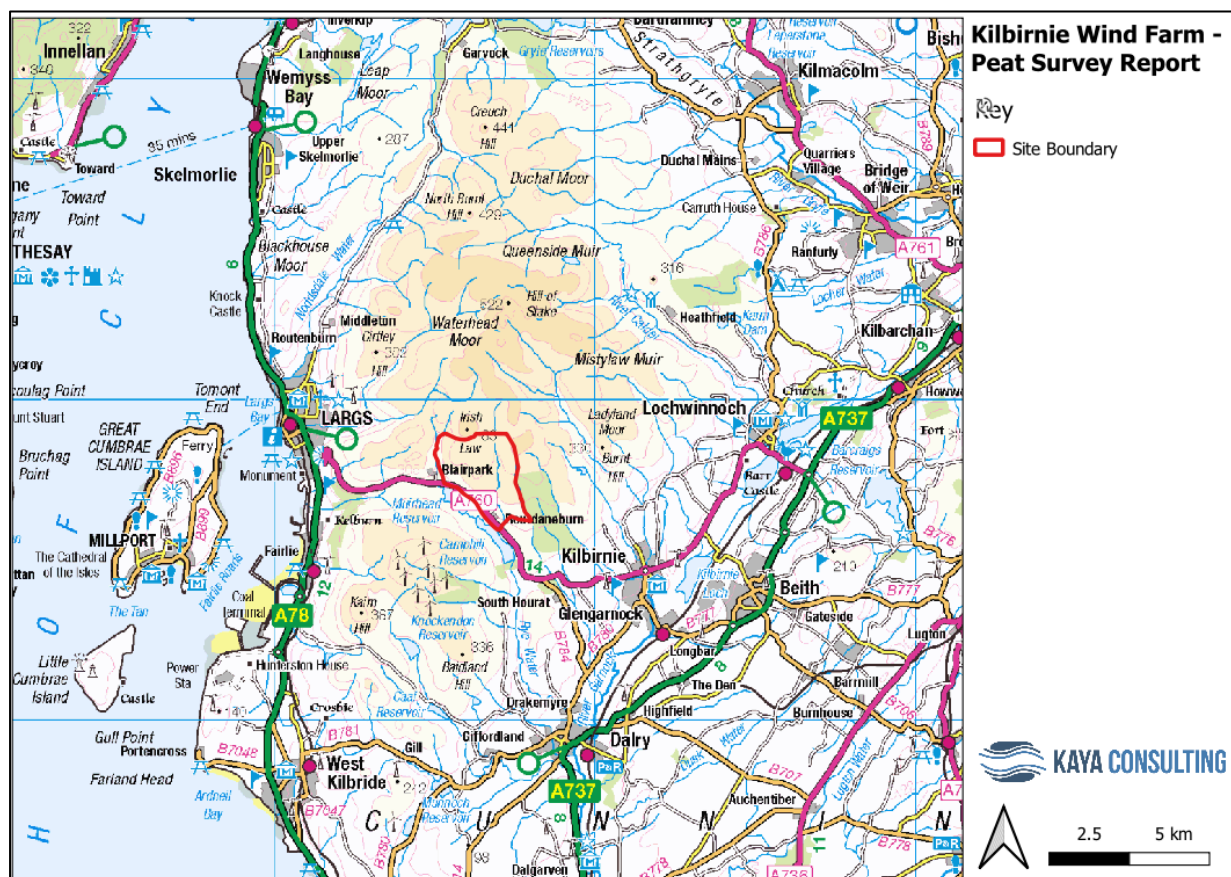
Kaya Consulting Ltd was commissioned by Eurowind Energy Ltd. through Land Use Consultants to undertake a phase 1 peat depth survey for the proposed Whitehill Wind Farm. The phase 1 peat survey was carried out in February 2026.

Figure 1 shows the site location. The site is located ~ 4 km to the west of Kilbirnie in the North Ayrshire Council area. The site is comprised predominantly of grazed moorland, peat bog and upland heath.

