Appin Wind Farm
EIA Scoping Report

Final report
Prepared by LUC
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Appin Wind Farm
EIA Scoping Report

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Chapter 1
Introduction

Project Background

1.1 Appin Wind Farm Limited on behalf of Statkraft UK Limited (hereinafter referred to as 'the applicant') is proposing to develop the Appin Wind Farm (hereinafter referred to as 'the Proposed Development'). The Proposed Development is located within the Dumfries and Galloway Council administrative area. The location of the Proposed Development is shown on **Figure 3.1**. Further details on the Site and a description of the Proposed Development are provided in **Chapter 3** below.

Application for Section 36 Consent

1.2 The Proposed Development currently comprises up to approximately 25 wind turbines, each up to 230m to turbine blade tip. The applicant therefore intends to apply to the Scottish Government Energy Consents Unit (ECU) for Section 36 (S36) consent for the Proposed Development under the Electricity Act 1989 ('the Act'). The application will be made to the ECU as the Proposed Development will have a generation capacity in excess of 50 megawatts (MW). In addition, a direction will be sought for deemed planning permission under Section 57 of the Town and Country Planning (Scotland) Act 1997, as amended.

1.3 It is acknowledged that the Proposed Development should be subject to an Environmental Impact Assessment (EIA) under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ('the EIA Regulations'), and the application for S36 consent will be accompanied by an EIA Report. Further details on the approach to the EIA are provided in **Chapter 2**.

1.4 The EIA Regulations provide for obtaining a Scoping Opinion from Scottish Ministers as to the environmental effects to be considered in the EIA (Regulation 12). This document accompanies the applicant's written request to the Scottish Government for a 'Scoping Opinion' as to which environmental effects are to be considered in the EIA. It provides details of the Proposed Development, the Site and surrounding area, and the environmental desk-based and field survey work undertaken to date. Likely significant effects as a result of the Proposed Development are identified and the proposed approach to assessing these is outlined.

The Applicant

1.5 The application will be made by Appin Wind Farm Limited a wholly owned subsidiary of Statkraft UK Limited (Statkraft). Statkraft is at the heart of the UK's energy transition. Since 2006, Statkraft has gone from strength to strength in the UK, building experience across wind, solar, hydro, storage, grid stability and EV charging. Statkraft is a global company in energy market operations, with approximately 4800 employees in 19 countries.

1.6 Statkraft has operated in the United Kingdom since 2006, developing, owning and operating renewable production facilities including wind farms in Wales and Scotland. Statkraft currently operates three onshore wind farms in Scotland, with a combined capacity of 155.5MW, and has recently completed construction on Windy Rig Wind Farm and is currently completing construction of the Twenty Shilling Wind Farm, both located in Dumfries and Galloway. Statkraft also delivers grid stability services to support National Grid ESO's target to deliver a zero-carbon electricity system by 2025.

1.7 Statkraft has invested £1.4 billion in the UK's renewable energy infrastructure and has facilitated over 4 GW of new-build renewable energy generation through Power Purchase Agreements (PPAs).

1.8 Statkraft is owned by the Norwegian government and has 125 years of history in renewable energy. 100% of the company's investments are targeted towards the growth of renewables.

1.9 Statkraft is committed to undertaking meaningful consultation with the local community while following Scottish Government advice in relation to the Covid-19 pandemic. During the development period, it is expected that engagement will include the use

of a dedicated project website, mail drops and public exhibitions (online and if regulations allow, in person events) to distribute information and respond to the public, along with emails, phone calls and virtual meetings with Community Council Members. Consideration is being given to ensure engagement methods reflect varying levels of access to technology.

Document Structure

1.10 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 Site and the nature and purpose of the Proposed Development.
- **Chapters 4** to **14** outline the topic areas to be considered in the EIA.
- **Chapter 15** summary of topics scoped in/out.
- **Appendix A** Phase 1 Peat Survey Report.
- **Appendix B** Cultural Heritage Scoping.
- **Appendix C** Consultee List.
- **Appendix D** Questions for Consultees.

1.11 Appendix C details the consultees that will be approached by the ECU to inform the scope of the EIA, as well as those that will be approached for information to inform the EIA, whilst **Appendix D** provides a consolidated list of the questions put forward to the consultees to focus the response to the Scoping Report and which are also included at the end of each chapter.

Chapter 2
The EIA Process and Assessment Methodology

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 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 for consent. Early detection of potentially adverse environmental effects informs iterations to the design of the Proposed Development to avoid or reduce effects.

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 in accordance with current Scottish Government regulations, policy and guidance, including:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended);
- Scottish Government Web Based Guidance on wind turbines (May 2014);
- Scottish Planning Policy (SPP) (June 2014);
- Planning Advice Note (PAN) 3/2010 Community Engagement (2010);
- Planning Circular 3/2013 Development Management Procedures;
- Scottish Natural Heritage (SNH[1]) (2018) (Version 5) A Handbook on Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- PAN 1/2013 Environmental Impact Assessment (updated June 2017); and
- All law and guidance related to the Coronavirus (COVID-19) pandemic, to the extent and at the time that such law and guidance is applicable.

The EIA Process

2.4 The EIA process usually follows the following stages:

- Screening may be the first stage of the EIA process where the relevant authorities need to decide whether EIA is required;
- Once it has been agreed that EIA is required, scoping is undertaken to define what should be assessed as part of the EIA and reported in the EIA Report;
- With the scope set, relevant information on the environmental baseline conditions is collected. This information is then used initially to understand the likely environmental effects and to inform the design of the development to minimise the potential for significant adverse effects;
- The formal assessment process is undertaken on the final design to identify the likely significant effects of the development;

[1] SNH was renamed NatureScot in August 2020 however references to guidance documents published prior to this are still referenced as SNH publications within this report and both terms are used throughout.

- Where significant adverse effects cannot be minimised through alterations to the design, mitigation measures are considered; and
- Monitoring to measure the actual significance of the effect during and post-construction is proposed, to allow management of mitigation where appropriate.

2.5 Once the EIA is completed, the EIA Report is submitted to the determining authority for consideration with the application for consent.

Screening

2.6 Development projects that are described within Schedule 1 of the EIA Regulations will always require EIA and are referred to as 'Schedule 1 Developments'. Development projects listed in Schedule 2 that are located in a 'sensitive area', or which exceed one of the relevant criteria or thresholds given in Schedule 2 are referred to as 'Schedule 2 Developments'. Not all Schedule 2 Developments require EIA as only a development project that is likely to have significant environmental effects by virtue of its size, location or nature will require assessment. A development project that requires EIA is referred to as 'EIA development'.

2.7 In this case, the Proposed Development (as described further in **Chapter 3**) is of a type described within Schedule 2 as an *"installation for the harnessing of wind power for energy production (wind farms)".* It is not located within a 'sensitive area' as defined by the EIA Regulations; however, the project would exceed both of the applicable thresholds as it involves more than two wind turbines with hub heights of more than fifteen metres. The requirement for EIA is therefore determined on the basis of whether the project would be likely to give rise to significant effects on the environment by virtue of its size, nature or location.

2.8 The scale, nature and location of the Proposed Development are such that, to allow the environmental effects of the project to be appropriately considered, the applicant has taken the decision to prepare an EIA. As such, no Screening Opinion has been sought from the ECU.

Scoping

2.9 The purpose of scoping is to focus the EIA on the likely and relevant significant environmental effects associated with the Proposed Development. On the basis of the expert judgement of the assessment team, experience from similar projects, as well as additional policy, guidance and standards of relevance, each topic chapter within this report will outline both:

2.10 Potential likely significant effects associated with the construction and/or operation of the Proposed Development, identified for detailed consideration within the EIA Report.

2.11 Effects which are considered unlikely to be significant and requiring no further assessment. Whilst these topics fall outside of the scope of assessment, they will be referred to in turn within the EIA Report.

Baseline Conditions

2.12 The EIA Regulations require that aspects of the environment which are likely to be significantly affected by the Proposed Development are clearly defined within the EIA Report. To achieve this, it is necessary to gather environmental information on the current and existing status of each topic proposed for consideration as part of the EIA, i.e. 'baseline conditions'.

2.13 Baseline conditions are not static, and it is often necessary to update them with further baseline surveys to ensure that the data upon which the EIA is based is up to date and accurately reflects the current situation of the receiving environment. For the purposes of the assessment, the baseline is considered to be the existing Site which is currently undeveloped. Details on the existing conditions of the Site, and the surveys which have been undertaken for each topic are detailed in **Chapters 5** to **14** below.

2.14 In accordance with the 2017 EIA Regulations, climate change will also be considered in the context of understanding how baseline conditions for each topic area could change during the lifetime of the Proposed Development.

Assessment of Effects

2.15 For each topic that is identified as requiring further study, a detailed technical assessment will be carried out in line with the scope and methodology agreed upon with relevant consultees. Individual technical assessment will be undertaken by a

competent and appropriately qualified consultant in which technical standards and relevant guidance will be adhered to. A range of relevant and appropriate methodologies will be employed to assess the potential effects associated with the Proposed Development. These assessments will take both the construction and operational phases of the Proposed Development into account and will be carried out in relation to the Site and surrounding area.

2.16 The EIA Regulations (Regulation 4 (2), (3) and (4)) specify that:

"(2) The environmental impact assessment must identify, describe and assess in an appropriate manner, in light of the circumstances relating to the proposed development, the direct and indirect significant effects of the proposed development (including, where the proposed development will have operational effects, such operational effects) on the factors specified in paragraph (3) and the interaction between those factors.

(3) The factors are —

(a) population and human health;

(b) biodiversity, and in particular species and habitats protected under Council Directive 92/43/EEC on the conservation of natural habits and wild flora and Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds;

(c) land, soil, water, air and climate; and

(d) material assets, cultural heritage and the landscape.

(4) The effects to be identified, described and assessed under paragraph (2) include the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development, of major accidents and disasters."

2.17 The EIA is being coordinated by LUC, and the following topics have been identified for detailed assessment for the Proposed Development. The organisations undertaking the specialist assessments are also noted below:

- Landscape and Visual Amenity (LUC);
- Hydrology, Hydrogeology and Peat (Kaya Consulting and East Point Geo);
- Ecology (Avian Ecology);
- Ornithology (Avian Ecology);
- Forestry (DGA Forestry);
- Cultural Heritage (LUC);
- Noise (TNEI);
- Traffic and Transport (Pell Frischmann);
- Aviation (Wind Power Aviation Consultants (WPAC));
- Socio-Economics (LUC); and
- Other Issues (including human health, climate change, major accidents and disasters and telecommunications) (LUC).

2.18 The EIA Regulations (Regulations 5(2)) further specify that:

"(2) An EIA report is a report prepared in accordance with this regulation by the developer which includes (at least)

(a) a description of the development comprising information on the Site, design, size and other relevant features of the development;

(b) a description of the likely significant effects of the development on the environment;

(c) a description of the features of the development and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;

(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and

(f) any other information specified in schedule 4 relevant to the specific characteristics of the development and to the environmental features likely to be affected."

Assessing Significance

2.19 The EIA Regulations do not define significance and it is, therefore, necessary to define this for the Proposed Development. The methods for predicting the nature and magnitude of any potential effects vary according to the topic assessed. Quantitative methods of assessment can predict values that can be compared against published thresholds and indicative criteria in Government guidance and standards. However, it is not always possible to ascribe values to environmental assessments and thus qualitative assessments are also used. Such assessments rely on previous experience and professional judgement. The methodologies used for assessing each topic area will be described within the individual chapters of the EIA Report.

2.20 The following criteria will be used to evaluate the significance of potential effects of the Proposed Development:

- Sensitivity, importance or value of the resource or receptor;
- Extent and magnitude of the effect;
- Duration of the effect;
- Nature of the effect;
- Performance against environmental quality standards; and
- Compatibility with environmental policies.

Cumulative Assessment

2.21 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. These will include:

- Schemes which have been submitted to the relevant authorities but not yet determined;
- Schemes which are consented; and
- Schemes which are under construction.

2.22 The scope and methodology for the cumulative assessment will be agreed with the relevant statutory consultees, including Dumfries and Galloway Council and NatureScot. Study Areas will be defined separately for each topic assessed in the EIA to reflect the likely extent of potential effects.

Approach to Mitigation

2.23 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 phases."

2.24 In many cases, mitigation measures are embedded within the Proposed Development (either through design, good practice during construction, or operation), whereby likely significant adverse effects are avoided. However, where necessary, additional mitigation measures are required to reduce the significance of effects.

Uncertainty

2.25 The EIA process is designed to enable good decision-making based on the best possible information about the environmental effects of a Proposed Development. There will, however, always be an element of uncertainty as to the exact scale and nature of the effects. These may arise through shortcomings in available information 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."*

EIA Report Structure

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

- Description of the Proposed Development;
- Details of the planning and renewable energy policy context that is relevant to the Proposed Development; and
- Individual environmental assessment topic chapters, including a description of the mitigation measures required to prevent, reduce and, where possible, offset any significant adverse effects on the environment; enhancement measures where possible will also be included.

2.27 Each 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 surveys undertaken);
- Impact Assessment (identification of the impacts and their significance);
- Mitigation (and monitoring as appropriate);
- Residual Effects (assessment of impact significance once mitigation has been incorporated); and
- Summary.

2.28 The EIA Report will also include a Non-Technical Summary (NTS) and supporting Technical Appendices including tables, figures and reports.

2.29 The EIA Report will be accompanied by a Pre-Application Consultation (PAC) Report, a Planning Statement, and a Design and Access Statement.

Chapter 3
Project and Site Description

The Site and Surroundings

3.1 The Site is located approximately 12.5km to the west of Thornhill within Dumfries and Galloway. The nearest settlements are Tynron, approximately 7.5km to the south-east within the Shinnel Water valley, and Moniavie, approximately 7km south-east within the parallel Dalwhat Water valley. There are also various dispersed dwellings extending along the length of Shinnel Glen and up to the site boundary. The nearest larger settlement is Sanquhar, approximately 12km north/north-east. The A702 passes within approximately 7km of the site to the south-east between Thornhill and St John's Town of Dalry; the A76 runs along the more populous Nithsdale, approximately 12km to the north-east of the site.

3.2 The site comprises a single block of commercial forestry under one private ownership, and is located in a wider area of largely forested hills in the Southern Uplands. The majority of the Site is within the Southern Uplands with Forest Landscape Character Type (LCT), and comprises two narrow ridges, extending out from Colt Hill. The north-eastern fringes of the Site are within the Upland Glens LCT, which are characterised by deep valleys and upland farming. The central valley within the Site consists of steep wooded slopes, with more level ground generally being found on the two ridges towards the Site's perimeter as well as the lower ground in the vicinity of Appin Burn, which flows through the centre of the Site from approximately north-west to south-east.

The Proposed Development

3.3 The applicant is investigating the potential for a wind farm development consisting of the erection, 50 year operation, and subsequent decommissioning of up to approximately 25 turbines, each up to 230m in height to blade tip. The principal elements of the Proposed Development are described in further detail below. An initial layout which has been developed for the purposes of scoping is shown on **Figure 3.2**.

3.4 The key elements of the Proposed Development are summarised as follows:

- Up to approximately 25 wind turbines, each up to a maximum tip height of up to 230m;
- Permanent foundations supporting each wind turbine;
- Associated crane hardstanding at each turbine location;
- A network of onsite access tracks and associated watercourse crossings;
- A network of underground cables to connect the turbines to the onsite substation;
- A control building and substation compound;
- A permanent anemometer mast or LiDAR compound for wind monitoring, including associated foundations and hardstanding;
- Temporary construction compound(s), laydown area(s) and a car park;
- Temporary borrow pits; and
- Energy storage systems, if included, designed to complement renewable energy generation.

3.5 The layout presented in **Figure 3.2** has been developed with the aim of defining a reasonable likely maximum 'envelope' for scoping and ensure that all potentially relevant environmental effects can be considered for the purposes of adopting a scoping opinion. It has taken into account various known and potential constraints including deep peat, sensitive (or potentially sensitive) ecological receptors and the Site's hydrology. However, it will be subject to change during (and in response to information

gathered and generated in) the EIA process. At this stage, it is important to note that the parts of the Site towards its interior are likely to be heavily constrained with respect to the delivery of viable development by, in particular, lower wind speeds and steep gradients. Available realistic options to locate infrastructure within the interior of the Site may therefore be more limited than consideration of the Site boundary alone would indicate. This will be subject to further consideration as the EIA progresses.

Access

3.6 A variety of alternative access options are currently being considered for the Site. The proposed EIA scope as detailed below is considered sufficient to cover all feasible options. The preferred option or options to be take forward for the purposes of the consent application will be provided to the ECU and any relevant consultees once known (post scoping) in order to confirm that the adopted scoping opinion remains applicable.

Grid Connection

3.7 The applicant is reviewing potential options for a transmission connection to the electricity network. An application will be made to the National Grid to determine the final connection point. The grid connection will be subject to a separate application for consent by Scottish and Southern Energy Networks, under Section 37 of the Electricity Act 1989. As a result, potential environmental effects as a result of offsite grid connection will not be considered in the EIA Report.

Forestry Works

3.8 The Proposed Development is located within an area of extensive commercial forestry, and some woodland will need to be felled in order to allow the development to be constructed and operated. The development and felling scheme will be designed so as to minimise the loss of woodland area and fragmentation of the remaining forestry crops, in accordance with the Scottish Government's Control of Woodland Removal Policy (Forestry Commission Scotland, 2009)[2].

Construction Works

3.9 It is estimated that it would take approximately up to 18 months to construct the Proposed Development. Construction works would include the following main activities:

- Working of borrow pits;
- Tree felling;
- Construction of the temporary construction compound;
- Construction of site access tracks, passing places and any watercourse crossings;
- Construction of culverts under tracks to facilitate drainage and maintain existing hydrology where required;
- Construction of turbine foundations and transformer plinths;
- Construction of an onsite substation and energy storage system, if included;
- Excavation of trenches and cable laying adjacent to site tracks;
- Movement onto site and delivery and erection of wind turbines;
- Commissioning of the wind farm; and
- Restoration of temporary construction areas.

3.10 The applicant will also seek to identify suitable borrow pit areas within the Site boundary and intends to include such areas within the consent application. However, should suitable borrow pit locations not be identified, the applicant will make provisions for the import of aggregate from suitable off-site sources.

3.11 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

[2] Forestry Commission Scotland (2009) The Scottish Government's Policy on the Control of Woodland Removal. Forestry Commission, Edinburgh.

whilst turbines are being erected elsewhere. To minimise disruption to land use, site restoration would be undertaken as early as possible.

3.12 A detailed programme of works would be produced by the construction contractors prior to the commencement of works onsite. Should consent for the Proposed Development be granted, it is likely that construction hours would be restricted by means of a consent condition.

Wind Farm Life and Decommissioning

3.13 The expected operational life of the Proposed Development is 50 years from the date of commissioning. Towards the end of this period, a decision would be made as to whether to refurbish, remove, or replace the turbines. If refurbishment or replacement were to be chosen, relevant applications for consent would be made.

3.14 The EIA Report will include high level information on the likely process that will be undertaken to decommission the Proposed Development at the end of its lifespan. However, it is not proposed to undertake a detailed assessment of the decommissioning effects associated with the Proposed Development as the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage; the detailed proposals for refurbishment/decommissioning are not currently known; and as decommissioning is in essence a reversal of the construction process, the effects of decommissioning can in general be anticipated in any case to be no greater than those from construction.

Questions for Consultees

Q3.1: Confirmation is requested on the proposed approach to 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 character and visual amenity through a Landscape and Visual Impact Assessment (LVIA). The primary guidance for LVIA is the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)[3]. In addition, NatureScot (formerly Scottish Natural Heritage (SNH)) has published several documents that have been adopted as industry standard good practice for landscape and visual assessments of wind farm proposals.

4.2 The LVIA will consider direct and indirect effects on landscape resources, landscape character, and the implications for designated landscapes and wild land, 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 proposed 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 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 scale, geographical extent, duration and reversibility of the effect. These criteria will all be considered to form a judgement regarding the overall significance of landscape and visual effects.

Guidance

4.4 The following guidance 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);
- Countryside Agency and SNH (2002) Landscape Character Assessment: Guidance for England and Scotland;
- SNH (2012) Assessing the Cumulative Impacts of Onshore Wind Energy Developments;
- SNH (2017) Siting and Designing Wind Farms in the Landscape. Version 3a;
- Countryside Agency and SNH (2004) Topic Paper 6. Techniques and Criteria for Judging Capacity and Sensitivity;
- Landscape Institute (2019) Visual Representation of Development Proposals – Technical Guidance Note 06/19;
- Landscape Institute (2019) Residential Visual Amenity Assessment (RVAA) – Technical Guidance Note 02/19;
- SNH (2020) Assessing impacts on Wild Land Areas – technical guidance;
- SNH (2017) Visual Representation of Wind Farms Guidance. Version 2.2;
- SNH (2015) Spatial Planning for Onshore Wind Farms: Natural Heritage Considerations; and
- Dumfries and Galloway Council (2017) Supplementary Guidance: Part 1 Wind Energy Development: Development Management Considerations Appendix 'C' Dumfries and Galloway Wind Farm Landscape Capacity Study.

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

Study Area

4.5 It is proposed that the Study Area for the LVIA will cover a radius of 45km from the outermost turbines of the Proposed Development in all directions, as shown in **Figure 4.1a**, in accordance with current NatureScot guidance in relation to turbines of 150m or higher, measured to the top of the blade tip[4].

4.6 A Zone of Theoretical Visibility (ZTV) plan will be used to assist in identifying which landscape and visual receptors require consideration in the assessment, and which can be scoped out because they are unlikely to be significantly affected. While the design of the Proposed Development is subject to change, the following figures are provided to illustrate the theoretical visibility of the indicative 25 turbine (230m to blade tip height) layout:

- **Figure 4.1a**: Zone of Theoretical Visibility (tip height) and Viewpoint Locations (A3 and A1 format);
- **Figure 4.1b**: Zone of Theoretical Visibility (hub height) and Viewpoint Locations (A3 and A1 format);
- **Figure 4.2**: Landscape Character Types with ZTV (tip height);
- **Figure 4.3**: Landscape Designations and Wild Land Area with ZTV (tip height); and
- **Figure 4.4**: Cumulative Baseplan.

4.7 The LVIA will be undertaken by experienced Chartered Landscape Architects (Chartered Members of the Landscape Institute (CMLI)), and in accordance with relevant best practice documents. LUC's team of Chartered Landscape Architects has extensive experience in the siting, design and assessment of onshore wind energy developments, and brings particular experience in avoiding or reducing landscape and visual effects through landscape-led embedded design mitigation.

Existing Conditions

4.8 The Proposed Development site is located within Dumfries and Galloway approximately 12.5km west of Thornhill, in the uplands between Nithsdale and the Glenkens. The site encompasses two parallel ridges of largely forested hills that lie around the head of Appin Burn, to the east and centre of the Carsphairn and Scaur Hill Range of the Southern Uplands. The Southern Upland Way (SUW) runs approximately 1km to the west of the Site as it traverses the peak of Black Hill.

4.9 A Study Area of 45km radius from the outermost turbines in all directions is proposed for the LVIA, as recommended in current guidance for turbines over 150m to blade tip. At its furthest extents this will include the settlements of Lesmahagow to the north; Crawford to the north-east; Moffat to the east; Dumfries to the south-east; Castle Douglas to the south; Straiton and Maybole to the west; and Ayr and parts of Kilmarnock to the north-west.

Landscape Character

4.10 In 2019, NatureScot made available online an updated national Landscape Character Assessment for Scotland[5].

4.11 The Site is located within the Southern Uplands with Forest (178) LCT. The northern boundary of the Site lies on the fringes of the Upland Glens (166) LCT and the southern boundary of the Site lies on the fringes of the Foothills (175) LCT.

4.12 The key characteristics of the 'host' Southern Uplands with Forest LCT are as follows:

- *"Large, smooth dome-shaped hills with large scale dark green forests on slopes and over lower summits.*
- *Predominantly simple, gently rolling landform.*
- *Some areas of more complex and smaller-scale landscapes, with steep slopes enclosing heads of valleys and/or where uplands remain open.*
- *Changing landscapes with large scale forestry operations and wind farm development.*
- *Forested areas dominated by Sitka Spruce, interspersed with mixed conifers and broadleaf planting, and undergoing felling and replanting in large coupes.*

[4] SNH (February 2017) Visual Representation of Wind Farms Guidance. Version 2.2.
[5] SNH (2019) Scottish Landscape Character Types Map and Descriptions. Available online: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

- *Wind farms are a key characteristic in some areas.*
- *Expansive scale[6].”*

4.13 The LVIA will consider the potential for direct effects on the Southern Uplands with Forest LCT as well as indirect effects upon LCTs in the Study Area within a 20km radius of the Proposed Development, and from which potential visibility is indicated by ZTV mapping. This will include LCTs in which the Southern Uplands with Forest LCT provides an important back drop in outward views. However, as distance from the Site increases it is recognised that the potential for significant effects on landscape character reduces. The role operational/under construction wind farms play in altering landscape character is also acknowledged. LCTs within the Study Area are shown on **Figure 4.2**. Those within 20km, which will be considered in further detail in the LVIA, are listed in **Table 4.1** below.

Table 4.1: LCTs within a 20km radius of the Proposed Development

LCT	Approximate Distance to Nearest Turbine at Closest Point (km)	Scoped In/Out of Assessment
Upland Glens (166) (73)	Adjacent	Scoped In
Foothills (175)	Adjacent	Scoped In
Southern Uplands (177) (81)	2	Scoped In
Narrow Wooded River Valley (160)	3.5	Scoped In
Pastoral Valley (161)	6	Scoped In
Foothills with Forest (176)	6	Scoped Out – these LCT areas, to the south-east, south and south-west of the Site, are located beyond 5km distance. The pattern of visibility is more intermittent, and the characteristic forest cover will help to reduce actual visibility. From areas with theoretical visibility, these tend to be more upland in nature, where wider outwards views are more likely to have been altered by operational wind farm development.
Middle Dale (163)	8	Scoped Out – theoretical visibility is more limited and focused to the eastern valley side, mainly beyond 10km from the Site. Woodland and tree cover in the Middle Dale will also help to reduce actual visibility. Any views of wind farm development at the Site are likely to be more fleeting, and unlikely to result in significant effects on wider landscape character.
Upper Dale (165)	8	Scoped Out – these LCT areas are focused along Nithsdale, to the north-east, and the Glenkens, to the south-west of the Site. The pattern of theoretical visibility is focused to the upper site facing valley sides, beyond 10km from the proposed turbines, and from areas where operational wind farm development has likely already altered outward views.
Upland Fringe (172)	12	Scoped Out – more notable theoretical visibility from Upland Fringe LCT, to east of Nithsdale. However, visibility is not widespread across these LCT and due to viewing distance and existing operational wind farm context in views to west

[6] SNH (2019) SNH National Landscape Character Assessment, Landscape Character Type 178: Southern Uplands with Forest – Dumfries and Galloway. Available online: https://www.nature.scot/sites/default/files/LCA/LCT%20178%20-%20Southern%20Uplands%20with%20Forest%20-%20Dumfries%20and%20Galloway%20-%20Final%20pdf.pdf

LCT	Approximate Distance to Nearest Turbine at Closest Point (km)	Scoped In/Out of Assessment
		from this landscape, this is unlikely to translate into significant effects on landscape character.
Upland River Valleys (69)	14	Scoped Out – very limited theoretical visibility.
Upland Basin (74)	14.5	Scoped Out – very limited theoretical visibility.
Plateau Moorland (78)	15	Scoped Out – very limited theoretical visibility, within 20km.
Rugged Uplands (180)	16	Scoped Out – some theoretical visibility from eastern facing hill flanks and summits. This is beyond 15km from the proposed turbines, and from areas where outward views to east have likely already been altered by operational wind farm development.
Flooded Valley (164)	16	Scoped Out – very limited theoretical visibility.
Drumlin Pastures (169)	16	Scoped Out – very limited theoretical visibility.

Designated Landscapes and Wild Land

4.14 The site itself is not designated, however there are a number of designated landscapes and areas of Wild Land within the 45km Study Area, as shown on **Figure 4.3**.

4.15 As for LCTs, theoretical inter-visibility with the Proposed Development will be described in the LVIA and used as a means of identifying which designated landscapes/areas of Wild Land require further consideration and assessment. However, as distance from the Site increases, significant effects on these areas are considered less likely to occur.

4.16 As with LCTs, the theoretical inter-visibility with the Proposed Development will be described, alongside an understanding of the special qualities of each designated landscape (key attributes for Wild Land), as a means of identifying which areas require further assessment. Those which will be considered in further detail in the LVIA are listed in **Table 4.2**.

Table 4.2: Designated Landscapes within the Study Area

Designated Landscape	Approximate Distance to Nearest Turbine at Closest Point	Scoped In/Out of Assessment[7]
National Scenic Areas (NSA)		
Nith Estuary	33	Scoped out due to viewing distance, limited land-based theoretical visibility and coastal-focused nature of key views. Effects on the special qualities of this NSA are unlikely to be significant.
Fleet Valley	38	Scoped out due to viewing distance, limited theoretical visibility, coastal-focused nature of key views and intervening operational wind farms. Effects on the special qualities of this NSA are unlikely to be significant.

[7] No theoretical visibility is indicated from the closest areas of landscape designations when the distance of theoretical visibility is greater than the distance to the closest turbine.

Designated Landscape	Approximate Distance to Nearest Turbine at Closest Point	Scoped In/Out of Assessment[7]
East Stewartry Coast	40	Scoped out due to viewing distance, limited theoretical visibility, coastal-focused nature of key views and intervening operational wind farms. Effects on the special qualities of this NSA are unlikely to be significant.
Wild Land Area		
Merrick	26	Scoped out due to viewing distance, limited theoretical visibility and intervening operational wind farms. Effects on the key attributes of this WLA are unlikely to be significant.
Talla-Hart Fell	36	Scoped out due to viewing distance, limited theoretical visibility, and intervening operational wind farms, effects on the key attributes of this WLA are unlikely to be significant.
Dumfries and Galloway RTegional Scenic Areas (RSA) within 20km		
Thornhill Uplands	Adjacent	Scoped in due to the overlap of the designated area with the eastern extents of the Site (no turbines are proposed within the RSA) and the widespread theoretical visibility of the Proposed Development from hill summits and site facing hill flanks between <5km-25km.
Galloway Hills	7	Scoped in due to the widespread theoretical visibility of the Proposed Development from hill summits and site facing hill flanks in the central and eastern extents of the designated area between <10km-40km.
Terregles Ridge	17.5	Scoped out due to viewing distance and intermittent pattern of theoretical visibility. As any wind farm development, the Site is unlikely to alter role the ridge plays in providing a setting to Dumfries. Effects on the features of this RSA are unlikely to be significant.
East Ayrshire Sensitive Landscape Character Areas (EASLCA) within 20km		
EASLCA	6	Scoped in due to proximity of the designated area to the Site (6km) and theoretical visibility of the Proposed Development from hill summits and site facing hill flanks between <10km and 35km.
South Lanarkshire Special Landscape Areas (SLA) within 20km		
Leadhills and Lowther Hills	17.5	Scoped out due to viewing distance, limited pattern of theoretical visibility and intervening operational wind farms Effects on the features of this designation are unlikely to be significant.

Visual Receptors

4.17 The LVIA will consider potential effects upon visual receptors within the Study Area, i.e. the people who may be affected by changes in views resulting from the Proposed Development. Visual receptors to be considered will include:

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

4.18 There are a small number of properties within 2.5km of the Site, mainly focused around the upper reaches of the Shinnel Water and Dalwhat Water valleys. With reference to **Figure 4.1a**, settlements within 15km of the Proposed Development with the potential for visibility include Thornhill and Moniaive.

4.19 Visual receptors also include recreational users of the area e.g. those travelling on the Core Path network and long-distance routes or walking towards landmarks such as hill tops/cairns or the 'Striding Arch' sculptures by Andy Goldsworthy located in the vicinity of the Site at Cairnhead, Colt Hill and Benbrack.

4.20 ZTV analysis will determine whether recreational routes within the wider Study Area are to be included in the LVIA. There is the potential for visibility from a number of popular hills along the nearby SUW, and hills to the east of the Glenkens. The following table sets out the proposed LVIA representative assessment viewpoints, which are also shown on **Figure 4.1a** and **Figure 4.1b**.

Table 4.3: Proposed Assessment Viewpoints

VP	Viewpoint Name	Grid Reference	Distance (km)[8]	Reason for Selection
1	Colt Hill	269815 598996	>1	Represents views experienced from popular local hill summit and site of Striding Arch sculpture.
2	Benbrack	268064 597073	2.7	Represents views experienced by recreational receptors from popular local hill summit on the SUW and site of Striding Arch sculpture.
3	Shinnelhead	272938 599124	>1	Represents views experienced by nearby residential receptors and recreational receptors using the forest track to the north of the Site.
4	Shinnel Water Valley near Craigencoon	277580 595650	4.3	Represents views experienced by road users and nearby residential receptors dispersed along the Shinnel Water Valley.
5	Cairnhead Sculpture	270073 597208	1.2	Represents views experienced by recreational receptors likely visiting the first of the series of Striding Arch sculptures. There is parking and interpretation signage near this viewpoint.
6	Cairn Table	272410 624234	25.3	Represents views experienced from popular summit on the eastern fringes of the EASLCA. There is a popular walking route between the summit and the settlement of Muirkirk, to the north.
7	Crawick Multiverse	277649 611768	14.2	Represents views experienced by recreational receptors from the highest point of a land art installation created by Charles Jencks, in Nithsdale near Sanquhar.
8	Lowther Hill	288498 610947	19.6	Represents views experienced by recreational receptors from popular summit in Lowther Hills, located on boundary line of Thornhill Uplands RSA and Leadhills and Lowther Hills SLA.
9	Southern Upland Way Whing Head	275117 605366	7.4	Represents views experienced by recreational receptors from minor summit on SUW.
10	Wauk Hill	284122 590949	12.3	Represents views experienced by recreational receptors from minor summit within Thornhill Uplands RSA, with views to north-west looking up Shinnel Water Valley.

[8] Approximate distance to nearest turbine in the Proposed Development scoping layout.

VP	Viewpoint Name	Grid Reference	Distance (km)[8]	Reason for Selection
11	A713 Stroangassel	260315 586888	15.3	Represents views experienced by road users and recreational receptors on popular tourist route through the Glenkens.
12	Cairnsmore of Carsphairn	259456 597985	10.6	Represents views experienced by recreational receptors from popular summit within Galloway Hills RSA.
13	A76 south of Closeburn	289840 592007	10.5	Represents views experienced by road users and recreational receptors on popular tourist route through Nithsdale.
14	Durisdeer Rig	289854 603819	17.1	Represents views experienced by residents and recreational receptors from small settlement on eastern valley side of Nithsdale, and within Thornhill Uplands RSA.
15	A702 Shinnel Water Valley	282644 591882	10.56	Represents oblique views experienced by road users, as they cross the Shinnel water Valley.

Other Wind Farm Developments

4.21 The submitted Euchanhead development (21 turbines up to 230m to tip height) lies immediately adjacent to the western boundary of the Site. Approximately 1km to the west of the Site Lorg wind farm (12 turbines up to 200m to tip height) is currently at scoping stage. Approximately 2km to the north of the Site boundary, the submitted Sanquhar II development (44 turbines up to 200m to tip height) is located in the upland area between the Shinnel Water Valley and the Scaur Water Valley. Given the potential for change with regard to wind farms in the more immediate context, the interaction between the Proposed Development and Euchanhead, Lorg, and Sanquhar II will be kept under careful review during design development and assessment.

4.22 Beyond these adjacent proposals, the closest operational wind farm to the Site is Wether Hill, just over 3km to the south-west at its closest point. Further larger scale wind farm developments in the local context include Twentyshilling Hill (under construction) approximately 6.2km to the north-east of the Site; a cluster approximately 6km to the north at its closest point, including Whiteside Hill (operational), Sanquhar Community Windfarm (operational), Sanquhar Six (consented), Sandy Knowe (under construction) and Hare Hill (operational); and a cluster approximately 8km to the west/north-west at its closest point including Windy Rig (operational), Afton (operational), Brockloch Rig (operational), Brockloch Rig I (operational), Brockloch Rig III (consented), South Kyle (under construction) and Enoch Hill (application). Wind farm developments within 45km of the Site are shown on **Figure 4.4**. Following scoping, more detailed consultation will be carried out with NatureScot, Dumfries and Galloway Council, South Lanarkshire Council and East Ayrshire Council to agree the scope of the cumulative assessment, including 'fixing' the cumulative list of wind farms to be considered in the Cumulative LVIA (CLVIA).

Design Considerations

4.23 The design of the Proposed Development will aim to achieve a coherent and balanced turbine layout, in line with guidance provided by NatureScot[9]. 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. It is also recognised that the final layout will need to balance a wide range of technical and environmental considerations.

[9] SNH (August 2017) Siting and Designing Wind Farms in the Landscape. Version 3a.

4.24 All elements of the proposed wind farm infrastructure will be considered in terms of locational and design choice, 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.

Assessment of Effects

Landscape Effects

4.25 Predicted changes to both the physical landscape of the Site and landscape character within the 45km Study Area will be identified. The assessment of landscape effects will take account of the sensitivity of the landscape, acknowledging any value placed on the landscape through formal designation at either a national or local level.

4.26 Landscape effects will be determined in relation to the magnitude and type of change to the landscape, in accordance with GLVIA3.

Visual Effects

4.27 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 or cycle 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.).

4.28 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.

Cumulative Effects

4.29 The cumulative landscape and visual impact assessment (CLVIA) will be carried out in accordance with the principles outlined in GLVIA3 and SNH Assessing the Cumulative Impact of Onshore Wind Energy Developments (March 2012) guidance.

4.30 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. These include wind farms that are consented but unbuilt, undetermined planning applications (including those which may have been refused and are currently at appeal stage) and in some instances scoping stage schemes, where it is deemed appropriate (and sufficient information is available in the public domain).

4.31 A review of the existing pattern(s) of wind energy development will be undertaken, considering operational, consented and proposed wind farms which are the subject of a valid application, up to a 60km radius from the Site, in accordance with current NatureScot guidance.

4.32 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, including the large emerging cluster to the west and north-west of the Site. Turbines of less than 50m to blade tip and single turbines beyond 5km from the Site will not be included in the detailed assessment. **Figure 4.4** illustrates the locations of operational, consented and proposed wind farms (including those at scoping within 5km) within 45km of the Site.

Residential Visual Amenity

4.33 Given the nearest residential properties are located within 2.5km of the Site, a Residential Visual Amenity Assessment (RVAA) accompanying the LVIA will be carried out. This will be prepared in accordance with the Landscape Institute Residential Visual Amenity Assessment Technical Guidance Note 2/19 (2019).

Field Survey

4.34 Field survey work will be carried out during 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.

Visualisations

4.35 Wireframes and photomontages 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 landscape to illustrate how the views will change against the current baseline. Other (cumulative) wind farms visible from each of the viewpoints will be shown on the wireframes. Visualisations will be prepared in accordance with NatureScot visualisation guidance[10].

4.36 Ancillary elements such as permanent anemometer masts and access tracks will be shown in photomontages for viewpoints within 5km when they would be visible. Beyond 5km it is considered unlikely that these ancillary elements would form more than a minor element of the entire Proposed Development when compared to the turbines.

Assessment of Visible Aviation Lighting

4.37 In the interests of aviation safety, structures, including wind turbines, of ≥150m require visible aviation lighting[11]. Potential visual effects arising from the necessity for this visible lighting (typically consisting of 2000 candela red lights mounted on the wind turbine nacelle and intermediate 32 candela lights mounted on the wind turbine tower) will be a key consideration. Informed by NatureScot visualisation guidance and scoping advice[12] the assessment of visual effects will consider the effects of aviation lighting.