The site lies within the Clyde Muirshiel Regional Park and lies across the Knockside, Greenside and Lairdsie Hills directly above the Muirhead and Camphill Reservoirs. Ground levels undulate between hilltop areas and the Rye Water and Routdane Burn valleys within the site, which travel north to south. The highest ground levels within the site are located in the western area at Knockside Hills at 446 m AOD, with similar levels present on the east boundary at Greenside Hills of approximately 435 m AOD.

This report covers the methodology and output of the phase 1 peat survey undertaken at the site shown on Figure 1 below. The purpose of the peat survey was to establish an understanding of the peat depth and peatland condition at the site, to optimise site design and layout to minimise both the extent of disruption to peatlands and the quantity of peat excavated.

Figure 1: Site location



2 Methodology

2.1 Desk-based Initial Assessment

The Carbon and Peatland Map (NatureScot, 2016) was consulted prior to the peat survey. The map contains information on the likely peatland classes present within the survey area. The Carbon and Peatland map was developed to be used as “a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities”.

The Carbon and Peatland map for the site is shown in **Figure 2** (see end of document), which shows that the site is predominantly comprised of a mixture of Class 1, Class 3, Class 4 and Class 5. A large area bordering the southern boundary is classed as Mineral Soil (Class 0). The relevant Class descriptions are below:

- Class 1 – Nationally important carbon-rich soil, deep peatland priority peatland habitat. Areas likely to be of high conservation value;
- Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat;
- Class 4 – Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon rich soils;
- Class 5 – Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soils. Soils are carbon-rich and deep peat; and
- Mineral Soil – Peatland habitats are not typically found on such soils (Class 0).

In addition, a review of British Geological Survey (BGS) Superficial Geology map indicates that peat soils are present across much of the Knockside and Greenside Hill areas.

The results of the desk-based assessment indicated that peat was likely to be present within the boundaries of the site.

2.2 Survey Methodology

The survey methodology follows current guidance in Scotland (Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only).

The following methods were employed for the peat survey:

- 418 peat probe depths were recorded across the site using a 100 m by 100 m grid, excluding areas where soil core samples showed the absence of peat;
- The peat survey was carried out using an extendable fibreglass utility probe capable of sampling up to 5 m depth. The peat base is established when the probe can no longer be passed or encounters sufficient resistance;
- Soil cores were taken using a hand auger capable of sampling up to 1 m. Cores were taken in areas identified as mineral soils using the NatureScot (2016) Carbon and Peatland Map to verify the absence of peat soils;
- Recorded probe depths were cross referenced with the results of the peat coring to identify peat extents across the site;

- 24 cores were taken during the survey, with soil characteristics recorded for each soil horizon, where applicable, as follows:
 - Von Post Humification Scale; and
 - BS5930 soil description
- The peatland condition was assessed at each probing location. The peatland condition categories were based on those used in the NatureScot (2016) Peatland Condition Survey guidance. The peatland condition categories were:
 - Actively eroding;
 - Drained: Artificial;
 - Drained: Hagg/gully;
 - Forested / previously forested;
 - Modified;
 - Near natural; and
 - Not peatland

The field survey was undertaken by a team with the appropriate experience of assessing hydrology, hydrogeology, geology, soil, and peat in upland environments.

2.2.1 Survey Dates

The peat survey was undertaken during the period Wednesday 18th to Thursday 19th of February 2026. The weather during the survey was cold and overcast, with intermittent snow and rain showers.

3 Survey Results

3.1 Peat Depths

Table 1 shows the range of results obtained during the Phase 1 peat survey. A total of 418 probes were collected across the survey period. Probe depths were recorded and then cross-referenced with soil core analysis to determine the peat extent across the site.

Guidance from NatureScot (2023) defines carbon-rich soils as peat soils and peaty soils. Peat soils in Scotland are defined as soil with a surface peat layer with more than 60% organic matter and of at least 50cm thickness. Peaty soils can have a shallower peat layer (<50cm) at the surface (NatureScot, 2023).

The results of the Phase 1 survey were:

- 35.4% of probes were recorded as having a depth of less than or equal to 30cm. These probes are not classified as 'peat soils' and are where peat is present are instead considered 'peaty soils';
- 16.3% of probes were recorded as having a depth of between 30-50cm. These probes are not formally considered to be peat and are organo-mineral soils or peaty soils (if a peat layer is present);
- 20.3% of probes were recorded as having a depth of between 50-100cm and are peat soils; and
- 28% of the probes were recorded as having a depth of over 100cm and are peat soils.

Figure 3 shows the spatial distribution of the peat depths over the site, while **Figure 4** shows the interpolated peat depth calculated from the collected probe data. The deepest peat depth was found to be 290cm at the northeastern site boundary above Greenside Hills. Areas of peat greater than 0.5 m were found to lie across flatter hilltop areas between Knockside and Greenside hills, with large pockets of deeper peat between 2 – 3 m in depth localised to this area.

Table 1: Probe depth summary

Probe depth range (cm)	Number of probes	Percentage of total probes
<= 30	148	35.4
> 30 - 50	68	16.3
> 50 - 100	85	20.3
> 100 - 200	90	21.5
> 200 - 300	27	6.5
Total	418	100

3.2 Soil Cores

Figure 3 shows the distribution of the 24 soil cores taken across the site, collected using a hand auger capable of taking cores to depths of up to 1 metre. Cores were taken in areas identified as mineral soils using the NatureScot (2016) Carbon and Peatland Map to verify the absence of peat soils.

The soil cores taken were cross-referenced with the results of the probe depth survey to delineate peat extents present within the site. The steep slopes adjacent the southern site boundary, classified as Mineral Soil by the Carbon and Peatland Map, were found to contain shallow mineral and organic soils. No peat soils were identified within this area.

Soil cores taken within the Class 4 areas of the site, located on gentler slopes above the Mineral Soil area, reflect the mostly shallow non-peat soil composition of this area. Probe depth data identified deeper pockets of peat between 100 – 200 cm in depth within the Class 4 area. These pockets were not found to extend into Mineral Soil area.

Table 2 provides details of each soil core collected during the survey.

Table 2: Soil core data

Core ID	Eastings	Northings	Peat Present	Notes
1	226942	656185	No	Mineral soil
2	227436	656393	No	Shallow organic soil
3	227705	656477	Yes	Horizon 1 - 20 cm dry organic soil. Horizon 2 - 60 cm firm dewatered dark brown peat. Horizon 3 - 20 cm dark brown gravelly peat
4	227212	656688	No	25 cm organic soil
5	227553	657051	Yes	Horizon 1 - 50 cm highly humidified amorphous orange brown peat with high root material content. Peat too amorphous to core past 50 cm
6	226928	656985	Yes	H1 50 cm firm orange brown dewatered peat
7	226617	656451	No	10 cm silty mineral soil
8	226752	656781	No	Clayey mineral soil
9	226538	656792	No	10 cm mineral soil
10	226371	657085	No	Mineral soil
11	226250	657330	No	30cm gravelly organic soil
12	225919	657654	No	Organic soil
13	226112	657109	No	Mineral soil
14	225841	657339	No	Mineral soil
15	225705	657517	No	Slightly humified organic soil
16	225715	657815	No	Mineral soil
17	225465	657847	No	mineral soil
18	225461	657427	No	Mineral soil
19	225272	657736	No	Mineral soil
20	225241	658200	No	Mineral soil
21	225064	658341	No	Horizon 1 - 15 cm organic soil. Horizon 2 - 50 cm clay
22	225234	658350	No	No peat
23	225200	658677	No	15 cm organic soil
24	225794	658433	No	Thin organic soil

3.3 Peatland Condition

Table 3 shows the results of the peatland condition assessment obtained during the peat survey.