4.38 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 as a starting point 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 night-time assessment will focus on viewpoints from which significant effects may be anticipated.

4.39 Dusk or night-time photomontage visualisations will be prepared in accordance with emerging NatureScot guidance from the following final LVIA assessment viewpoints, informed by the hub height ZTV shown on **Figure 4.1b**:

- Viewpoint 4 – Shinnel Water Valley near Craigencoon; and
- Viewpoint 15 – A702 Shinnel Water Valley.

4.40 Both of these viewpoints represent views which are more likely to be frequented during the hours of darkness and are within a distance range where significant visual effects associated with aviation lighting are more likely.

4.41 The baseline night-time context and presence of any 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.

Potential Significant Effects

4.42 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.

4.43 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.

[10] SNH (2017) Visual Representation of Wind Farms Guidance. Version 2.2.
[11] Civil Aviation Authority (2016) CAA Policy and Guidelines on Wind Turbines CAP 764.
[12] SNH (2017) Siting and Designing Wind Farms in the Landscape. Version 3a.

4.44 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 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.

4.45 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.

4.46 The following will inform the iterative design of the Proposed Development and are key considerations for the LVIA and cumulative LVIA:

- Effects on the landscape fabric of the Site and effects on landscape character;
- Effects on the special qualities of designated landscapes;
- Effects on the residential visual amenity of the nearest properties;
- Visual effects on sensitive residential receptors including nearby settlements and dispersed properties along the Shinnel Water Valley;
- Visual effects on sensitive recreational receptors in and around Nithsdale and the Glenkens, and popular hills and features in the Carsphairn and Scaur Hill range;
- Sequential effects on sensitive recreational receptors using the Core Path network and the SUW; and
- Sequential effects on receptors travelling along the major road network, including popular tourist routes in the Glenkens and Nithsdale.

Potential Effects Scoped into Assessment

4.47 Based on the baseline conditions, it is proposed that the following receptors are scoped into the assessment:

- Upland Glens, Foothills and Southern Uplands with Forest LCTs and other LCTs within a 20km radius (refer to **Table 4.1**) upon which there may be potential for significant landscape effects;
- Designated landscapes (refer to **Table 4.2**) where there may be a potential for the Proposed Development to affect the special qualities of a designated landscape;
- Residential receptors living nearby, including residents of the Shinnel Water and Dalwhat Water valleys;
- Users of key routes throughout the Study Area, including the A76 (and Dumfries to Kilmarnock railway line), A702 and A713; and
- Recreational receptors e.g. those at recognised attractions (including the series of Striding Arch sculptures); those at popular hills tops; and those on recognised walking routes including the SUW and Core Path network.

4.48 In addition, potential cumulative landscape and visual effects arising through combined, successive and/or sequential interactions with other existing and proposed wind farms will be included in the assessment.

Potential Effects Scoped out of Detailed Assessment

4.49 Based on the baseline conditions recorded and distance from the Site, it is proposed that the following are scoped out:

- Landscape character areas with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant effects on landscape character is limited;
- Landscape designations with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant effects on the special qualities is limited;
- Effects on Wild Land;
- Routes and settlements with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant visual and sequential effects is limited; and

- Landscape and visual receptors in the cumulative LVIA where the potential for significant cumulative landscape and visual effects is limited.

4.50 If the design changes substantively and further effects can be justifiable scoped out, this will be agreed through further consultation.

Approach to Mitigation

4.51 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.

Questions

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

- NatureScot;
- Dumfries and Galloway Council;
- South Lanarkshire Council; and
- East Ayrshire Council.

Questions for Consultees

Q4.1: Are there any comments on the overall methodology proposed to assess effects on landscape and visual receptors, or to assess cumulative effects?

Q4.2: Are there any comments on the proposed list of assessment viewpoint locations (including night-time assessment viewpoint locations)?

Q4.3: Are there any further wind farm sites to those shown on **Figure 4.4**, or changes to project development status, which should be considered as part of the cumulative assessment?

Q4.5: Has the consultee identified 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 there any other relevant consultees who should be consulted with respect to the LVIA?

Chapter 5
Hydrology, Hydrogeology and Peat

Introduction

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

Existing Conditions

5.2 A desk-based review of 1:10,000 and 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 1:250,000 SNH (now NatureScot) Carbon and Peatland 2016 Map has been undertaken to identify watercourses and ground conditions within the vicinity of the proposed wind farm. A phase 1 peat survey has also been undertaken.

5.3 The site is located on steep and largely afforested hills which drain to the Appin Burn, a headwater stream that runs in a south-east direction to join the Shinnel Water (**Figure 5.1**). The Appin Burn valley is surrounded by adjacent summits which comprise a series of rounded hills that align south-east to north-west leading to pronounced undulating topography along each side of the valley.

5.4 Most of the Site drains towards the Appin Burn, which flows through the centre of the Site. Many named and unnamed tributaries flow off the valley sides through the Site to enter the Appin Burn (e.g. the Magmallach Burn, Dun Cleuch and Shiel Cleuch). The Shinnel Water flows in a south-east direction north of the Site before its confluence with the Appin Burn immediately east of the Site. The northern site boundary runs adjacent to the Shinnel Water for ~3.5km and part of the north-eastern area of site drains towards the Shinnel Water, via several named and unnamed tributaries (e.g. White Burn).

5.5 The geology of the Proposed Development area is comprised of sedimentary rock (Greywacke). The Shinnel Formation dominates the east and the Portpatrick Formation dominates the west of the Site. Both are derived from deep sea, continental shelf origins with graded bedding.

5.6 The drift deposits in the Proposed Development site are dominated by Devensian till and diamicton derived from Quaternary glaciogenic origins (BGS 1:50K superficial deposits map), which dominate the lower lying ground around the valley floor and the watercourses. The valley floor to the east of the Site is dominated by unconsolidated alluvium: silt, sand, and gravel from fluvial origins. The higher ground and hilltops generally have no drift deposits based on the BGS mapping, with the exception of two small areas of peat on Mid Hill and Lamgarroch in the north-west of the Site.

5.7 The 2016 Carbon and Peatland Map indicates an area of Class 1 peatland at the valley head (Colt Hill, Lagdubh Hill and Blackcraig Hill) and Class 2 on Mullwhanny. Class 1 and Class 2 carbon-rich soils, deep peat and priority peatland habitats are considered by NatureScot to be part of a nationally important resource. With the exception of these areas, the majority of the afforested part of the Site is classed as mineral soils (Class 0), with pockets of Class 3, 4 and 5 peatland soils. While these classes are not considered to be part of the nationally importance resource, they may still have the potential to be restored to a better condition.

5.8 A Phase 1 peat probing survey was carried out in two periods (21-24 September 2021 and 5-6 October 2021). The peat survey report and interpolated peat depth map is appended as **Appendix A**. The majority of the surveyed area did not record any notable peat. Areas which did record peat were isolated to the hilltops, close to watercourses or within forest firebreaks. Throughout the Site the surface substrate was largely composed of unconsolidated minerogenic sediments (alluvium and glacial till). Where peat was found, it was largely confined to the north and western parts of the Site on the hilltops. The site survey found isolated pockets of peat which exceeded 2m; however, most of the peat probe locations indicated less than 0.5m in depth of soil.

5.9 A review of the SEPA Flood Map indicates that there are some areas identified to be at risk of flooding in a 1 in 200-year event within the Proposed Development site (e.g. the banks of Appin Water and Shinnel Water). Flood risk areas will be identified within the baseline of the EIA.

5.10 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 through High, Good, Moderate, Poor, and Bad status. This provides a holistic assessment of ecological health. The northern boundary of the Site has one watercourse which is large enough to be classified: Shinnel Water (Waterbody ID 10628), which was classified as 'Good' in 2018.

Design Considerations

5.11 Where possible a 50m buffer will be applied to all watercourses to minimise the risk of potential impacts due to changes in runoff, sedimentation, or water quality.

5.12 All components of the Proposed Development will be kept outwith the estimated 1 in 200-year fluvial flood extent. Watercourse crossings will be designed to accommodate the 1 in 200-year flow.

5.13 Where possible infrastructure will avoid areas of deeper (> 1m) peat. This reduces the volume of peat required to be excavated (reducing displaced carbon) and, dependent on baseline ecological conditions, may have benefits for habitats as well as reducing the potential to interrupt localised shallow subsurface flow-paths.

5.14 Where possible, all excavations <1m should be over 100m away from any groundwater abstractions, private water supplies (PWS) or Ground Water Dependent Terrestrial Ecosystems (GWDTEs) as per SEPA guidance[13]. Excavations >1m (e.g. turbine foundations) will, where possible, be over 250m away from these receptors.

Proposed Surveys and Assessment Methodologies

5.15 In addition to the desk-based surveys undertaken to date, consultation with Dumfries & Galloway Council, Scottish Water, SEPA and NatureScot will be undertaken to obtain relevant flood, water supply and peat information, including abstractions and private water supplies (PWS). Relevant flow and water quality data will also be obtained from SEPA.

5.16 A walkover hydrological survey of the Proposed Development site will be carried out to supplement the desk-based work and data collection to identify the existing baseline conditions, including identifying and documenting watercourse crossings (proposed and existing); identifying other water features such as wetlands and springs; undertaking an overview assessment of areas identified as floodplain within the SEPA Flood Maps; and providing a general overview of landscape and land cover of importance to hydrology and peat. Private water supply visits will also be undertaken following consultation with the private water supply owners to verify the source location. GWDTEs will be identified based on habitat mapping and ecology surveys and reviewed by hydrologists in the field (see **Chapter 6: Ecology**).

5.17 Phase 1 peat probing has already been undertaken within the Proposed Development site; the results are summarised in **Paragraph 5.8** above. Due to access and health and safety considerations, some parts of the Site – particularly some steep forested slopes – have not been included in the scope of Phase 1 survey to date. The completed survey coverage indicates that the presence of deep peat in these parts of the Site is unlikely (see above and **Appendix A**). However, additional locations will be subject to targeted survey should infrastructure be proposed at them.

5.18 The proposed frequency for Phase 2 probing and coring will follow relevant guidance[14], as follows:

- Targeted high frequency probing will be undertaken along tracks, at turbines/hard standings, turning points and passing places, site compounds, substation and if required, energy storage units, borrow pits and met mast locations;
- Probes will then be taken at 50m spacing, both along the centre line of any access tracks and at 10m offsets;
- Detailed probing survey on a 10m-by-10m grid basis will be undertaken around the centre of each proposed turbine base and additional proposed infrastructure; and

[13] SEPA (2017) Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.
[14] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland.

- Cores will be undertaken at representative locations to verify the actual peat depth, the thickness of the acrotelm and catotelm, determine the mineral soil characteristics and allow for von Post-tests to be undertaken.

5.19 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 0-0.5m, >0.5m-1m, >1m-1.5m, >1.5m-2m, >2m-2.5m, etc. will be used to demonstrate the occurrence of peat across the Site.

5.20 The findings of the survey work and baseline assessment will contribute to environmental constraints mapping and will provide input and feedback into design iterations and subsequent environmental assessment.

5.21 The peat survey results will also be used to inform the preparation of a peat management plan and peat landslide hazard and risk assessment.

5.22 The peat management plan will follow relevant guidance and identify potential excavation volumes of peat (both acrotelm and catotelm). Early calculations will be 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.

5.23 A peat landslide hazard and risk assessment will be undertaken according to Scottish Government guidance and will assess the likelihood of peat instability in association with wind farm construction. Early calculations will be used to minimise overlap with areas of higher natural likelihood. Assessment of the design-freeze layout will consider all relevant receptors and provide mitigation measures and good practice recommendations to minimise risks associated with peat landslides.

Potential Significant Effects

5.24 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 (e.g. sediment release, pollution, fuel spills etc.) and effects on specific locations such as sensitive habitats (i.e. GWDTEs, peatland habitats), private water supplies (PWS) or watercourse crossings, which are sensitive to pollution risk and/or disturbance from required engineering works.

5.25 Potentially significant effects are considered more likely to occur during the construction phase. The applicant is committed to implementing good practice construction methods and has extensive working knowledge of construction methods due to constructing several similar projects throughout Scotland.

5.26 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/or operation of the Proposed Development include:

- Pollution of surface water, including private drinking water supplies caused by releases of sediment to watercourses from excavated/stockpiled material during construction, stream crossings or works near streams;
- Pollution of surface water and groundwater, including drinking water supplies, through operation of machinery (e.g. spillage of fuels, oils etc.) during site preparation and construction;
- Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk during construction and operation; and
- Effects on peat (including potential peat instability).

Approach to Mitigation

5.27 Given the applicant's commitment to, and prior experience of, implementing accepted good practice during construction and operation, together with the current regulatory context and the careful siting of infrastructure components, many potential effects on the water environment can be avoided or reduced. With respect to the current regulatory context, since the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) came into force, CAR authorisation will be required in relation to a number of activities e.g. engineering works in inland waters and wetlands. A Construction Site Licence

(CSL) is also likely to be required for the works under the CAR Regulations. Consultation with SEPA throughout the EIA process will be undertaken in relation to those activities for which a licence or registration is required.

5.28 Several good practice pollution prevention and control measures will be put in place during construction. These will be embedded into the project design and will reflect best practice guidance and recognised industry standards (e.g. SEPA guidance, including their Guidance for Pollution Prevention (GPPs), CIRIA SUDS Manual[15], CIRIA Control of Water Pollution from Construction Sites[16] and the joint publication Good Practice during Windfarm Construction[17], amongst others).

5.29 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 taken into account prior to assessing the likely effects of the Proposed Development. However, where appropriate, more tailored mitigation measures will be identified prior to determining the likely significance of residual effects.

Questions

Questions for Consultees

Q5.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, and peat?

Q5.2: Is the proposed methodology appropriate?

Q5.3: Are the proposed list of effects which are scoped in appropriate?

Q5.4: Is the proposed approach to mitigation appropriate?

[15] CIRIA (2015) CIRIA SUDS Manual 2015, C753.
[16] CIRCA (2001) Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532).
[17] Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland and Historic Environment Scotland (2015) Good Practice during Wind Farm Construction.

Chapter 6
Ecology

Introduction

6.1 This chapter sets out the proposed approach to the assessment of potential effects on ecology during the construction and operation of the Proposed Development (decommissioning is to be scoped out of the EIA and EIA Report as detailed in **Chapter 3** above).

6.2 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 (1981);
  - National/local planning policy; and
  - National/local nature conservation policy (including the Ancient Woodland Inventory (AWI)).
- Species and habitats offered legislative or policy protection via:
  - The Conservation (Natural Habitats, &c) Regulations (1994);
  - The Wildlife and Countryside Act (1981); and
  - National/local planning policy.

6.3 The assessment will follow the Chartered Institute of Ecology and Environmental Management Guidelines (CIEEM) for Ecological Impact Assessment in the UK (2018)[18].

Existing Conditions

6.4 Baseline information in relation to ecological features which may be affected by the Proposed Development has been collected through consultation, desk study and ecological field surveys. In addition, members of the field team were able to advise on potential ecological constraints on the basis of established local knowledge.

Consultation

6.5 NatureScot were consulted in September 2020 to ensure they were satisfied with the scope of ecology surveys. NatureScot emailed confirmation of their satisfaction with the ecology survey scope on 6th October 2020.

Initial Desk Study

6.6 An initial desk study was undertaken in 2020-21 to inform the proposed approach for baseline information gathering, including the scope and requirement for baseline ecological surveys.

6.7 The following key sources were consulted:

- NatureScot (formerly Scottish Natural Heritage) Sitelink[19];

[18] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland.
[19] Available online: https://sitelink.nature.scot/home

- Multi-Agency Geographic Information for the Countryside (MAGIC)[20];
- Aerial imagery;
- South West Scotland Environmental Information Centre (SWSEIC);
- NatureScot general pre-application/scoping advice to developers of onshore wind farms applicable at the time (NatureScot, 2020)[21]; and
- Environmental Impact Assessment Reports/Environmental Statements for nearby windfarm developments.

6.8 Desk study records returned by SWSEIC included otter, bat species and red squirrel within the search area. Full results obtained from the desk study will be provided in the EIA Report.

Baseline Ecology Surveys

6.9 The following field surveys have been undertaken to confirm baseline ecological features within the Site, and surrounding area:

- Extended phase 1 habitat survey;
- National Vegetation Classification (NVC);
- Terrestrial mammal surveys;
- Bat activity surveys;
- Bat preliminary roost assessment (PRA) survey; and
- Fish habitat survey.

6.10 All surveys have been undertaken by suitably competent and qualified ecologists in accordance with industry standard guidance. Full details of survey methodologies will be presented within the EIA Report. If required, field surveys will be updated prior to assessment in response to changes in the design of the Proposed Development, to ensure compliance with relevant current guidance (NatureScot, 2020).

6.11 Full details of key sources reviewed, consultations undertaken, and information gathered will be provided within the EIA Report.

Designated Sites

6.12 The Site does not include any part of a statutory site with designated ecological interest. **Table 6.1** and **Figure 6.1** identify statutory designated sites with ecological interests located within 10km of the Site. The approximate distances provided in **Table 6.1** are between the designated site boundary and the Site at their nearest points. The Site does not include any part of a non-statutory site with designated ecological interest, nor is it within 2km of any such non-statutory site.

6.13 Sites with ornithological qualifying interests are detailed and discussed separately in **Chapter 7: Ornithology** of this EIA Scoping Report.

Table 6.1: Statutory Ecological Designated Sites within 10km of the Site

Name	Designation	Qualifying Features	Distance at Closest Point and Orientation from Site Boundary
Upper Nithsdale Woods	Special Area of Conservation (SAC)	Mixed woodland on base-rich soils associated with rocky slopes	5.3km, south-east
Stenhouse Wood	Special Site of Scientific Interest (SSSI)	Upland mixed ash woodland	5.3km, south-east

[20] Available online: https://magic.defra.gov.uk/magicmap.aspx
[21] Available online: https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms

Name	Designation	Qualifying Features	Distance at Closest Point and Orientation from Site Boundary
Chanlockfoot	SSSI	Upland mixed ash woodland	5.3km, north-east
Tynron Juniper Wood	SAC	Juniper on heaths or calcareous grasslands	8.6km, south-east
Tynron Juniper Wood	SSSI	Juniper scrub	8.6 km, south-east

Habitats and Vegetation

6.14 Surveys were undertaken in July-August 2021 following industry standard survey guidance for Phase 1 habitat (JNCC, 2010)[22] and National Vegetation Classification (NVC) survey (Rodwell, 2006)[23]. The purpose of these surveys was to establish baseline terrestrial habitat conditions at the Site and identify vegetation communities of notable importance, including habitats listed on Annex 1 of the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (i.e. Habitats Directive), and as UKBAP Priority Habitats.

6.15 The Site primarily comprises commercial coniferous plantation, with some areas of clear-fell. The Appin Burn flows through the centre of the Site from west to east. Open habitats types, found mainly around peripheral areas of the Site, consist of acid grassland and marshy grassland, with an isolated area of bog habitat in the north of the Site.

6.16 The following Phase 1 habitat types have been recorded:

- A1.1.1 – Broad-leaved woodland semi-natural;
- A1.2.1 – Broad-leaved woodland plantation;
- A1.2.2 – Coniferous plantation woodland;
- A4 – Clear-fell;
- B1.1 – Acid grassland unimproved;
- B1.2 – Acid grassland semi-improved;
- B2.1 – Neutral grassland unimproved;
- B2.2 – Neutral grassland semi-improved;
- B5 – Marshy grassland;
- C1 – Bracken;
- E1.6.1 – Blanket bog;
- G2.4 – Dystrophic running water; and
- J3.3 – Domestic buildings.

6.17 When identified to NVC community level, several of the habitats present, including areas of marshy and unimproved grassland and bog, are indicative of areas that may be either highly groundwater dependent or moderately groundwater dependent (and as such meet the definition of groundwater dependent terrestrial ecosystems (GWDTE)) depending on the hydrogeological setting.

6.18 Full details of baseline habitats and vegetation conditions will be presented within the EIA Report.

6.19 If required, terrestrial habitat and vegetation surveys will be updated prior to assessment in response to evolution of the scheme design. This will seek to ensure compliance with current NatureScot guidance (2020) and provision of sufficient

[22] JNCC (2010) Handbook for Phase 1 habitat survey – a technique for environmental audit. Joint Nature Conservation Committee, Peterborough.
[23] Rodwell, J.S. (2006) National Vegetation Classification: Users' Handbook. Joint Nature Conservation Committee, Peterborough.

information in accordance with Scottish Environmental Protection Agency (SEPA) guidance (2017)[24] regarding the identification of GWDTEs within a Zone of Influence (ZoI) of development areas for subsequent hydrological assessment.

Protected Species

6.20 Terrestrial mammal walkover surveys were undertaken within the Study Area in May and September 2021 by suitably competent ecologists, following industry standard guidance and species-specific survey methodologies applicable at the time of survey. The Site is not close to a priority area for Scottish wildcat[25] and therefore the potential for this species to be present on-site can be discounted. As such, surveys sought to identify the presence and distribution of field signs confirming or indicating the potential presence of otter, water vole, badger, pine marten and red squirrel.

6.21 Full details of survey methodologies will be provided within the EIA Report.

6.22 Surveys recorded evidence of the presence of otter within the Site, and the wooded Appin Burn has potential to be used by the species, including for resting or holt creation. Evidence of pine marten was also recorded within the Site. There was no evidence of water vole or red squirrel and the watercourses on-site are considered to be sub-optimal for water vole. There was no evidence of badger on-site but the habitats present (woodland) are considered to be potentially suitable for the species.

6.23 If required, terrestrial mammal surveys will be updated prior to assessment in response to changes in scheme design. This will seek to ensure compliance with current NatureScot species-specific advice for development proposals[26].

6.24 Surveys to establish the bat species assemblage utilising the Site and the spatial and temporal distribution of activity have been undertaken in 2021 in line with current NatureScot guidance (2019)[27]. 15 ground-level static detectors were deployed, to record bat activity within the Site, for a period of at least 10 nights with suitable weather conditions, in spring, summer and autumn. As far as possible, detectors were placed in approximate proposed wind turbine locations as indicated at the time, as per 2019 guidance. The 15 detectors provide an adequate survey coverage for a wind farm of up to 25 turbines (one detector per turbine up to the first 10 turbines, plus 1/3 of the number for the remainder, as per guidance).

6.25 All bat activity data will be analysed through Kaleidoscope (Wildlife Acoustics) software and manually checked by an experienced ecologist. All sonogram data obtained from activity surveys will then be uploaded to the online Ecobat tool in order to quantify bat activity in accordance with NatureScot guidance (2019), with the Ecobat output used to assess the likelihood for significant effects to bat species arising as a result of the Proposed Development.

6.26 A Preliminary Roost Assessment (PRA) was undertaken in May and September 2021 (combined which covered the Study Area), comprising a daytime inspection of trees (and any other features, e.g. buildings) within Site, and out to 200m where access allowed, for potential to support bat roosts in accordance with the 2019 guidance. Several features were noted to offer low to moderate roosting potential. The likelihood of impacts upon potential roost sites and the requirement for further survey work pre-construction in line with Collins (2016)[28] guidance will be considered in the EIA Report.

6.27 A fish habitat survey was carried out in October 2021, to identify any areas of critical fish habitat within watercourses of and intersecting the Site (i.e. spawning, nursery areas, juvenile and adult holding areas). The survey was undertaken by suitably competent ecologists, in normal flow conditions, following the Scottish Fisheries Co-ordination Centre (SFCC) industry standard guidance (SFCC, 2007)[29]. Survey results are in the process of being appraised and will be reported in the EIA Report.

6.28 Desk study sources will also be consulted to identify the known status of watercourses within the Study Area, any known barriers to fish migration and the known distribution of fish within the relevant catchment area.

6.29 Full details of fish habitat survey methodology and results, watercourses surveyed, and desk study findings will be provided within the EIA Report.

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[24] SEPA (2017) Land Use Planning System Guidance Note 4: Planning Guidance on On-shore Windfarm Developments. Scottish Environment Protection Agency.
[25] Scottish Wildcat Action. Available online: https://www.scottishwildcataction.org/ [accessed on 15 November 2021]
[26] Available online: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-protected-species [accessed on 15 November 2021]
[27] SNH (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation. Prepared jointly by Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, ScottishPower Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) with input from other key stakeholders.
[28] Collins, J. (ed.) (2016) Bat surveys for professional ecologists: good practice guidelines. 3rd edition. The Bat Conservation Trust, London.
[29] SFCC (2007) Habitat Surveys Training Course Manual. Scottish Fisheries Co-ordination Centre, Pitlochry.

6.30 It is considered that further detailed fish surveys to inform an assessment of effects upon fisheries will not be required, providing the implementation of good practice scheme design and mitigation measures in consultation with NatureScot and other primary interest groups, to avoid and/or minimise the potential for pollutant impacts upon aquatic habitats and ensure the free passage of fish within the Site is maintained. These measures will be included in the embedded mitigation for the Proposed Development.

6.31 In accordance with current guidance (NatureScot, 2020) there are some species groups which, providing the implementation of suitable mitigation measures, are unlikely to be subject to significant effects as a result of wind farm developments. As such, they do not require surveys to inform an EIA. This includes invertebrates, reptiles and amphibians, but excludes additional European Protected Species such as great crested newt. However, there are no ponds within the Study Area and so the potential for great crested newt to be present can also be discounted.

Design Considerations

6.32 The following measures will be considered in embedded design of the Proposed Development to protect ecological features:

- A minimum bat buffer of 50m (from blade tip) will be applied from turbines to suitable bat commuting/foraging features, such as watercourses and woodland;
- A minimum buffer of 50m around watercourses will be applied which all elements of the Proposed Development (incl. turbines and infrastructure) will avoid;
- The most ecologically valuable habitats (e.g. Annex 1) will be avoided and loss of native woodland on-site will be minimised; and
- Watercourse crossings will be minimised and sensitively designed to allow the continued movement of wildlife along the watercourse.

Proposed Surveys and Assessment Methodologies

6.33 As the existing conditions at the Site have been reported on the basis of the completed survey effort, survey methodologies and scope have already been discussed in the paragraphs above.

6.34 Impact assessment presented within the EIA Report for ecological features will be based on current CIEEM guidance (2018).

6.35 The assessment process will include the following stages:

- Determination and evaluation of important ecological features;
- Identification and characterisation of impacts;
- Outline of mitigating measures to avoid and reduce significant impacts;
- Assessment of the significance of any residual effects after such measures;
- Identification of appropriate compensation measures to offset significant residual effects; and
- Identification of opportunities for ecological enhancement.

6.36 The Ecology chapter of the EIA Report will be supported by Technical Appendices detailing the desk study results, consultation, survey methods and results, and will be further supported by relevant figures, tables and photographs, where necessary. Where sensitive data is recorded, the Ecology chapter will be supported by confidential appendices which will not be released to the public domain.

6.37 The assessment within the EIA Report will only assess in detail impacts upon important ecological features i.e. those that are considered important and potentially significantly affected by the Proposed Development. A detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts will not be undertaken and justification for scoping such detailed assessment out of the EIA Report will be provided.

6.38 Relevant European, national and local legislation policy and guidance will be referred to in order to determine the importance (or 'sensitivity') of ecological features. In addition, importance will also be determined using professional judgement, specialist consultation advice and the results of baseline surveys and the importance of features within the context of the geographical area.

6.39 Importance will not necessarily relate solely to the level of legal protection that a feature receives: ecological features may be important for a variety of reasons, such as their connectivity to a designated site and the rarity of species or the geographical location of species relative to their known range.

6.40 The importance of ecological features will be defined in a geographical context from 'Local' to 'International'.

6.41 The identification and characterisation of impacts on important ecological features will be undertaken in accordance with CIEEM guidelines (2018) with reference made to magnitude (e.g. area or number of individuals to be impacted), extent, duration and reversibility as appropriate.

6.42 Impacts will be considered during the construction and operational phases of the Proposed Development (the decommissioning phase will not be considered in detail, for reasons provided in **Chapter 3** above) and will be assessed on the basis that a clearly defined range of avoidance and standard good practice measures are implemented.

Potential Significant Effects

6.43 The assessment will consider the potential significant effects associated with construction and operation of the Proposed Development as detailed below.

6.44 CIEEM guidelines (2018) define a 'significant effect' as an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general (i.e. the feature could be positively or negatively significantly affected).

6.45 CIEEM guidelines on ecological impact assessment note that *"A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures as long as the mitigation hierarchy has been applied effectively as part of the decision-making process"*.

6.46 Potentially significant effects identified will be expressed with reference to an appropriate geographic scale. For example a significant effect on a nationally designated site is likely to be of national significance. However, the scale of significance does not necessarily always relate to the importance of an ecological feature. For example, an effect on a species which is considered of national importance may not have a significant effect upon its national population.

6.47 In line with the principles of proportionate EIA, embedded mitigation, including avoidance through the design process and application of industry standard good practice, will be considered at the outset of the assessment. Important ecological feature status will only be assigned where there is still considered to be the potential for significant effects on the identified feature arising from the Proposed Development after the application of embedded mitigation measures.

6.48 In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect will be assumed as a precautionary approach. Where uncertainty exists, this will be acknowledged.

6.49 Where the EIA proposes measures to mitigate potentially significant adverse effects on ecological features, a further assessment of residual ecological effects, taking into account any ecological mitigation recommended, will be undertaken.

Potential Effects Scoped into the Assessment

6.50 The assessment will consider the following given their presence identified during baseline ecology surveys:

- Ecological valuable habitats (i.e. Annex 1 habitats);
- Bats;
- Otter; and
- Pine marten.

Potential Effects Scoped out of the Assessment

6.51 It is proposed that the potential for indirect effects upon the ecological qualifying interests of any statutorily designated site for nature conservation located greater than 2km from the Site, or for which embedded mitigation and good practice will be sufficient to prevent any impacts, is scoped out of the assessment, by virtue of the static nature of the Sites' qualifying habitats interests, spatial separation and/or absence of hydrological pathways of connectivity.

6.52 The assessment will therefore not consider the following:

- Upper Nithsdale Woods SAC;
- Stenhouse Wood SSSI;
- Chanlockfoot SSSI;
- Tynron Juniper Wood SAC; and
- Tynron Juniper Wood SSSI.

6.53 Impacts to common and widespread habitats of low sensitivity and/or conservation interest, such as bracken, plantation forestry, and some grassland habitats, are scoped out of the assessment.

6.54 Baseline information gathering has not identified the Site as being sufficiently important to lead to the potential for significant effects on the following protected species (and thus are scoped out of assessment):

- Wildcat;
- Water vole;
- Red squirrel;
- Badger;
- Invertebrates; or
- Amphibians and reptiles.

6.55 Effects on habitats and species (excluding bats) during operation of the Proposed Development can also be scoped out. No further damage or disturbance is anticipated to habitats during operation, and maintenance visits will be rare and unlikely to result in disturbance to protected species.

6.56 Although these ecological features are scoped out of assessment, consideration will, however, be afforded to the provision of precautionary embedded mitigation to be included in the Construction Environmental Management Plan (CEMP) and Operational Management Plans to ensure legislation compliance with regards the protection afforded to these species under the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) (as amended in Scotland) and the Wildlife and Countryside Act 1981 (as amended in Scotland), as relevant.

Cumulative Assessment

6.57 The potential for cumulative impacts with other renewable energy development proposals will be assessed in accordance with NatureScot guidance (SNH, 2012)[30] and include consideration of those such developments located within the same hydrological catchment(s) or within the regular range of mobile species (e.g. for bats) out to a maximum of 10km from the Site boundary.

6.58 The assessment will encompass the effects of the proposal in-combination with existing windfarm developments (>3 turbines), either built or under construction; approved developments, awaiting implementation; and, proposals awaiting determination within the planning process with design information in the public domain.

[30] SNH (2012) Assessing the Cumulative Impact of Onshore Wind Energy Developments. Inverness.

6.59 It is proposed that non-windfarm proposals be excluded from in the cumulative assessment, unless the ECU can refer LUC to specific proposals in close proximity to the development that should be included (following consideration of input from consultees).

Approach to Mitigation

6.60 The adoption of embedded mitigation measures to avoid or minimise adverse impacts upon ecological features will be part of the iterative design process for the Proposed Development. Those measures listed in Section 6.29 'Design Considerations' details the embedded mitigation that will inform Proposed Development design.

6.61 Other measures to avoid or otherwise minimise potentially adverse impacts upon ecological features during the Proposed Development will include:

- A CEMP (or similar) to be in place during the construction, operational and decommissioning phases of the Proposed Development. The CEMP will include all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the Proposed Development in line with current guidance; and
- Ecological Clerk of Works (ECoW) – An ECoW will be appointed to supervise works during the construction phase to ensure the agreed ecological mitigation and management measures are implemented. This is likely to include the production and implementation of a protected species protection plan, to minimise the risk to protected ecological species.

6.62 Where effects are assessed as being significant, within the context of the EIA regulations, further mitigation measures will be identified and agreed. 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.

6.63 Suitable principles for biodiversity enhancement to be delivered as part of the Proposed Development will be outlined within the EIA Report. The appropriateness and feasibility of principles will be confirmed with NatureScot and relevant consultees over the course of the EIA process, with view to prescriptive enhancement measures being detailed post-consent within a Habitat Management Plan (HMP).

Questions

Questions for Consultees

Q6.1: Do consultees agree with the range of desk study sources and ecology surveys considered to inform the design and assessment of the Proposed Development?

Q6.2: Do consultees agree that the full range of likely effects to be assessed within the EIA Report has been adequately identified and is proportionate to the nature of the Proposed Development?

Q6.3: Are there any other relevant consultees who should be contacted with respect to the ecology assessment and scope of baseline information gathering?

Q6.4: Do consultees agree with those features that have been scoped out of assessment in respect to ecology (and the rationale for the decision)?

Q6.5: Do consultees agree with the proposed scope of the cumulative assessment?

Chapter 7
Ornithology

Introduction

7.1 This chapter sets out the proposed approach to the assessment of potential effects on ornithology during construction and operation of the Proposed Development.

7.2 Ornithological 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 (1981); and
  - National/local planning policy.
- Species offered legislative or policy protection via:
  - The Conservation (Natural Habitats, &c) Regulations (1994);
  - The Wildlife and Countryside Act (1981); and
  - National/local planning policy.

7.3 The assessment will follow the Chartered Institute of Ecology and Environmental Management Guidelines (CIEEM) for Ecological Impact Assessment in the UK (2018)[31].

Existing Conditions

7.4 Baseline information in relation to ornithological features which may be affected by the Proposed Development has been collected through consultation, desk study and ornithological field surveys.

7.5 Full details of key sources reviewed, consultations undertaken, and information obtained will be provided within the EIA Report.

Consultation

7.6 NatureScot were consulted in September 2020 to ensure they were in agreement with the scope of ornithology surveys and the identified ornithological features to consider within these surveys. NatureScot emailed confirmation of their satisfaction with the survey scope on 6th October 2020.

7.7 NatureScot were consulted again in September 2021 after the completion of Year 1 ornithology surveys to establish whether they agreed that a proportionate level of survey data had been gathered to inform assessment with respect to ornithology. On 5th October 2021 NatureScot expressed their agreement that an appropriate level of survey had been completed, and no further ornithology surveys would be required.

[31] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland.

Initial Desk Study

7.8 An initial desk study was undertaken in 2020-21 to inform the proposed approach to baseline information gathering, including the scope and requirement for baseline ornithological surveys.

7.9 The following key sources have been consulted:

- NatureScot (formerly Scottish Natural Heritage) Sitelink[32];
- Multi-Agency Geographic Information for the Countryside (MAGIC)[33];
- Royal Society for the Protection of Birds (RSPB);
- Dumfries and Galloway Raptor Study Group (DGRSG);
- South West Scotland Environmental Information Centre (SWSEIC); and
- Environmental Statements for nearby windfarm developments.

7.10 Records were returned from RSPB, DGRSG and SWSEIC including breeding peregrine, goshawk, red kite and lekking black grouse within the search area.

Statutory Designated Sites for Nature Conservation

7.11 The Site does not include any part of a statutory site with designated ornithological interest. **Table 7.1** and **Figure 7.1** identify statutory designated sites with ornithological interests located within 10km of the Site (extended to 20km for any sites with qualifying migratory waterfowl). The approximate distances provided in **Table 7.1** are between the designated site boundary and the Site at their nearest points. The Site does not include any part of a non-statutory site with designated ornithological interest, nor is it within 2km of any such non-statutory site.

7.12 Sites with non-avian ecological qualifying interests are detailed and discussed separately in **Chapter 6: Ecology** of this EIA Scoping Report.

Table 7.1: Statutory Ornithological Designated Sites within 10km of the Site (extended to 20km for sites with qualifying migratory waterfowl interest)

Name	Designation	Qualifying Features	Distance at Closest Point and Orientation from Site Boundary
Loch Ken and River Dee Marshes	Special Protection Area (SPA) and Ramsar	Non-breeding greylag goose and Greenland White-fronted goose.	20km, south-west

Baseline Surveys

7.13 The following field surveys have been undertaken in 2020-21 to confirm baseline ornithological features within the Site and surrounding area:

- Vantage point (VP) flight activity surveys;
- Moorland Breeding Bird Surveys (MBBS);
- Annex 1/Schedule 1 breeding raptor and owl searches;
- Breeding black grouse searches; and
- Breeding nightjar surveys.

7.14 VP flight activity surveys were carried out from three VP locations to provide appropriate coverage of the Study Area (defined as turbines plus 500m), as shown in **Figure 7.2**.

[32] Available online: https://sitelink.nature.scot/home
[33] Available online: https://magic.defra.gov.uk/magicmap.aspx

7.15 Vantage point flight activity survey undertaken at each VP monthly is shown in **Table 7.2**. VP hours met the criteria of 6hrs in accordance with NatureScot guidance (SNH, 2017)[34], with extra hours undertaken during the breeding bird season (April-August). This was due to experience of ornithological interest in the locality suggesting that breeding raptors are likely to be the main ornithological consideration for the Proposed Development.

Table 7.2: VP Survey Effort

VP	2020					2021							Total Hours
	Non-breeding Season						Breeding Season						
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
VP1	6	6	6	6	6	6	6	9	9	6	12	9	87
VP2	6	6	6	6	6	6	6	9	9	9	9	9	87
VP3	6	6	6	6	6	6	6	9	9	9	9	9	87

7.16 MBBS surveys were carried out in April-July 2021, following an adapted Brown and Shepherd (1993)[35] methodology, in accordance with NatureScot guidance (SNH, 2017), to record breeding moorland species within the Site and out to 500m where accessible. Further details of the methodology will be provided in the EIA report.

7.17 Dedicated Annex 1/Schedule 1 breeding raptor and owl surveys, comprising a combination of short VPs and walkovers to detect displaying or nesting behaviour, were carried out between April and August 2021 in accordance with methods described in Hardey et al. (2013)[36]. The Study Area comprised the Site, plus 2km (extended to 6km to search for eagles, where accessible). Further details of the methodology will be provided in the EIA report.

7.18 Dedicated black grouse surveys were carried out within Site and out to 1.5km (where accessible), following methods summarised in Gilbert et al. (1998)[37] and in accordance with NatureScot guidance (SNH, 2017). Further details of the methodology will be provided in the EIA report.

7.19 A dedicated nightjar survey was carried out following methodology provided in Gilbert et al. (1998), with a dusk survey carried out in mid-June 2021. This involved a walkover survey (with stopping points) to listen for churring male nightjar in suitable habitats within the Site.

7.20 All surveys have been undertaken by suitably competent and qualified ornithologists in accordance with industry standard guidance. Full details of survey methodologies (including the Study Areas used for each survey) will be presented within the EIA Report. If required, field surveys will be updated prior to assessment in response to changes in the design of the Proposed Development to ensure compliance with relevant current guidance (SNH, 2017).