The site was found to be extensively drained by artificial drainage channels cut into the terrain. 74.4% of the assessed locations were found to be drained by an extensive network of drains and troughs cut at regular intervals (see **Photo 1** and **Photo 2**). These areas are spread across the entire site and serve to lower the water table of the surrounding peatland to the detriment of the peatland condition. 3.1% of the assessed locations were classified as 'Drained: Hagg/gully' where natural erosion features were found to lead to the drainage of the surrounding area (**Photo 3**). The remainder of the site, mostly localised to the slopes of the Class 4 area and steep hilltops of Knockside Hills, was found to be 'Not peatland' and constituted 22.5% of the assessed locations - see **Photo 4**. The peatland condition distribution is shown in **Figure 5**.

Table 3: Peatland condition assessment based on the peat survey

Peatland Condition	Number of probes	Percentage of total probes
Actively eroding	0	0
Drained: Artificial	311	74.4
Drained: Hagg/gully	13	3.1
Forested / previously forested	0	0
Modified	0	0
Near natural	0	0
Not peatland	94	22.5
Total	418	100

Photo 1: Network of peat drains in the southeast of the site



Photo 2: Example drainage channel in central site area



Photo 3: Haggs and gullies found at Knockside Hill



Photo 4: Non-peatland area within the site



4 Summary

Kaya Consulting Ltd was commissioned by Eurowind Energy Ltd. through Land Use Consultants to undertake a phase 1 peat depth survey for the proposed Whitehill Wind Farm. The phase 1 peat survey was carried out in February 2026.

This report covers the methodology and output of the phase 1 peat survey undertaken at the site. The purpose of the peat survey was to establish an understanding of the peat depth and peatland condition at the site, to optimise site design and layout to minimise both the extent of disruption to peatlands and the quantity of peat excavated. The NatureScot (2016) Carbon and Peatland map for the site shows that the site is predominantly comprised of a mixture of Mineral Soil (Class 0), Class 1, Class 3, Class 4 and Class 5. A total of 418 probes were collected across the survey area in combination with 24 soil cores collected across the Mineral Soil area of the site.

The results of the peat survey are summarised below and shown in **Figures 2 - 5**:

- 35.4% of probes were recorded as having a depth of less than or equal to 30cm. These probes are not classified as 'peat soils' and are where peat is present are instead considered 'peaty soils';
- 16.3% of probes were recorded as having a depth of between 30-50cm. These probes are not formally considered to be peat and are organo-mineral soils or peaty soils (if a peat layer is present);
- 20.3% of probes were recorded as having a depth of between 50-100cm and are peat soils; and
- 28% of the probes were recorded as having a depth of over 100cm and are peat soils.

The deepest peat depth was found to be 290 cm at the northeastern site boundary above Greenside Hills. Areas of peat greater than 0.5 m were found to lie across flatter hilltop areas between Knockside and Greenside hills, with large pockets of deeper peat between 2 – 3 m in depth localised to this area. An area of peat lying between 0.5 – 1 m was found to extend the length of Greenside Hill down to the southeastern site boundary. Peat depths are seen to gradually decrease as the site topography drops towards the south, eventually petering out towards the Class 4/Mineral Soil areas in the south and west of the site.

The site was found to be extensively drained. 74.4% of the assessed locations were found to be drained by an extensive network of drains and troughs cut at regular intervals (see **Photo 1** and **Photo 2**). These areas are spread across the entire site and serve to lower the water table of the surrounding peatland to the detriment of the peatland condition. 3.1% of the assessed locations were classified as 'Drained: Hagg/gully', while the remainder of the site, mostly localised to the slopes of the Class 4 area and steep hilltops of Knockside Hills, was found to be 'Not peatland' and constituted 22.5% of the assessed locations.