7.21 The following summarises the results of the ornithology surveys carried out in 2020-21:

- VP flight activity surveys – most commonly recorded species were red kite (total of 26 flights) and goshawk (total of 19 flights), with other recorded species (greylag goose, pink-footed goose, whooper swan and goosander) only observed in much lower numbers (≤4 flights);
- MBBS – curlew (1 territory) and snipe (3 territories) recorded breeding in Study Area;
- Annex 1/Schedule 1 breeding raptor searches – suspected barn owl nest/roost site in Study Area; and
- No black grouse or nightjar recorded, although there is potential suitable habitat for these species.

[34] SNH (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms. SNH, Inverness.
[35] Brown, A.F. & Shepherd, K.B. (1993) A method for censusing upland breeding waders. Bird Study, 40, pp.189-195.
[36] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) Raptors: a field guide to survey and monitoring. 3rd Edition. The Stationery Office, Edinburgh.
[37] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods A Manual of Techniques for Key UK Species. RSPB, Bedford.

Design Considerations

7.22 A species-specific buffer will be applied to protect the barn owl nest/roost site and ensure works associated with the Proposed Development does not disturb the Schedule 1 species. The nest/roost site is off-site (approximately 500m from the Site boundary) and so is unlikely to represent a notable constraint.

Proposed Surveys and Assessment Methodologies

Approach to Assessment

7.23 The survey scope has been described above in relation to the existing conditions at and around the Site.

7.24 Impact assessment presented within the EIA Report for ornithological features will be based on CIEEM guidance (2018) and NatureScot guidance 'Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas' (2018)[38].

7.25 The assessment process will include the following stages:

- Determination and evaluation of important ornithological features;
- Identification and characterisation of impacts;
- Outline of mitigating measures to avoid and reduce significant impacts;
- Assessment of the significance of any residual effects after such measures;
- Identification of appropriate compensation measures to offset significant residual effects; and
- Identification of opportunities for enhancement.

7.26 The Ornithology chapter of the EIA Report will be supported by Technical Appendices detailing the desk study results, consultation, survey methods and results, and will be further supported by relevant figures, tables and photographs, where necessary.

Determining Importance

7.27 The assessment within the EIA Report will only assess in detail impacts upon ornithological features that are considered important and to have the potential to be significantly affected by the Proposed Development. A detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts will not be undertaken and justification for scoping out of these features from detailed assessment will be provided.

7.28 Important ornithological features (defined as 'Target Species'[39]) will comprise:

- Species listed on Annex 1 of the Birds Directive;
- Species listed on Schedule 1 of the WCA; and
- 'Priority bird species for assessment when considering the development of onshore wind farms in Scotland' as listed on Annex 1 of current guidance (SNH, 2018).

7.29 Relevant European, national and local legislation policy and guidance will be referred to in order to determine the importance (or 'sensitivity') of ornithological features. In addition, importance will also be determined using professional judgement, specialist consultation advice and the results of baseline surveys and the importance of features within the context of the geographical area.

7.30 Importance will not necessarily, however, relate solely to the level of legal protection that a feature receives, and ornithological features may be important for a variety of reasons, such as their connectivity to a designated site and the rarity of species or the geographical location of species relative to their known range. This will be taken into account when defining the Target Species for the purposes of impact assessment.

[38] SNH (2018) Assessing the significance of impacts from onshore wind farms outwith designated areas. SNH, Inverness.
[39] As agreed with NatureScot during pre-scoping consultation in September 2020.

7.31 The importance of ornithological features will be defined in a geographical context from 'Local' to 'International'.

Identification and Characterisation of Impacts

7.32 The identification and characterisation of impacts on important ornithological features will be undertaken in accordance with CIEEM guidelines (2018) with reference made to magnitude (e.g. area or number of individuals to be impacted), extent, duration and reversibility as appropriate.

7.33 Impacts will be considered during the construction and operational phases of the Proposed Development and will be assessed on the basis that a clearly defined range of avoidance and standard good practice measures are implemented.

Significant Effects

7.34 CIEEM guidelines (2018) define a 'significant effect' as an effect that either supports or undermines biodiversity conservation objectives for 'important ornithological features' or for biodiversity in general and notes that *"a significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures"*.

7.35 Potentially significant effects identified will be expressed within the EIA Report with reference to an appropriate geographic scale. For example, a significant effect on a nationally designated site is likely to be of national significance. However, the scale of significance does not necessarily always relate to the importance of an ornithological feature. For example, an effect on a species which is considered of national importance, may not have a significant effect upon its national population.

7.36 For the purposes of assessment, the significance of effects will primarily be expressed within the EIA Report with reference to the regional, national or international scale (as relevant) in line with guidance. The significance of effects at a local scale may also be assessed where sufficient information allows a meaningful assessment.

7.37 In line with the principles of proportionate EIA, embedded mitigation, including avoidance through the design process and application of industry standard good practice, will be considered at the outset of the assessment. Important ornithological feature status will only be assigned where there is still considered to be the potential for significant effects on the identified feature arising from the Proposed Development after the application of embedded mitigation measures.

7.38 In order to assess significance, population information will be provided at regional and national scales, as relevant, where available. For regional estimates, it is proposed that Natural Heritage Zone (NHZ) population estimates are used (Wilson et al., 2015)[40]. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect will be assumed as a precautionary approach. Where uncertainty exists, this will be acknowledged.

7.39 Where the EIA proposes measures to mitigate potentially significant adverse effects on ornithological features, a further assessment of residual effects, taking into account any ornithological mitigation recommended, will be undertaken.

Cumulative Impacts

7.40 The potential for cumulative impacts with other wind farm developments will be assessed in accordance with NatureScot guidance (2012), for any feature with greater than negligible magnitude residual effects following the application of mitigation and compensation proposals. With regard to the spatial extent of the cumulative assessment, NatureScot guidance (SNH, 2012 and SNH, 2018) recommends that cumulative effects should typically be assessed at the relevant Regional NHZ scale, unless there is a reasonable alternative. The Site sits within NHZ19 'Western Southern Uplands & Inner Solway', which covers much of the south-west of Scotland. In this case, the undertaking of a cumulative assessment of potential impacts at the NHZ scale would entail the consideration of a vast number of other windfarm developments and the work required to obtain sufficient data for robust cumulative assessment would be disproportionate to any potential increase in effects associated with the Proposed Development.

7.41 NatureScot guidance (2012) recognises that access to relevant data for other developments may be limited and therefore a meaningful assessment of cumulative effects is not always possible. Given that relevant data for many of the wind farm

[40] Wilson, M.W., Austin, G.E., Gillings S. & Wernham, C.V. (2015) Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number 1504.

developments located within NHZ19 is unlikely to be readily available, the results of any cumulative assessment at the NHZ scale based on incomplete data would not allow any meaningful conclusions to be drawn.

7.42 As such, it is proposed that an alternative species-specific approach will be adopted for the purposes of this assessment, with core foraging ranges of important ornithological features, as per NatureScot guidance (2016a)[41] or best available evidence, used to determine the spatial extent over which the cumulative assessment is undertaken. Therefore, it is proposed that the cumulative assessment for this Proposed Development will encompass the effects of the proposal in-combination with existing windfarm developments (>3 turbines), located within 20km of the Site, either built or under construction; approved developments, awaiting implementation; and, proposals awaiting determination within the planning process with design information in the public domain.

7.43 It is proposed that non-windfarm proposals be excluded from in the cumulative assessment, unless the ECU can refer LUC to specific proposals in close proximity to the development that should be included (following consideration of input from consultees).

Habitat Regulations Appraisal

7.44 The Site is located in the upper core foraging range for greylag goose which is a qualifying feature of the Loch Ken and River Dee Marshes SPA and Ramsar (20 km from the Site, with the core range for greylag geese, 15-20km).

7.45 The Site is predominantly forested and is thus unsuitable for foraging geese, and it is not within any documented feeding sites for geese from the SPA and Ramsar (Mitchell, 2012)[42].

7.46 The VP flight activity surveys recorded four greylag goose flights, all in the breeding season (April and May), and thus representative of resident birds and not birds which are part of the migratory Icelandic population.

7.47 The potential for connectivity between the Site and the Loch Ken and River Dee Marshes SPA and Ramsar has therefore been discounted.

Presentation of Sensitive Information

7.48 Ornithological data considered sensitive (e.g. data pertaining to breeding locations of Schedule 1 species) will be included in a confidential appendix to the EIA Report in line with guidance (NatureScot, 2016b). This will not be made publicly available.

7.49 It will be ensured that sufficient information is presented within the EIA Report to allow an objective and robust assessment of potentially significant adverse impacts upon ornithological features to be carried out.

Potential Significant Effects

7.50 Impacts will be considered during the construction and operational phases of the Proposed Development (the decommissioning phase will not be considered in detail for reasons provided in **Chapter 3** above) and will be assessed on the basis that a clearly defined range of avoidance and standard good practice measures are implemented.

7.51 Potential significant effects could arise during the construction phase of the Proposed Development, through habitat loss, fragmentation or habitat change, or disturbance or loss of nest sites, eggs or dependent young.

7.52 Potential significant effects could arise during the operational phase of the Proposed Development through avian mortality from collision with turbine blades (or other infrastructure associated with the Proposed Development), or displacement caused by avoidance of the operational Proposed Development.

7.53 Where flight activity data justifies it (≥3 'at-risk' flights) Collision Risk Models following the Band Model in accordance with NatureScot guidance (Band et al., 2007[43]; SNH, 2000[44]) will be undertaken to quantify the likelihood of mortality for Target Species.

[41] SNH (2016a) Assessing Connectivity with Special Protection Areas. SNH, Inverness.
[42] Mitchell, C. (2012) Mapping the distribution of feeding pink-footed and Icelandic greylag geese in Scotland. WWT, July 2012.
[43] Band, W., Madders, M. & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M., Janss, G.F.E. and Ferrer, M. (Eds.) Birds and Wind Farms: Risk assessment and Mitigation, pp.259-275. Quercus, Madrid.
[44] SNH (2000) Calculating a theoretical collision risk assuming no avoiding action. SNH, Inverness.

7.54 These sources of impact will be considered throughout the design process for the Proposed Development, and where possible will either be avoided completely through scheme design or will be prevented/minimised via good practice embedded mitigation measures to be included in the Proposed Development from the outset and detailed within the EIA Report.

Potential Effects Scoped into the Assessment

7.55 The assessment will consider the following given their presence identified during baseline ornithology surveys:

- Red kite;
- Goshawk;
- Curlew; and
- Snipe.

7.56 This will likely include collision risk modelling of red kite and goshawk flights, as these are the only Target Species which are likely to meet the criteria of ≥ three flights passing within the 'collision risk zone' at potential collision height.

Potential Effects Scoped out of the Assessment

7.57 It is proposed that the potential for indirect effects upon the ornithological qualifying interests of Loch Ken and River Dee Marshes SPA and Ramsar (the only designated site with qualifying ornithological interest within 20km of the Site) can be scoped out from the assessment by virtue of spatial separation; lack of evidence that the Site (and surrounding areas) support feeding migratory greylag geese; the typical unsuitability of the dominant habitat on-site (forested); and lack of records of greylag goose during baseline ornithology surveys.

7.58 Impacts to common and widespread ornithological species, including woodland and moorland passerines are scoped out of the assessment (in accordance with current guidance; SNH, 2017).

7.59 Baseline information gathering has not identified Proposed Development as having the potential to lead to significant effects on the following ornithological species, given the lack of records during surveys and lack of onsite desk study records:

- Greylag goose;
- Pink-footed goose;
- Whooper swan;
- Goosander;
- Barn owl;
- Black grouse;
- Nightjar;
- All other raptors; and
- All other wetland species.

7.60 These ornithological features are therefore to be scoped out of assessment; consideration will, however, be afforded to the provision of precautionary embedded mitigation, to be included in the CEMP to ensure compliance with the provisions protecting these species in the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) (as amended in Scotland) and the Wildlife and Countryside Act 1981 (as amended in Scotland), as relevant. This will include pre-construction surveys for nesting species so that active nests are protected during construction.

Approach to Mitigation

7.61 The adoption of embedded mitigation measures to avoid or minimise adverse impacts upon ornithological features will be part of the iterative design process for the Proposed Development.

7.62 Full details of the scheme design evolution and embedded mitigation measures in relation to ornithology will be detailed within the EIA Report. This will include the specification of any species-specific working buffers as necessary, and requirement

for the production of a breeding bird protection plan to ensure legislative in accordance with current good practice guidance. Measures including the appointment of an ECoW to oversee the implementation of ornithological protection measures and production a CEMP to be followed will minimise the risk to ornithological features.

7.63 Flight activity and breeding data will also be reviewed to identify any potentially problematic turbines which may result in significant collision risk, and measures to limit increased suitability of the Site to sensitive species (such as hen harrier, merlin and short-eared owl) will be outlined where required, with reference to NatureScot guidance (2017).

7.64 Suitable principles for biodiversity enhancement to be delivered as part of the Proposed Development will be outlined within the EIA Report. The appropriateness and feasibility of principles will be confirmed with NatureScot and relevant consultees over the course of the EIA process, with a view to prescriptive enhancement measures being detailed post-consent within a Habitat Management Plan (HMP).

Questions

Questions for Consultees

Q7.1: Do consultees agree with the range of desk study sources and ornithology surveys considered to inform the design and assessment of the Proposed Development? Including the 'Target Species' considered.

Q7.2: Do consultees agree that the full range of likely effects to be assessed within the EIA Report has been adequately identified and is proportionate to the nature of the Proposed Development?

Q7.3: Are there any other relevant consultees who should be contacted with respect to the ornithology assessment and scope of baseline information gathering?

Q7.4: Do consultees agree with those features that have been scoped out of assessment in respect to ornithology (and the rationale for the decision)?

Q7.5: Do consultees agree with the proposed scope of the cumulative assessment?

Chapter 8
Cultural Heritage

Introduction

8.1 This chapter sets out the proposed approach to the assessment of potential effects on cultural heritage during construction and operation of the Proposed Development.

8.2 In this context, cultural heritage is held to be *"the physical evidence for human activity that connects people with place, linked with the associations we can see, feel and understand"* (Scottish Government, 2014)[45]. 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. The diversity of heritage assets is matched by the diversity of their significance; that is, the way in which they are valued and the measure by which change to them is measured.

Legislation and Policy

8.3 There is a range of relevant national and local historic environment-related legislation and policies applicable to examining the potential effects of the Proposed Development on cultural heritage assets:

- Town and Country Planning (Listed Buildings and Conservation Areas) (Scotland) Act (1997) as amended;
- Ancient Monuments and Archaeological Areas Act (1979) as amended;
- HES (2014) Our Place in Time; and
- HES (2019) Historic Environment Policy for Scotland.

Existing Conditions

Site Context

8.4 The Site lies within a sparsely populated upland landscape of pastoral agriculture, forest and wind energy development. While there is relatively extensive evidence for past settlement and activity along the deeply incised river valleys of the area, there is a comparatively scant settlement record in the uplands. Much of the development area lies within plantation forest, meaning that the archaeological potential of the afforested area is likely to have been significantly compromised through highly invasive ground preparation, drainage and the growth of trees. Few previously recognised non-designated assets lie within the indicative boundary, and those that do relate principally to relatively recent upland pastoralism. However, absence of evidence does not necessarily equate to evidence of absence.

Designated Heritage Assets

8.5 There are no designated assets within the Site.

[45] Scottish Government (2014) Our Place in Time: The Historic Environment Strategy for Scotland. Available online: https://www.gov.scot/publications/place-time-historic-environment-strategy-scotland/

8.6 There are relatively few designated assets within the proposed 10km study area (see further below). An overview of the these is provided below according to the type of asset designation. No World Heritage Sites or Historic Battlefields have been identified.

8.7 All designated heritage assets within the study area have been shown on **Figure 8.1**. This figure also includes the bare earth ZTV based on the turbine tip height. The use of a bare earth ZTV means that actual visibility is likely to be less than initially indicated as no screening has been considered.

8.8 Assets within the 10km study area that intersect with the ZTV have been identified as having theoretical visibility of the Proposed Development. The assets have been scoped in or out of the assessment based on a high-level understanding of their heritage significance (including the contribution made by setting) and the potential interaction with the Proposed Development. Understanding of the latter has been informed by review of the turbine locations within Google Earth and of street view imagery.

8.9 The assets scoped in or out of the assessment will be kept under review as the baseline and project develops. Changes to the nationally important assets scoped in/out of the assessment may result in changes to the proposed visualisations listed in **Table 8.1**. Any changes to the scoping of nationally important assets will be agreed with Historic Environment Scotland (HES) and the appropriate local authority officer.

Scheduled Monuments

8.10 There are 14 scheduled monuments (hereafter SMs) within the 10km study area, all located over 5km from the Site. These SMs include several prehistoric forts and cairns, a Roman fort, two medieval mottes, and a churchyard.

8.11 Seven of the SMs in the 10km study area have been calculated to have theoretical visibility of the Site using a bare earth ZTV. These seven monuments include an Iron Age Hill fort [HES ref: SM6285], three prehistoric cairns [HES ref: SM1043, SM2238 and SM633], a Roman fort [HES ref: SM13711] and two medieval motte's [HES ref: SM699 and SM695].

8.12 Of the assets with theoretical visibility, only Grennan Iron Age hillfort has been identified as being potentially susceptible to setting change that could affect its heritage significance. This is because visibility of the turbines in conjunction with the monument could affect the understanding of its role as a symbol of power/dominance within the landscape. It has therefore been scoped into the assessment.

8.13 Further information on the scoping of the SMs is included in **Appendix B**.

Gardens and Designed Landscapes

8.14 There are two Gardens and Designed Landscapes (hereafter GDLs) within the 10km study area, both located over 5km from the Site. These GDLs are:

- Drumlanrig Castle [HES ref: GDL00143]; and
- Maxwelton (Glencairn Castle) [HES ref: GDL00276].

8.15 Drumlanrig GDL is a particularly important designed landscape focused around the category A 17th century mansion – Drumlanrig Castle. It lies to the east of the Site with some theoretical visibility from the eastern and western parts of the GDL. Maxwelton GDL, a much smaller and less complex estate, lies to the south-east with theoretical visibility from its southern extent. Both of these GDLs have been scoped into the assessment as in-combination views with the Proposed Development could affect their designed (aesthetic) value.

8.16 Further information on the scoping of the GDLs is included in **Appendix B**.

Conservation Areas

8.17 There are two conservation areas (hereafter CAs) within the 10km study area; both located over 5km from the Site. The CAs are:

- Moniaive Conservation Area; and
- Tynron Conservation Area.

8.18 Both CAs lie to the south-east of the Site. Moniaive has widespread theoretical visibility, which needs to be better understood along with any potential effects to its character and appearance as a result of setting change. Visibility within Tynron is limited largely to the western side, where intervening topography and vegetation mean that it should be quite limited and not in combination with the historic core. However, it has been scoped in on a precautionary basis.

8.19 Further information on the scoping of the CAs is included in **Appendix B**.

Listed Buildings

8.20 There are 137 listed buildings within the 10km study area[46]: seven category A, 84 category B and 46 category C. Of these 138 listed buildings, the bare earth ZTV suggests that 46 (recorded under 35 listings) have theoretical visibility of the Development. The 46 listed buildings include three category A buildings, 29 category B and 14 category C. Of the 46 listed buildings with theoretical visibility only three are located within 5km of the development. These three are:

- Caitloch House and Gatepiers, category B [HES ref: LB10338];
- Chanlockfoot Farmhouse and Steading, category B [HES ref: LB17293]; and
- Tererran Bridge over Dalwhat Water, category C [HES ref: LB10319].