5 References

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

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Figure 2: NatureScot (2016) Carbon and Peatland Mapping

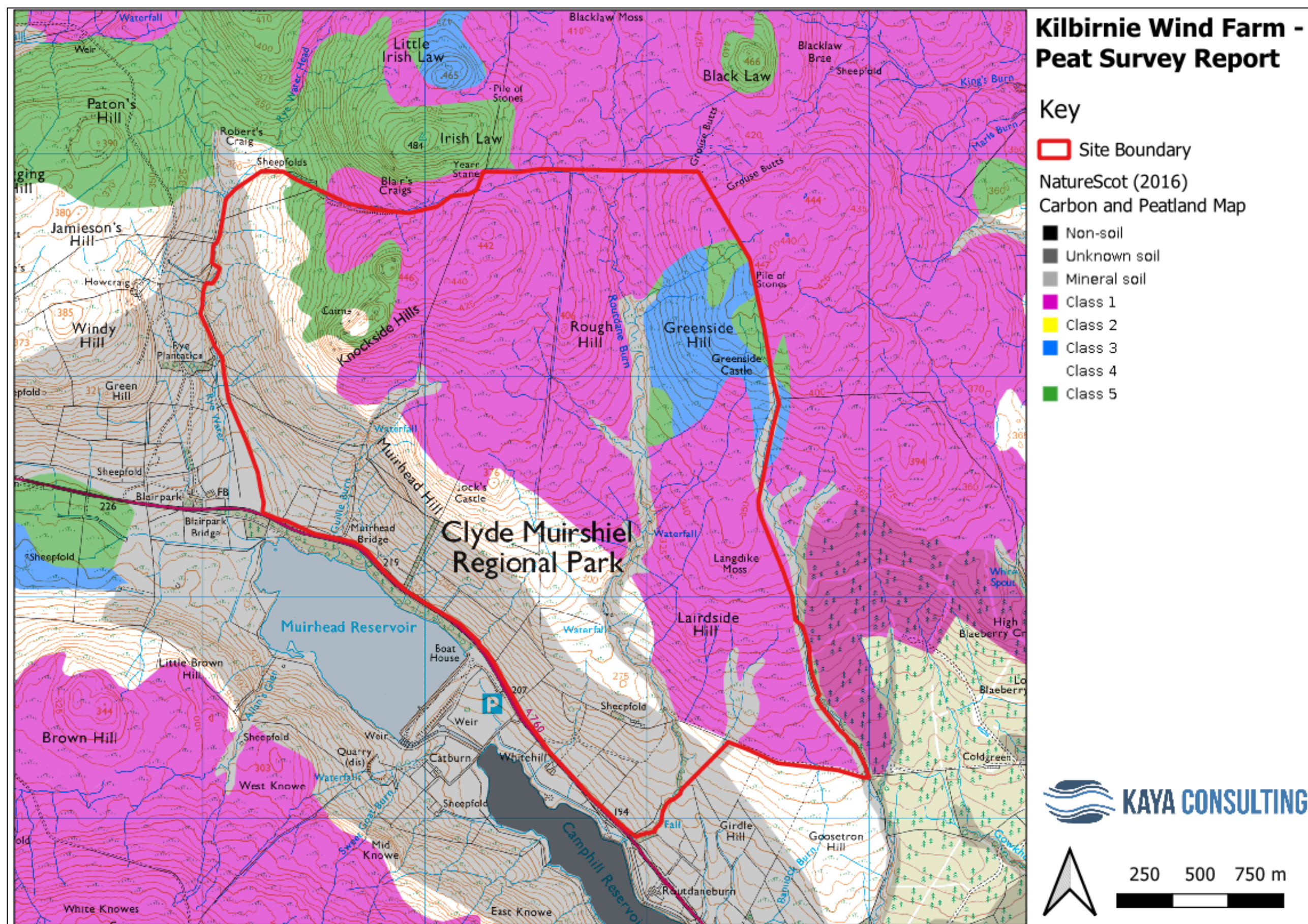


Figure 3: Peat depths and soil cores across the site