8.21 Of the listed buildings with theoretical visibility, three have been scoped into the assessment. The category A Drumlanrig Castle [HES ref: LB3886] has been scoped in on a largely precautionary basis as the suggested visibility is considered unlikely given intervening topography and vegetation. The other listed buildings scoped in are Kilneiss House [HES ref: LB10298] in Moniaive, an arts and crafts House designed by Sir John Burnet for the Scottish landscape artist James Paterson, and the category C Stenhouse [HES ref: LB17219], a small country house with a remnant designed landscape. The assessment will review whether visibility of the Development within the setting of these assets affects their significance, or appreciation of this significance.

8.22 Further information on the scoping of the listed buildings is included in **Appendix B**.

Non-designated Heritage Assets

8.23 Historic Environment Record (HER) data has been requested and will inform the final assessment baseline. In the meantime, Canmore data has been reviewed[47]. This data records the site of a possible undated house within the Site [Canmore ID: 64803], on Croglin Craig. The same record indicates that there are two 17th century tombstones near the site of the house, as well as an undated knocking stone[48] and several sheepfolds. No other assets are recorded within the Site but a 14th-17th century brass pot was recovered from a peat bog at Appin, potentially within or near the Site[49].

8.24 To determine which non-designated assets are susceptible to significant effects as a result of setting change, a scoping exercise will be undertaken along the same lines as that for the designated assets once HER data has been received. This scoping exercise will focus on all non-designated assets out to 1km, regionally significant individual assets to 5km, nationally significant individual assets and regionally significant area assets out to 10km. These distances have been agreed by the Dumfries and Galloway Archaeological Officer in supplying the data.

Design Considerations

8.25 Design iterations will be informed by an understanding of the significance of cultural heritage assets to ensure careful siting of the Development. This will seek to avoid and/or minimise direct effects on cultural heritage assets.

[46] This count is based on the individual number of listed buildings with more than one building per actual listing reference.
[47] Historic Environment Scotland (undated) 'Canmore' online catalogue. Available online: https://www.historicenvironment.scot/learn/learning-resources/canmore/
[48] Exposed bedrock or boulders with a pot-shaped cavity in them used for husking grain up until the 19th century in some rural parts of Scotland.
[49] The Canmore record locates the find c.50m outside the Site but its accuracy is only to 100m, meaning it could have been from within the Site.

Proposed Surveys and Assessment Methodologies

Data Gathering

8.26 In accordance with the Chartered Institute for Archaeologists (CIfA) standard and guidance[50], a desk-based assessment will be conducted to:

- Identify all known designated and non-designated cultural heritage assets sensitive to the Proposed Development;
- To inform consideration of the archaeological potential of the study area;
- To understand the significance of the cultural heritage assets/areas of archaeological potential identified, including any contribution made by setting; and
- To identify potential effects on the significance of the cultural heritage assets.

8.27 The assessment of direct physical change will be limited to assets identified within (or extending into) the Site, while setting effects will be considered in relation to the significance of assets within a 10km study area of the Site that interact with the Development, with consideration of high value assets out to c. 15km from the Site boundary. Setting effects are considered unlikely beyond this distance.

8.28 Sources consulted for the collation of data include:

- Historic Environment Scotland (HES) designated asset GIS/online database data;
- Conservation Areas designations and associated appraisals;
- Canmore (HES National Record of the Historic Environment database);
- Dumfries and Galloway Historic Environment Record (HER) data;
- Ordnance Survey maps (principally 1st and 2nd Editions) and other published historic maps available online, and held in the Map Library of the National Library of Scotland;
- Aerial Photographs – HES National Collection of Aerial Photography (NCAP) holdings (oblique, vertical) and Google Earth;
- LiDAR imagery – from the Scottish Spatial Data website;
- Available reports from other recent archaeological work undertaken in the area;
- The Scottish Palaeoecological Archive Database;
- Local archives, societies and libraries, if recommended by Dumfries and Galloway Council; and
- Dumfries and Galloway Council's archaeological advisors.

8.29 It should be noted that there may be limitations on the access of archives etc., due to the current Covid-19 pandemic.

Field Survey

8.30 A walkover survey will be undertaken of the Site. As per CIfA guidelines, this will enable the assessment of its character, identify visible historic features, and assess possible factors that may affect the survival or condition of known or potential assets. As part of the Site visit, assets within the study area that have been identified as potentially sensitive to significant effects will be visited in order to understand the contribution made by setting to their significance and the way in which the Proposed Development may interact with their setting. A photographic record will be made of the Site visit and a selection of images utilised in the baseline reporting.

[50] CIfA (2014, updated 2020) Standard and guidance for historic environment desk-based assessment.

Table 8.1: Proposed Cultural Heritage Assets Visualisations

VP	Viewpoint Name/Asset	Grid Reference	Distance[51]	Commentary
1	Grennan Iron Age Hillfort scheduled monument [HES ref: SM6285]	TBC	7.3km	The bare earth ZTV suggests that 21-25 turbines from the scoping layout may be visible from and potentially in-combination with the asset, albeit that they will be partially screened by intervening topography. Review of the turbines in Google Earth suggests that only tips would be visible over the hill line of the opposite side of the valley. It is proposed that a wireframe be prepared to better understand the potential visibility in-combination with the asset.
2	Drumlanrig Castle GDL [HES ref: GDL00143]	TBC	7.8km (at its closest)	Theoretical visibility of the Proposed Development is indicated along the western and eastern edges of the GDL with up to 25 turbines from the scoping layout theoretically visible (via bare earth modelling). It is proposed that a photomontage be prepared from the eastern side of the GDL as the potential for in-combination views with the GDL and house are greatest from here. Much of the areas with theoretical visibility lie in woodland; the photomontage will be prepared from a location in open land.
3	Moniaive Conservation Area	TBC	5.5km	The bare earth ZTV suggests that most of the area will have some visibility of the Development, with up to 15 turbines from the scoping layout potentially visible. This visibility increases from east to west across the village (although screening from built development also increases). It is, therefore, proposed that a wireframe be prepared from the western side of the conservation area as this is where the greatest visibility and potential for in-combination effects is likely.
4	Tynron Conservation Area	TBC	6.3km	The bare earth ZTV suggests that there is theoretically visibility of up to 25 of the scoping layout's turbines from the conservation area, with this maximum number being visible only from the Site of the war memorial. This potential visibility is limited to the higher southern and western areas of the conservation area (where there is still much intervening topography and vegetation), the northern edge (beyond the Church and around Kirkland House) theoretically has no visibility. It is proposed that a wireframe visualisation be prepared from the vicinity of the war memorial and adjacent listed road bridge to better understand the extent of change and its effect.
5	Drumlanrig Castle [HES ref: LB3886] – category A listed building	TBC	9.8km	Theoretical visibility of up to 10 of the scoping layout's turbines is suggested by the bare earth ZTV but some screening is provided by intervening topography and vegetation. It is proposed that a wireframe visualisation be prepared to better understand the potential for setting change, if any, and its effect.
6	Kilneiss House [HES ref: LB10298] – category A	TBC	5.8km	Theoretical visibility of up to 15 turbines from the scoping layout is suggested by the bare earth ZTV but some screening is provided by intervening topography and vegetation. A wireframe visualisation will be prepared to understand the extent of potential setting change and its effect.
7	Stenhouse and conservatory [HES ref: LB17219] – category C	TBC	6.3km	The bare earth ZTV suggests that up to 20 turbines from the scoping layout could be visible (albeit these will be screened to some extent by intervening topography and vegetation). As the turbines will stand directly behind (north) of the main elevation in-combination views could affect the ability to appreciate is aesthetic value. A wireframe visualisation is proposed to better understand

[51] Approximate distance to nearest turbine in the Proposed Development scoping layout.

VP	Viewpoint Name/Asset	Grid Reference	Distance[51]	Commentary
				the interaction between the development and asset and the effect of that interaction.

Assessment of Potential Effects

8.31 Once baseline data has been compiled, all heritage assets within the Site and study area will be identified and the scoping 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 either:

- HES's Designation Policy and Selection Guidance (2019)[52], which sets out cultural values that vary according to asset type; or
- The Burra Charter (Australia ICOMOS 2013)[53] values (e.g. aesthetic, historic, scientific or social) which are referenced by the Historic Environment Policy for Scotland (2019).

8.32 The contribution made by setting to that significance will be set out narratively with reference to HES's setting guidance. Scottish Planning Policy (2014) 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"*. 'Setting' is the way the surroundings of an asset or place contribute to how it is understood, appreciated, and experienced in the present landscape. All assets have a setting, but the contribution that this makes to their cultural significance varies in line with the location, form, function and preservation 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.

8.33 Sensitivity ratings to setting change (i.e. high, medium and low) will also be ascribed to each asset based on 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. All heritage assets within the Site will be assumed to be of high sensitivity to direct physical change, unless otherwise stated.

8.34 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.
- Uncertain: Assets of uncertain importance.

8.35 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[54].

8.36 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

[52] Available online: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b
[53] Australia ECOMOS (2013) Burra Charter and Practice Notes. Available online: https://australia.icomos.org/publications/burra-charter-practice-notes/
[54] Indirect physical effects of the loss or preservation of fabric can also occur at any stage of development to assets which lie removed from the Proposed Development. For instance, impacts can include such as increased/decreased erosion or damage to walls from vibration of piling which is likely to be permanent.

changed. The criteria for the assessment of effects will be informed by guidance published in Appendix 1 of HES's EIA Handbook (2018)[55].

8.37 Only assets identified as likely to experience significant effects will be assessed in the main ES chapter. Effects to assets that are not significant in EIA terms will still be fully considered, but instead reported upon in a Technical Appendix.

8.38 An appropriate range of figures and images will be included to support the assessment.

8.39 Where required, mitigation to help avoid, minimise, offset and/or reduce effects will be set out. This will be included in the main chapter and Technical Appendix, as required.

Technical Guidance

8.40 The assessment of effects of the Proposed Development will be carried out in accordance with the principles contained within the following documents:

- IEMA (2021) Principles of Cultural Heritage Impact Assessment;
- HES (2016) 'Managing Change in the Historic Environment Guidance Notes – Setting';
- HES (2019) Designation Policy and Selection Guidance;
- Planning Advice Note 2/2011: Planning and Archaeology;
- SNH & HES (2018) EIA Handbook;
- The Chartered Institute for Archaeologists (2017) 'Code of Conduct'; and
- The Chartered Institute for Archaeologists (2017) 'Standard and guidance for historic environment desk-based assessment'.

Potential Significant Effects

Potential Effects Scoped into the Assessment

8.41 It is proposed that the following direct effects are considered within the EIA Report:

- Physical effects to the significance of cultural heritage assets within the Site, with consideration given to any in the immediate vicinity that may extend into the Site;
- Setting effects to the significance of heritage assets within a 10km study area, with consideration of nationally important assets beyond that distance; and
- Cumulative setting effects will be considered in relation any assets identified as having the potential for inter-effects between the Proposed Development and other developments in the area.

8.42 The potential for indirect effects such as dewatering of archaeological deposits within peat remains under review.

Potential Effects Scoped out of the Assessment

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

- Direct physical effects during operation (since physical effects can only occur during construction);
- Inter-relationship effects between environmental topics (i.e. indirect physical effects on sites or features of national, regional or local cultural heritage value as a consequence of vibration, dewatering or changes in hydrology (since such effects are unlikely, and will definitely not be significant, given the scale and nature of the development); and
- Cumulative physical effects (these are considered unlikely given the nature of the Proposed Development).

[55] Available online: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=6ed33b65-9df1-4a2f-acbb-a8e800a592c0

Approach to Mitigation

8.44 In the first instance the Proposed Development will seek to avoid and minimise effects by design. Where interaction cannot be completely avoided, good practice and additional mitigation measures to prevent, reduce, and/or where possible offset these effects will be proposed.

8.45 Measures which may be adopted include:

- The fencing off or marking out of sites or features of cultural heritage importance in proximity to working areas;
- Implementation of a working protocol should unrecorded archaeological features be discovered; and
- Archaeological evaluation and/or recording in advance of construction activities.

Questions

Questions for Consultees

Q8.1: Have the key concerns relating to cultural heritage been identified correctly?

Q8.2: Do consultees agree with the designated assets scoped into the assessment or should additional assets also be assessed? (If so, please provide a rationale for why these asset(s) should be assessed).

Q8.3: Do consultees agree with the proposed approach to baseline gathering and assessment?

Q8.4: Do consultees agree with the proposed visualisations?

Chapter 9
Noise and Vibration

Introduction

9.1 Noise will be emitted as a result of the Proposed Development during the construction and operational phases. This chapter provides a summary of the noise effects anticipated at each stage of the development and, where appropriate, details of the proposed assessment work.

Existing Conditions

9.2 The Site is within a rural location. There are a number of scattered residential properties around the Site with the closest property being at or just under 1km from turbines within the scoping layout presented in **Figure 3.1**.

9.3 There are a number of operational, consented or proposed wind farm developments to the north and south of the Proposed Development.

Design Considerations

9.4 The wind turbine layout will be designed so that operational noise levels, including cumulative contributions from neighbouring sites, comply with the relevant noise limits at neighbouring noise-sensitive locations based on a representative turbine model.

9.5 The risk of significant effects from construction noise associated with ancillary infrastructure will also be reviewed.

Guidance and Assessment Methodologies

Guidance

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

9.7 PAN1/2011 refers to the 'Onshore Wind Turbines' web based document which in turn states that ETSU-R-97 'The Assessment of Rating of Noise from Windfarms'[56] should be used by Planning Authorities *"to assess and rate noise from wind energy developments until such time that an update is available"*. The web-based document also refers to the Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'[57] (IOA GPG) as a source, which provides *"significant support on technical issues to all users of the ETSU-R-97 method for rating and assessing wind turbine noise, and should be used by all IOA members and those undertaking assessments to ETSU-R-97. The Scottish Government accepts that the guide represents current industry good practice"*.

9.8 PAN1/2011 and the Technical Advice Note accompanying PAN1/2011 provide further advice on construction noise and make reference in particular to British Standard BS5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Noise'[58].

[56] The Working Group on Noise from Wind Turbines, (1996) ETSU-R-97, the Assessment and Rating of Noise from Windfarms, Final Report for the Department of Trade & Industry.
[57] Institute of Acoustics (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.
[58] BS 5228-1:2009 (amended 2014) 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'.

Assessment Methodologies

Construction Noise

9.9 A construction noise assessment will be undertaken in accordance with BS5228-1: 2009+A1:2014. The assessment will consider the temporary noise effects of construction activities on the nearest identified noise sensitive receptors. Specifically, the assessment will consider noise arising from the use of borrow pits, concrete batching, construction compounds and laydown areas, and vehicle movements within and accessing the Site and activities occurring at the base of the turbines.

9.10 Consideration will also be given to the potential impact of construction traffic on sensitive receptors in the area.

Operational Noise

9.11 ETSU-R-97 details a methodology for establishing noise limits for proposed wind farm developments and these limits should not be exceeded. ETSU-R-97 states that noise limits should be set relative to existing background noise levels at the nearest receptors and that these limits should reflect the variation in both turbine source noise and background noise with wind speed. Separate noise limits apply for quiet daytime and for night-time periods. Quiet daytime limits are chosen to protect a property's external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

9.12 ETSU-R-97 recommends that wind farm noise for the quiet daytime periods should be limited to 5dB(A) above the prevailing background or a fixed minimum level within the range 35-40dB $L_{A90,10min}$, whichever is the higher. The precise choice of criterion level within the range 35-40dB(A) depends on a number of factors, including the number of dwellings in the neighbourhood of the wind farm (relatively few dwellings suggest a figure towards the upper end), the effect of noise limits on the number of kWh generated (larger sites tend to suggest a higher figure) and the duration and level of exposure to any noise. These factors will be taken into account when deriving suitable noise limits.

9.13 An exception to the setting of both the quiet daytime and night-time fixed minimum limit occurs where a property occupier has a financial involvement with the Proposed Development. In that case the fixed minimum limit can be increased to 45dB $L_{A90,10min}$ or the prevailing background noise L_{A90} plus 5dB, whichever is the greater for both the quiet daytime and night-time periods.

9.14 A background noise survey may not be required for situations where predicted wind turbine noise levels at the nearest noise sensitive properties is limited to an $L_{A90,10min}$ of 35dB(A) up to wind speeds of 10m/s at 10m above ground level, as the protection of the amenity of those properties can be controlled through a simplified noise condition as detailed in ETSU-R-97. ETSU-R-97 states that *"for single turbines or wind farms with very large separation distances between the turbines and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to an $L_{A90,10min}$ of 35dB(A) up to wind speeds of 10m/s at 10m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary"*.

9.15 The noise assessment for the Proposed Development will be undertaken in three stages:

- Determine the 'Total ETSU-R-97 Noise Limits' which are applicable to the operation of all schemes in the area;
- Undertake cumulative noise predictions to determine whether noise immissions from the Proposed Development at nearby receptors are within 10dB of the total noise immissions at these receptors from the other wind farms/turbines within the area. Where turbine predictions are within 10dB then a cumulative noise assessment will be undertaken to determine whether predictions from all cumulative schemes meet the 'Total ETSU-R-97 Noise Limits'; and
- Derive a set of Site Specific Noise Limits (for the Proposed Development) and undertake predictions to determine whether the Proposed Development can operate within the Site Specific Noise Limits.

9.16 Given the proximity of other consented/proposed (in planning) schemes in the area and the fact that background noise monitoring has already been undertaken at a number of the closest properties, a review will be undertaken of the previously collected datasets to determine whether additional noise monitoring will be required.

9.17 Given the existing noise limits allocated to others schemes in the area, it is proposed that the 'Total ETSU-R-97 Noise Limits' for the assessment will be based on a 40dB noise limit during the daytime period and a 43dB noise limit during the night time period.

9.18 The guidance contained in the IOA GPG will be used to establish suitable Site Specific Noise Limits which fully take account of the proportion of the Total ETSU-R-97 Noise Limits which has been allocated too, and can realistically be used by, existing operational and consented wind farms in the area.

9.19 Detailed consultation will be undertaken with the Council's Environmental Health Department in order to agree the overall assessment methodology.

9.20 The noise assessment will include predictions of likely wind turbine noise levels across a range of wind speeds to demonstrate compliance with the Total ETSU-R-97 and Site Specific Noise Limits. A cumulative noise assessment will also be undertaken in order to consider the consented, operational and proposed wind farms within the vicinity of the Proposed Development. The assessment will be undertaken in accordance with ETSU-R-97 and the IOA GPG.

Potential Significant Effects

Potential Effects Scoped into the Assessment

9.21 The assessment will consider the following potential effects:

- Noise associated with the construction activities and associated traffic (including cumulative impacts with other nearby wind farms);
- Noise during operation of the Proposed Development; and
- Cumulative noise impacts during operation with other nearby wind farms.

Potential Effects Scoped out of the Assessment

Vibration

9.22 Given the nature of construction activities proposed and the relative distances from residential receptors, the risk of ground borne vibration impacting on residential receptors is considered very low, as such it is proposed that a vibration assessment is scoped out.

- Low Frequency Noise – A study, published in 2006 by acoustic consultants Hayes McKenzie on the behalf of the Department of Trade and Industry (DTI), investigated low frequency noise from wind farms. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines.

  In February 2013, the Environmental Protection Authority of South Australia published the results of a study into in infrasound levels near wind farms. This study measured infrasound levels at urban locations and rural locations with wind turbines close by, and rural locations with no wind turbines in the vicinity. It found that infrasound levels near wind farms are comparable to levels away from wind farms in both urban and rural locations. Infrasound levels were also measured during organised shut-downs of the windfarms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

  Bowdler et al., (2009) concluded that *"...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours".*

  More recently during a planning Appeal (PPA-310-2028, Clydeport Hunterston Terminal Facility, approximately 2.5km south-west of Fairlie, 9 Jan 2018), the health impacts related to low frequency noise associated with wind turbines were considered at length by the appointed Reporter (Mr M Croft). The Reporter considered evidence from Health Protection Scotland and the National Health Service. In addition, he also considered low frequency noise surveys undertaken by the Appellant and the Local Authority both of which demonstrated compliance with planning conditions and did not identify any problems attributable to the turbine operations; some periods with highest levels of low frequency noise were recorded when the turbines were not operating.