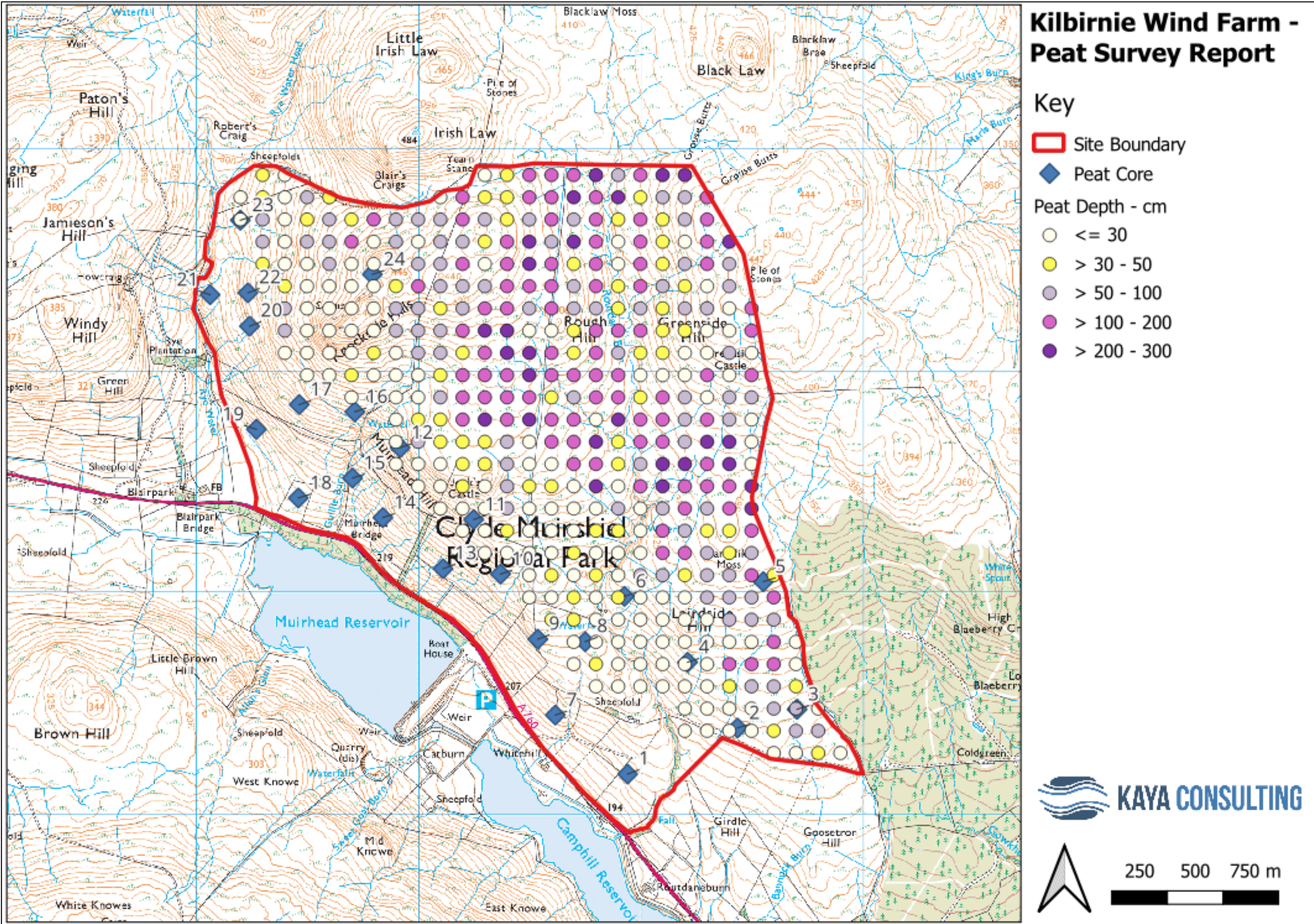


Figure 4: Interpolated peat depth

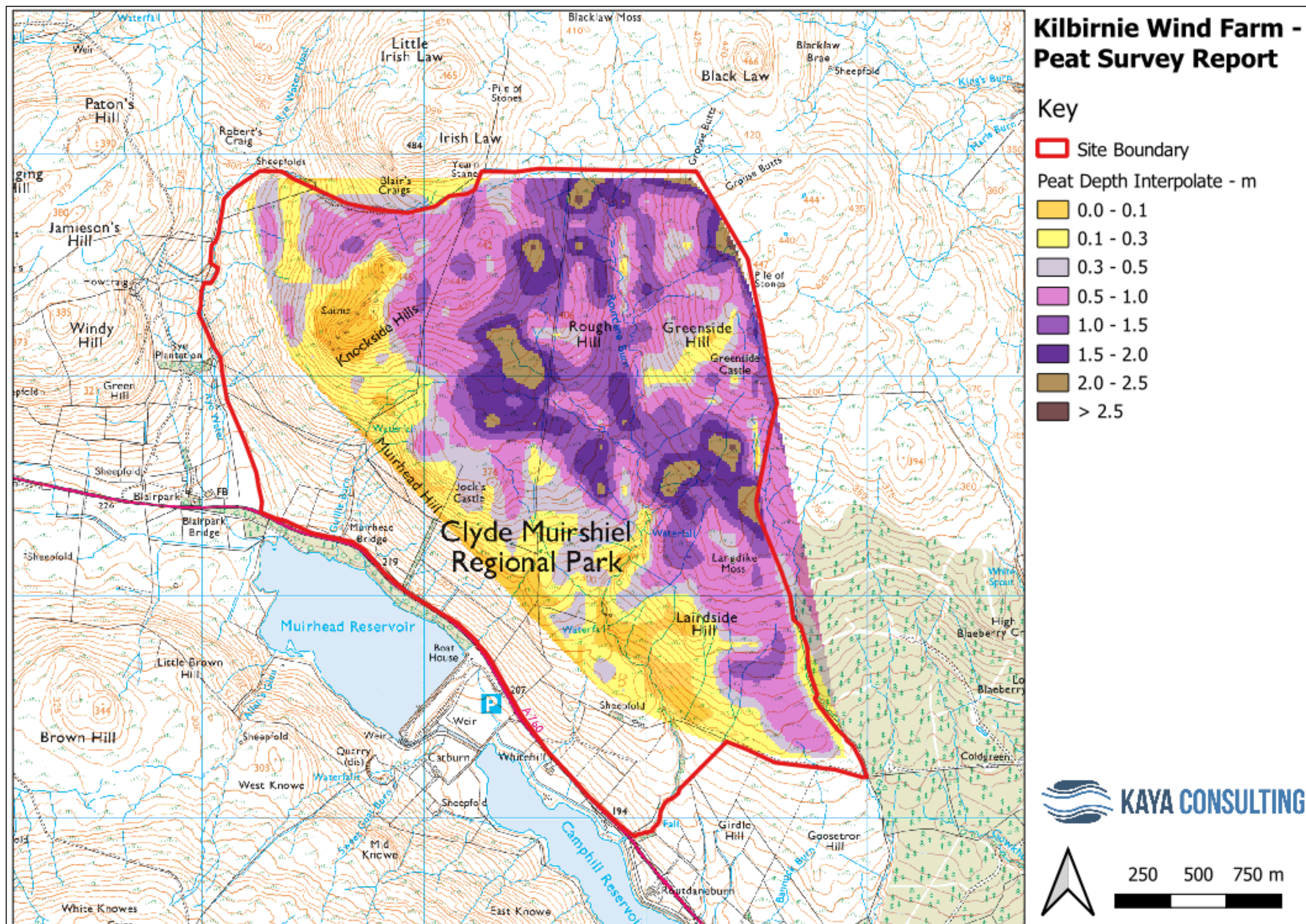


Figure 5: Peatland condition across the site