  The Reporter concluded that:

  – The literature reviews by bodies with very significant responsibilities for the health of local people found insufficient evidence to confirm a causal relationship between wind turbine noise and the type of health complaints cited by some local residents.

- The NHS's assessment is that concerns about health impact are not supported by good quality research.
- Although given the opportunity, the Community Council failed to provide evidence that can properly be set against the general tenor of the scientific evidence.
- It is therefore not considered necessary to carry out specific assessments of low frequency noise and that it should be scoped out.

Amplitude Modulation

9.23 In its simplest form, Amplitude Modulation (AM), by definition, 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 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.

9.24 A study was carried out in 2007 on behalf of the Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford, which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM. The study defined AM as aerodynamic noise from wind turbines with a greater degree of fluctuation than normal at blade passing frequency. Its aims were to ascertain the prevalence of AM on UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required.

9.25 The study concluded that AM had occurred at only a small number (4 of 133) of wind farms in the UK, and only for between 7% and 15% of the time. It also stated that, the causes of AM are not well understood and that prediction of the effect was not currently possible.

9.26 This research was updated in 2013 by an in-depth study undertaken by Renewable UK, which has identified that many of the previously suggested causes of AM have little or no association to the occurrence of AM in practice. The generation of AM 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 AM, and the incidence of AM occurring at any particular site remains low, as identified in the University of Salford study. The report includes a sample planning condition to address AM, however that has not yet been validated or endorsed by UK Government.

9.27 In 2016, the IOA proposed a measurement technique to quantify the level of AM present in any particular sample of windfarm noise. In August 2016 a report written by WSP/Parsons Brinkerhoff was published by the Department of Business, Energy & Industrial Strategy (BEIS, formerly The Department of Energy & Climate Change). The report sought to build on the conclusions of the IOA study in order to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition.

9.28 In November 2017, an article entitled 'A planning condition for wind farms' was published in Vol 42 No 6 of the Acoustics Bulletin magazine. The article was written collaboratively by a number of noise consultants and suggested a noise planning condition which included consideration of AM. The authors noted in the article that *"Whilst local authorities and developers have waited for a planning condition that could be applied to newly consented wind farms, or to those already consented but with a suspensive condition, the report Wind Turbine AM Review (WTAMR) by WSP/Parsons Brinckerhoff for DECC arguably did not provide that. In addition there have been a number of comments on WTAMR that we consider should be addressed"*.

9.29 The article then went on to propose a draft condition but noted that *"This approach is proposed based on the current state of understanding, but may be subject to modification in light of new research and further robust information"* and *"As various people before us have discovered, the derivation of a penalty is not easy. There is not sufficient reliable research to be confident that a penalty system would always provide a fair indication of the impact of AM"*.

9.30 At the time of writing there has been no official response to those recommendations from the IOA Noise Working Group and, as yet, no endorsement from any Scottish Government Minister or Department. The recommendation to impose a planning condition and the associated penalty scheme is at odds with the advice from the IOA GPG which currently states (paragraph 7.2.1) *"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"*.

9.31 At time of writing there is no agreed methodology which can be used to predict the occurrence of AM or an agreed methodology which can be used to determine whether the effects of AM, should it occur, are likely to be significant. On that basis it is considered therefore that amplitude modulation should be scoped out.

Decommissioning

9.32 Finally, it is not intended to separately consider decommissioning of the Proposed Development as potential effects associated with this phase of the development are likely to be less than those occurring during construction and are likely to be of shorter duration. Hence, the construction noise assessment is considered to be the worst case.

Approach to Mitigation

9.33 The applicant is committed to implementing accepted good practice during design and construction of the Proposed Development, thereby ensuring that many potential noise impacts are avoided or reduced. However, should significant noise impacts from construction activities be identified, measures will be proposed to prevent and/or reduce them. Measures which may be utilised include:

- Restricted hours of infrastructure works to avoid sensitive periods;
- The fitting of equipment with appropriate noise control measures (e.g. silencers, mufflers and acoustic hoods);
- The positioning of temporary site compounds as far as practicably possible from neighbouring residential properties; and
- Additional good practice measures as set out in BS 5228:2009+A1:2014.

9.34 Noise emitted during the construction phase will be temporary and short term in nature and can be minimised through careful construction practices. The effective control of these impacts can be achieved by way of a suitable planning condition.

9.35 The installed wind turbines will need to operate within the derived operational noise limits. It is not anticipated that any mitigation will be required but, if necessary, due to unforeseen circumstances, changes to the operational characteristics of the turbines can be made to reduce noise levels for specific circumstances.

Questions

Questions for Consultees

Q9.1: Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the IOA GPG to assess operational noise and BS5228 to assess construction noise?

Q9.2: Can consultees agree that assessment of vibration, low frequency noise, amplitude modulation and decommissioning noise be scoped out of EIA?

Chapter 10
Traffic and Transport

Introduction

10.1 The section covers the predicted transport and access issues that may arise from the construction of the Proposed Development, the significance of these effects and what suitable mitigation can be put in place to avoid, minimise or offset adverse effects.

10.2 The Transport and Access EIA Report chapter will be supported by a Transport Assessment report, Abnormal Load Route Survey and technical figures.

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

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

Existing Conditions

10.4 The Proposed Development will be accessed directly from the public road network using either a purpose-built access junction or reusing an existing forestry or agricultural access junction. Loads will then proceed to the proposed turbine locations using upgraded and new access tracks.

10.5 It is proposed that all vehicular access will use the proposed access route, including Abnormal Indivisible Loads (AIL). A detailed Route Survey Report will support the 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 from King George V Docks in Glasgow to the Site via the strategic trunk road and local road networks.

10.6 Locally sourced material will be used where feasible and traffic will avoid impacting on local communities as far is possible.

Proposed Surveys and Assessment Methodologies

10.7 Baseline traffic count data will be obtained from a new Automatic Traffic Count (ATC) survey located on one or more appropriate locations on the local road network (once the proposed access route is defined).

10.8 Further traffic data for the local road network will be obtained from UK Government Department for Transport (DfT) traffic count data, the Traffic Scotland database or from specifically commissioned traffic surveys. 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.

10.9 Traffic accident data will be obtained from Crashmap UK for the study network to inform the accident review for the immediate road study area. Three years' worth of data will be collated for roads within the study area.

10.10 The main transport impacts will be associated with the movement of general heavy goods vehicles (HGV) traffic travelling to and from the Site during the construction phase of the development.

10.11 The following policy and guidance documents will be used to inform the Transport and Access chapter:

- Transport Assessment Guidance (Transport Scotland, 2012)[59];
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993); and
- Scottish Planning Policy (Scottish Government, 2014).

10.12 The Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on:

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

10.13 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 are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%).
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

10.14 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.

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

10.16 Potentially significant environmental effects will then be assessed where the thresholds defined in **Paragraph 10.13** above are exceeded. Suitable mitigation measures will be proposed, where appropriate.

10.17 Committed development traffic, i.e. those from nearby proposals 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 would not be included.

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

10.19 Each turbine is likely to require between 11 and 14 abnormal loads to deliver the components to site. The components will be delivered on extendable trailers which will then be retracted to the size of a standard HGV for the return journey.

10.20 Detailed swept path analyses will be undertaken for the main constraint points on the route from the port of entry 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.

Potential Significant Effects

10.21 Potential effects arising from the construction of the Proposed Development on road users and residents along the delivery route may include the following:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;

[59] Available online: https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management__dpmtag_ref__17__-_transport_assessment_guidance_final_-_june_2012.pdf

- Fear and intimidation; and
- Accidents and safety.

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

Potential Effects Scoped into the Assessment

10.23 The effects on receptors identified within the study area will be reviewed for the construction phase, with a peak construction period assessment undertaken. This will include a review of the maximum potential impact and therefore it is considered to provide a robust assessment of the effects of construction traffic on the users and nearby residents of the local and trunk road network.

Potential Effects Scoped out of the Assessment

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

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

Approach to Mitigation

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

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

10.27 Additional mitigation will be included should the assessment reveal criteria that are significant following the application of standard mitigation measures.

10.28 Site specific mitigation, 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 in the study area;
- Potential widening of local roads in the vicinity of the Site to allow for AIL and other construction deliveries;
- Provision of a greater number of laybys on local road network to allow for improved access for all road users, if required;
- Design of the Site access junction to ensure that approved access routes are adhered to; and
- Enhanced temporary construction warning and direction signage.

10.29 Details of these measures will be detailed in the Transport Assessment.

Questions

Questions for Consultees

Q10.1: Is the proposed methodology considered acceptable?

Q10.2: Are the methods proposed for obtaining traffic flow data acceptable?

Q10.3: Is the use of Low National Road Traffic Forecasts (NRTF) acceptable for the whole of the study?

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

Chapter 11
Aviation

Introduction

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

Guidance and Legislation

11.2 There are a number of publications relevant to the interaction of wind turbines and aviation, containing guidance and legislation which cover the complete spectrum of aviation activity in the UK as shown below:

- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines, Version 6 (Feb 2016);
- CAP 168 Licensing of Aerodromes, Version 11 (March 2019);
- CAP 670 ATS Safety Requirements, Version 3 (June 2019);
- CAP 774 UK Flight Information Services, Ed 3 (May 2017);
- CAP 738 Safeguarding of Aerodromes, Version 2 (Dec 2006);
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes, Ed 1 (July 2010);
- CAP 493 Manual of Air Traffic Services Part 1, Ed 7.0 (2017);
- CAP 660 Parachuting, Ed 5 (March 2020);
- Military Aviation Authority Regulatory Article 2330 (Low Flying);
- UK Military Aeronautical Information Publication (MIL AIP);
- UK Aeronautical Information Publications (AIP);
- CAA 1:250,000 and 1:500,000 VFR Charts; and
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level (Dated 01/06/17).

Study Area

11.3 The assessment of effects of the proposed turbines will be based upon the guidance laid down in CAA Publication CAP 764 'Policy and Guidelines on Wind Turbines' Version 6, Dated February 2016. Consultation criteria for aviation stakeholders are defined in **Chapter 4** of this publication. They are based upon distance radii from various aviation assets/facilities, which consequently inform the study area for the purposes of a wind farm EIA. The distances include:

- Airfield with a surveillance radar – 30 km;
- Non radar licensed aerodrome with a runway of more than 1,100 metres – 17 km;
- Non radar licensed aerodrome with a runway of less than 1,100 metres – 5 km;
- Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);

- Unlicensed aerodromes with runways of more than 800 metres – 4km;
- Unlicensed aerodromes with runways of less than 800 metres – 3km;
- Gliding sites – 10km; and
- Other aviation activity such as parachute sites and microlight sites within 3km – in such instances developers are referred to appropriate organisations.

11.4 In line with CAP 764, these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders and will be reported upon in the EIA Report. For example, in the case of Glasgow and Edinburgh Airports they have stated that they wish to be consulted in relation to wind farms out to 40km.

11.5 It is necessary to take into account the aviation and air defence activities of the Ministry of Defence (MOD) as safeguarded by the Defence Infrastructure Organisation (DIO). The types of issues that will be addressed in the EIA Report include:

- Ministry of Defence Airfields, both radar and non-radar equipped;
- Ministry of Defence Air Defence Radars;
- Ministry of Defence Meteorological Radars; and
- Military Low Flying.

11.6 In addition, the assessment will take into account the possible effects of wind turbines upon the National Air Traffic Services En Route Ltd (NERL) communications, navigation and surveillance (CNS) systems – a network of primary and secondary radars and navigation facilities around the country.

11.7 As well as examining the technical impact of wind turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine, whether the Proposed Development will breach obstacle clearance criteria. This will also be reported on in the EIA Report, but initial surveys show there are no physical safeguarding issues associated with this proposal.

Radar Modelling Methodology

11.8 The radar calculation results shown in this report have been produced using specialist propagation prediction software (Rview Version 5). Developed over a number of years, it has been designed and refined specifically for the task. RView uses a comprehensive systems database which incorporates the safeguarding criteria for a wide range of radar and radio navigation systems. RView models terrain using the Ordnance Survey (OS) Terrain 50 digital terrain model, which has a post spacing of 50 metres and has a root mean square (RMS) error of 4 metres. The results are verified using the Shuttle Radar Topography Mission (SRTM) dataset, a separate smoothed digital terrain model with data spacing of 3 arc seconds. By using two separate and independently generated digital terrain models, anomalies are identified and consistent results assured. Rview models the refractive effects of the atmosphere on radio waves and the First Fresnel Zone. A feature of RView is that as well as performing calculations in the manner believed to be most appropriate, it also allows comparison with results from simpler models. For example, RView can perform calculations using the true Earth Radius at the midpoint between the radar and the wind turbine or the simplified 4/3 Earth Radius model. If needed, Rview is also capable of modelling a range of atmospheric refractive conditions. RView models the trajectory of radar signals at different elevations enabling modelling of both volume surveillance and pencil beam radars, as well as the effects of angular sterilisation as applied, for example, in Met Office radars.

Existing Conditions and Proposed EIA Report Scope

11.9 The Proposed Development is located 45km to the south-east of Glasgow Prestwick Airport (GPA) and 74km to the south of Glasgow International Airport. It is in a location that is relatively remote from significant aviation facilities as shown in **Figure 11.1**. The site is located under unregulated Class G airspace up to 5500ft and above that is the Scottish Terminal Area (TMA), Class D Regulated Airspace used to enable the sequencing and separation of aircraft inbound and outbound from the three Scottish airports of GPA, Glasgow and Edinburgh. In military terms, the Site is well to the north of the RAF Spadeadam Electronic Warfare Training Facility, but in an area designated for tactical low flying.

Licensed Aerodromes

11.10 An initial review undertaken by Wind Power Aviation Consultants (WPAC) using the above criteria shows that there are no civil licensed aerodromes within consultation distance, however Glasgow Prestwick Airport is 45km to the north-west and are routinely consulted about wind farm proposals in the region. Initial radar line of sight (RLOS) modelling has been undertaken against the Primary Surveillance Radar (PSR) currently in service at GPA with the results reported in **Table 11.1** below. Radar modelling has also been undertaken against the Terma Scanter 4002 also located at GPA and used for wind farm mitigation. The results are at **Table 11.2**.

Table 11.1: Glasgow Prestwick PSR Results (metres AGL)

Turbine	RLOS	Turbine	RLOS	Turbine	RLOS
1	301.9	10	245.5	19	149.3
2	189.1	11	319	20	238.1
3	178	12	296.5	21	411.6
4	251.4	13	416	22	383.5
5	311.9	14	342.8	23	337.9
6	207.2	15	460.5	24	439
7	182	16	454.9	25	366.1
8	275.4	17	436.3		
9	258.8	18	428.3		

Table 11.2: Glasgow Prestwick Terma REsults (metres AGL)

Turbine	RLOS	Turbine	RLOS	Turbine	RLOS
1	292	10	243.4	19	140.5
2	180.3	11	314.2	20	235.6
3	176	12	291.1	21	411.9
4	248.4	13	412.8	22	383.2
5	302.4	14	339.5	23	338.7
6	204.5	15	464.3	24	437.2
7	182.4	16	450.9	25	365.1
8	270	17	429.5		
9	248.9	18	425.3		

11.11 Assuming a turbine tip height of 230 metres, four out of twenty five of the turbines included within the scoping layout may be visible to the PSR at a distance of 45km. As previously stated, this is beyond the usual consultation distance, however GPA will be consulted by the applicant once the Site layout is finalised to confirm the results and to discuss any mitigation that may be required.

11.12 GPA will almost certainly also require an independent check of the Instrument Flight Procedures (IFP) to confirm that the Proposed Development does not impinge upon the Minimum Obstacle Clearances (MOC) for any of the published or planned procedures. GPA will be consulted to confirm their requirement for the check, which is routinely undertaken by NATS on behalf of the airport.

11.13 The results of the consultation with GPA will be reported in the EIA Report.

11.14 There are no other licensed aerodromes within consultation distance, Glasgow and Edinburgh International Airports are routinely consulted in relation to wind farm applications in this region, however at a distance of 74km and 86km respectively from the Proposed Development, consultation is not required. Initial radar modelling has also confirmed that the turbines will be screened from the radars by terrain. Glasgow and Edinburgh Airports can therefore be scoped out of the EIA Report.

Unlicensed Aerodromes

11.15 There are no unlicensed aerodromes marked on the aviation charts or known within consultation distance. As such, this issue can be scoped out of the EIA Report.

Ministry of Defence

Military Air Traffic Control

11.16 There are no military airfields in the region, however, the RAF Spadeadam Electronic Warfare Training Facility, 80km to the east, has two ATC radars, one at Deadwater Fell and one at Berryhill. Initial radar modelling has been undertaken against both radars. The results for Deadwater Fell are shown in **Table 11.3**. The results for Berryhill show there is no low level coverage below 300 metres AGL across the Site.

Table 11.3: RAF Spadeadam Deadwater Fell Radar REsults (metres AGL)

Turbine	RLOS	Turbine	RLOS	Turbine	RLOS
1	174.2	10	301.9	19	259.8
2	252	11	279.6	20	318.4
3	264.1	12	173.3	21	335.1
4	152.6	13	227.8	22	273.5
5	163.2	14	339.3	23	184.6
6	233.1	15	351.8	24	275.2
7	289.7	16	299.7	25	371.8
8	143.1	17	257.2		
9	189.8	18	260.9		

11.17 The results show that six of the turbines in the scoping layout have the potential to be visible to the Deadwater Fell radar. It is very unlikely that the MOD would wish to object as the location is so far to the west of the Spadeadam operating area, however, MOD DIO will be consulted again once the layout is finalised and their response reported upon in the EIA Report.

MOD Air Defence Radar

11.18 The closest air defence radar is located at RRH Brizlee Wood, near Alnwick. Radar modelling shows that there is no radar line of sight below 500 metres AGL and there will be no MOD air defence radar objection. This will be confirmed through the MOD response to scoping and reported in the EIA Report.

MOD Low Flying

11.19 The Proposed Development is located in Low Flying Area (LFA) 20(T), which is mainly an MOD Red Area. However, under an arrangement made several years ago between the MOD and the wind farm industry, certain areas were turned 'Blue' to reflect flying routes and the existence of operating wind farms and other constraints. The Appin site is located within one of these 'Blue' areas and a low flying objection is therefore unlikely. The MOD will require IR lighting which will be in addition to any CAA lighting requirements. Although an MOD low flying objection is very unlikely, this will be confirmed through the MOD response to scoping and reported in the EIA report.

NATS En Route Ltd (NERL)

11.20 An initial assessment has been conducted to determine any effect of the Proposed Development on NERL communications, navigation and surveillance infrastructure. The closest radars in the system are at Lowther Hill and Great Dun Fell. Initial radar modelling shows that the turbines will be visible to both radars. NERL will be consulted to confirm this result and to explore mitigation options; the outcome will be reported in the EIA Report.

Met Office Radars

11.21 The Met Office safeguards its network of radars using a European methodology known as OPERA. In general they will object to any turbine within 5km in line of sight and will examine the impact of any turbines within 20km. Where a site is within 20km, 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 the following:

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

11.22 In this case the closest Met Office radar is at Holehead, over 90km to the north. There will be no Met Office radar objection to this proposal and consultation is not required. This issue can be scoped out of the EIA Report.

Aviation Obstruction Lighting

11.23 A wind farm with tip heights in excess of 150 metres will 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 on in the EIA Report within a Technical Appendix of the Aviation chapter to describe the effect of aviation lighting on the environment and to inform the Landscape and Visual Impact Assessment. It will also articulate the mitigation techniques available, taking into account the extant legislation and guidance. 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.

Questions

Questions for Consultees

Q11.1: Does the proposed method for consultation with aviation stakeholders meet the requirements of the ECU?

Chapter 12
Socio-Economics

Introduction

12.1 This chapter sets out the proposed approach to the assessment of potential socio-economic effects during construction and operation of the Proposed Development. The assessment will consider the likely impacts of the proposal on the socio-economic profile of the area, including short-term job opportunities that may arise during construction. This will involve the identification of the existing socio-economic, tourism and recreation conditions for the Site and surrounding area, and consideration of potential direct and indirect effects of the Proposed Development on employment and economic benefits (including community benefit), recreation and tourism activity, through both quantitative and qualitative assessment.

Existing Conditions

12.2 The Study Area used for the identification and evaluation of baseline conditions, and of potential socio-economic impacts, is defined as the Dumfries and Galloway local authority area.

12.3 Visitor attractions nearby include Drumlanrig Castle and Glencairn Castle, both located within 10km of the Site to the east and south-east respectively, as well as local hills. The latter include the Galloway Hills, popular amongst hill walkers. There are a number of walking and recreational routes in the Site's surroundings including the Southern Upland Way, located approximately 1km west of the Site, as well as a network of core paths that are primarily clustered around the local communities and settlements as well as local hills. Core Path No: 51, Benbuie from Troston Hill, is present within the Site and enters from the north, following the Site boundary for approximately 1.9km before terminating in the east. The immediate context of the Site features a number of Andy Goldsworthy's 'Striding Arch' sculptures which form landmarks for users of local walking routes.

Design Considerations

12.4 The LVIA contribution to the design process for the Proposed Development will involve consideration of potential effects at viewpoints and along designated routes that are considered important for recreation and tourism.

Proposed Surveys and Assessment Methodologies

12.5 There is no established guidance concerning how to conduct a socio-economic assessment as part of the EIA process. Consistent with generally accepted good practice, however, it is proposed that the assessment of the Proposed Development in this case uses desk-based information sources, supplemented by consultation with local stakeholders, to allow an assessment of the likely scale of effects informed by professional judgement.

12.6 Cross-reference would be made to other EIA Report chapters so as to consider potential effects on recreational assets and other leisure and tourism attractions in the vicinity, for example due to visual impact, traffic, and noise.

Potential Significant Effects

12.7 The socio-economic impacts of wind farm developments primarily relate to job creation, use of local services and income spent in the locality of a project. These impacts can result in both short and long term direct benefits to surrounding local communities.

Potential Effects Scoped into the Assessment

12.8 The EIA will consider the effects of the Proposed Development on employment and the economy. This will include the employment opportunities for local suppliers with relevant construction and maintenance experience during the construction and

operational phases of the Proposed Development. The EIA Report will focus on short and long-term employment opportunities and wider input from the Proposed Development into the local economy (expenditure in shops/local services etc.).

12.9 Potential effects upon tourism and recreation would be considered, as would potential effects on land management practices.

Potential Effects Scoped out of the Assessment

12.10 The assessment is to be restricted to the effects referenced in **paragraphs 12.8-12.9** above.

Approach to Mitigation

12.11 The applicant is committed to implementing accepted good practice measures during construction and operation, thereby ensuring that many potential adverse social and economic effects can be avoided or reduced.

12.12 Possible mitigation measures may include the following:

- The programming of the transportation of abnormal loads wherever practicable to avoid peak visitor, or other busy, periods so as to mitigate the effect of the Proposed Development on particularly sensitive locations, tourist/visitor viewpoints, and road corridors; and
- Local sourcing of construction materials where possible to reduce the import and export of materials to and from the Site, limiting traffic movements on the surrounding road network and hence minimising related adverse effects upon visitors and locals.

12.13 It is considered that there are opportunities to enhance positive effects resulting from the Proposed Development, including:

- Local promotion of contract and supply chain opportunities during construction and operation to maximise the use of local business and labour;
- Skills development and training programmes to increase local take up of training, apprenticeship and employment opportunities associated with the Proposed Development;
- Establishing effective linkages with local job centres, employability programmes and partners; and
- Promotion of the wider area and its opportunities as part of the marketing of the Proposed Development.

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

- Dumfries and Galloway Council (Access Team);
- Visit Scotland (as national tourism lead body);
- The Scottish Rights of Way and Access Society (ScotWays);
- Mountaineering Scotland; and
- The John Muir Trust.

Questions

Questions for Consultees

Q12.1: Are there any other relevant consultees who should be consulted with respect to the assessment of the Proposed Development's socioeconomic effects?

Chapter 13
Other Issues

Introduction

13.1 It is proposed that a single EIA Report chapter will be prepared to draw together the assessments of the Proposed Development on other topics that are not dealt with within the other technical chapters of the EIA Report, or alternatively, to explain why these topics have been scoped out.

13.2 It is anticipated that this chapter would include discussion of the following issues:

- Communications and Telecommunications;
- Shadow Flicker;
- Climate Change including Carbon Balance;
- Population and Human Health (including dust); and
- Major Accidents and Disasters.

13.3 Predicted effects for these topics will be determined through a standard method of assessment based on professional judgement. Where a 'significant effect' is identified, this will be considered as significant in the context of the EIA regulations.

Communications and Telecommunications

13.4 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. Where possible, any potential effects on radio-communication links and television will be mitigated at the turbine layout design stage by the use of exclusion zones around any link paths. Alternative options (in particular link re-routing) are available to mitigate impacts upon communications links where these cannot be avoided by turbine siting.

13.5 The Office of Communications (Ofcom) is responsible for the licensing of two-way radio transmitters and holds a register of most microwave links. However, because not all microwave links are published, system operators will be individually consulted on the Proposed Development's potential to cause electromagnetic interference. In the event that no effects upon communications infrastructure are identified via this consultation process, then effects upon communications links will be subject to brief descriptive treatment in the EIA Report but scoped out of detailed assessment. If consultation identifies the potential for interference with communications links that cannot be addressed via re-design of the Proposed Development, then alternative mitigation will be explored and proposed or available mitigation measures described within the EIA Report. Effects that will result in material compromise to the operations of communications infrastructure and that cannot feasibly be mitigated will be treated as significant; all other effects will be treated as non-significant.

Shadow Flicker

13.6 Shadow flicker is a phenomenon where, under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off. It only occurs inside buildings where the flicker appears through a narrow window opening.

13.7 A shadow flicker assessment is generally required if any properties lie within 10x rotor diameter of the wind farm. This is in line with Scottish Government online renewables planning advice on 'onshore wind turbines' which states that *"Where*

separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), 'shadow flicker' should not be a problem".

13.8 In the event that turbines are proposed within 10x rotor diameter of a property, the potential for effects from shadow flicker to arise will be considered.

Climate Change, including Carbon Balance

13.9 By its very nature, the Proposed Development will reduce demand for fossil fuel electricity generation and therefore contribute to the Scottish Government's carbon reduction targets.

13.10 A carbon balance assessment for the Proposed Development will be undertaken using Scottish Government guidance produced by Aberdeen University and the Macaulay Land Use Research Institute and the latest version of the carbon calculator spreadsheet produced by the Scottish Government (currently version 1.6.1).

13.11 The main aims of the calculation are: to quantify sources of carbon emissions associated with the Proposed Development (i.e. from construction, operation and transportation of materials, as well as loss of peat); to quantify the carbon emissions which will be saved by operating the Proposed Development; and to calculate the length of time for the project to become a 'net avoider', rather than a 'net emitter' of carbon dioxide emissions.

13.12 With respect to climate adaptation, consideration will be given to the resilience of the wind farm to projected climate change and to the likely consequences of climate change for the baseline conditions/assessment findings reported elsewhere in the EIA Report, and the resilience of proposed mitigation measures to any projected changes. The latest climate change projections (UKCP18)[60] will be used, which allow climate change to be projected at the regional level; in this case, south-west Scotland.

Population and Human Health, including Dust

13.13 An assessment of potential health effects will be undertaken in the context of noise and shadow flicker where scoped into the EIA.

13.14 The health effects of dust emissions of construction activities on nearby receptors will also be considered during the EIA process. 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 200m of construction activities should be identified and mitigation measures to reduce dust effects be applied. As such, all receptors within 200m of potential dust sources will be considered as potential receptors. Particular attention will be paid to any vulnerable populations or individuals who could be susceptible to potential health effects. Where no significant effects are likely, they will be scoped out of the EIA Report.

Major Accidents and Disasters

13.15 The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events, and peat slide risk will be covered fully in Chapter 6: Hydrology, Hydrogeology and Peat of the EIA Report. The construction and operation of the Proposed Development would also be managed within the requirements of a number of health and safety related Regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974.

13.16 As the 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.

[60] Met Office (undated) UK Climate Projections (UKCP). Available online: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp

Chapter 14
Forestry

Introduction

14.1 In the UK there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, such deforestation is dealt with under the Scottish Government's Control of Woodland Removal Policy (Forestry Commission Scotland, 2009)[61]. The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. It will be essential that the Proposed Development addresses and satisfies the requirements of the Policy.

14.2 The Proposed Development is located within an area of extensive commercial forestry. Commercial forests are dynamic and constantly changing through, for example, landowner activities; market forces; natural events, such as windblow or pest and diseases; or developments. The forestry assessment will be a factual assessment describing the changes to the physical forest structure resulting from the incorporation of the Proposed Development into the forest, in particular the loss of woodland area. This will be included as an appendix to Chapter 3 of the EIA Report (Project and Site Description). Other chapters within the EIA Report will identify the sensitive receptors relevant to their disciplines and report on the effects of the Proposed Development due to the forestry proposals.

14.3 A key issue will be the integration of the Proposed Development into the forest structure to minimise the loss of woodland area and to prevent fragmentation of the remaining forestry crops. Forest design and the effect of the Proposed Development on it, is an important part of the overall design process.

Existing Conditions

14.4 The forestry baseline will describe the crops existing at time of preparation of the EIA Report. This will include current species; planting year; any felling and replanting plans; and other relevant woodland information. The baseline will be compiled from a desk-based assessment and field surveys. The desk-based assessment will include landowner crop databases; the Native Woodland Survey of Scotland (NWSS)[62]; the National Forest Inventory (Forestry Commission Scotland, 2018)[63]; aerial photography; Scottish Forestry (SF) publicly available databases; and current Policy, Legislation and Guidance.

14.5 The field survey will consist of a site walkover to verify and update baseline data as necessary; assessment of the crops with respect to integration of the development infrastructure; and identification of any opportunities within the forestry for on-site compensatory planting, where required.

14.6 The forestry consists of a single block of commercial forestry under one ownership. It is in the production phase, with ongoing felling and replanting as part of a Long Term Forest Plan (LTFP) approved by Forestry Commission Scotland in 2015. Appin is a productive, primarily coniferous forest originally planted between 1971 and 1977 and has been actively managed since establishment. Commencement of restructuring of what was essentially an even-aged monoculture took place during the previous 10 year LTFP.

14.7 The primary management objective is stated in the LTFP as *"to maximise revenue from the sustainable production of timber while meeting the UK Forestry Standard and UKWAS Standard for woodland management"*.

14.8 There are a range of secondary management objectives covering a number of topics and issues.

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[61] Forestry Commission Scotland (2009) The Scottish Government's Policy on the Control of Woodland Removal. Forestry Commission, Edinburgh.
[62] Forestry Commission Scotland (2013) The Native Woodland survey of Scotland. Available online: https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18 [accessed on 30 June 2021]
[63] Forestry Commission Scotland (2018) The National Forest Inventory Woodland Scotland. Available online: https://data-forestry.opendata.arcgis.com/datasets/b71da2b45dde4d0595b6270a87f67ea9_0 [accessed on 30 June 2021]

14.9 An initial desk-based assessment has identified that there are two areas recorded in the Ancient Woodland Inventory (AWI) Scotland[64] within the commercial forests, towards the east of the Site. These are classed as 'Other' woodland on Roy's map of the 1750's. It was noted in the LTFP that woodland cover was not shown on the 1st Edition Ordnance Survey Map, or on subsequent maps, although a few small shelterbelts are shown on the 2nd Edition. It was further noted there are no signs of historic woodland cover on the ground.

14.10 The desk-based assessment further identified small areas of native woodland were recorded in the NWSS within the commercial forests, although none of these were recorded as ancient or other woodland in the AWI. This native woodland is primarily young woodlands established as part of the forest restructuring.

Legislation, Policy and Guidance

14.11 The Proposed Development forestry proposals will be prepared in accordance with current policies, guidance and best practice, including, but not limited to:

- Forestry Commission (2017) The UK Forestry Standard: The Government's Approach to Sustainable Forestry, Forestry Commission, Edinburgh;
- Forestry Commission Scotland (2009) The Scottish Government's Policy on Control of Woodland Removal, Edinburgh;
- Forestry Commission Scotland (2013) The Native Woodland survey of Scotland;
- Forestry Commission Scotland (2018) The National Forest Inventory Woodland Scotland;
- Forestry Commission Scotland (2019) Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal;
- SEPA (2017) SEPA Guidance Notes WST-G-027 'Management of Forestry Waste';
- SEPA (2014) LUPS-GU27 'Use of Trees Cleared to Facilitate Development of Afforested Land';
- The Scottish Government (2016) A Land Use Strategy for Scotland, Edinburgh;
- The Scottish Government (2018) The Forestry and Land Management (Scotland) Act 2018, Edinburgh;
- The Scottish Government (2019) Scotland's Forestry Strategy 2019 -2029, Edinburgh; and
- UKWAS (2018) The UK Woodland Assurance Standard 4th Edition, UKWAS, Edinburgh.

Proposed Scope of Assessment

14.12 The Forestry Study Area will be limited to the forestry within the Site boundary and any forestry areas that may be affected by the access route to site (once a preferred route is known). A Proposed Development Forest Plan will be prepared. This will include a felling plan to show which forestry is to be felled, and when, for the construction and operation of the Proposed Development. It will further include a restocking plan showing any areas which are to be replanted and with which species, and which areas are to be left unplanted for the Proposed Development.

14.13 The changes to the woodland structure will be analysed and described including changes to woodland composition and the felling and restocking plans. The resulting changes to the woodland structure will be assessed for compliance against the UKFS and the requirement for compensation planting to mitigate against any woodland loss, as per the methodology outlined in the Control of Woodland Removal Policy Implementation Guidance (Forestry Commission Scotland, 2019)[65].

14.14 There is potential for changes to the forest structure resulting from the Proposed Development, with consequential implications for the wider felling and restocking plans across the remaining parts of the forestry. It is anticipated that areas of

[64] Scottish Natural Heritage (2010) Ancient Woodland Inventory Scotland. Available online: https://map.environment.gov.scot/sewebmap/ [accessed on 26 February 2021]
[65] Forestry Commission Scotland (2019) Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal. Available online: https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance/viewdocument [accessed on 30 June 2021]

forestry will require to be felled for the construction and operation of the Proposed Development, including for access tracks, wind turbine locations and other infrastructure, which may result in a loss of woodland area.

14.15 The changes to the forestry for a particular development are regarded as site specific and it is considered there are no cumulative on-site forestry issues to be addressed, therefore cumulative forestry effects are scoped out of the EIA Report.

Potential Mitigation

14.16 Measures to avoid or mitigate potential impacts upon the forestry will, as far as practicable, be embedded in the design of the Proposed Development through consideration of the siting of the Proposed Development infrastructure; and by using existing access tracks and forest roads where possible. Woodland loss would be minimised by keyholing infrastructure into the felling and restocking plans.

14.17 Potential forms of mitigation may include a redesign of the existing forest structures including, for example, changes to the felling programme; the use of designed open spaces; use of alternative species and woodland types; or the provision of compensation planting on or off-site.

Consultation Proposals

14.18 The main consultee on forestry matters is Scottish Forestry (SF), South Scotland Conservancy. SF will be consulted to ensure that the proposed changes to the woodlands address the requirements of the Scottish Government's Control of Woodland Removal Policy and other relevant guidance. In addition, there may be interrelated issues raised by other consultees and this will be clearly set out in the EIA Report.

Chapter 15
Topics to be Scoped Out of the EIA Report

15.1 Table 15.1 below provides a summary of the environmental topics to be scoped in and out of the EIA.

Table 15.1: Topics Scoped In and Out of the EIA Report

Topic	Scoped In	Scoped Out
Planning and Policy	Each topic chapter will identify the legislation and guidance that the assessment has referenced.	■ Plans and Policy Assessment. (A standalone Planning Statement will be provided in support of the application.)
Landscape and Visual	Based on the baseline conditions, it is proposed that the following receptors are scoped into the assessment: ■ Upland Glens, Foothills and Southern Uplands with Forest LCTs and other LCTs within a 20km radius (refer to **Table 4.1**) upon which there may be potential for significant landscape effects; ■ Designated landscapes (refer to **Table 4.2**) where there may be a potential for the Proposed Development to affect the special qualities of these landscapes; ■ Residential receptors living nearby, including residents of the Shinnel Water and Dalwhat Water valleys; ■ Users of key routes throughout the Study Area, including the A76 (and Dumfries to Kilmarnock railway line), A702 and A713; and ■ Recreational receptors e.g. those at recognised attractions (including the series of Striding Arch sculptures); those at popular hills tops; and those on recognised walking routes including the SUW and Core Path network. In addition, potential cumulative landscape and visual effects arising through combined, successive and/or sequential interactions with other existing and proposed wind farms will be included in the assessment.	Based on the baseline conditions recorded and distance from the Site, it is proposed that the following are scoped out: ■ Landscape character areas with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant effects on landscape character is limited; ■ Landscape designations with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant effects on the special qualities is limited; ■ Effects on Wild Land; ■ Routes and settlements with limited theoretical visibility and/or beyond 20km from the Site, where the potential for significant visual and sequential effects is limited; and ■ Landscape and visual receptors in the cumulative LVIA where the potential for significant cumulative landscape and visual effects is limited. If the design changes substantively and further effects can be justifiably scoped out, this will be agreed through further consultation.
Hydrology, Hydrogeology and Peat	■ Pollution of surface water, including private drinking water supplies caused by releases of sediment to watercourses from excavated/stockpiled material during construction, or because of stream crossings or works near streams; ■ Pollution of surface water and groundwater, including drinking water supplies, through operation of machinery (e.g. spillage of fuels, oils etc.) during site preparation and construction;	

Topic	Scoped In	Scoped Out
	■ Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk during construction and operation; and ■ Effects on peat (including potential peat instability).	
Ecology	The following ecological features and Protected Species scoped in include: ■ Ecological valuable habitats (i.e. Annex 1 habitats); ■ Bats; ■ Otter; and ■ Pine marten.	The following Designated Sites are scoped out of the ecological assessment: ■ Upper Nithsdale Woods SAC; ■ Stenhouse Wood SSSI; ■ Chanlockfoot SSSI; ■ Tynron Juniper Wood SAC; and ■ Tynron Juniper Wood SSSI. Other ecological features and Protected Species scoped out include: ■ Common and widespread habitats of low sensitivity and/or conservation interest, such as bracken, plantation forestry, and some grassland habitats; ■ Wildcat; ■ Water vole; ■ Red squirrel; ■ Badger; ■ Invertebrates; or ■ Effects on habitats and species (excluding bats) during operation. Although these ecological features are scoped out of assessment, consideration will, however, be afforded to the provision of precautionary embedded mitigation to be included in the CEMP and Operational Management Plans.
Ornithology	The assessment will consider the following given their presence identified during baseline ornithology surveys: ■ Red kite;	Baseline information gathering has not identified Proposed Development as having the potential to lead to significant effects on the following ornithological species, given the lack of records during surveys and lack of onsite desk study records:

Topic	Scoped In	Scoped Out
	■ Goshawk; ■ Curlew; and ■ Snipe. This will likely include collision risk modelling of red kite and goshawk flights, as these are the only Target Species which are likely to meet the criteria ≥ three flights passing within the 'collision risk zone' at potential collision height.	■ Greylag goose; ■ Pink-footed goose; ■ Whooper swan; ■ Goosander; ■ Barn owl; ■ Black grouse; ■ Nightjar; ■ All other raptors; and ■ All other wetland species. These ornithological features are therefore to be scoped out of assessment; consideration will, however, be afforded to the provision of precautionary embedded mitigation, to be included in the CEMP.
Cultural Heritage	It is proposed that the following direct effects are considered within the EIA Report: ■ Physical effects to the significance of cultural heritage assets within the Site, with consideration given to any in the immediate vicinity that may extend into the Site; ■ Setting effects to the significance of heritage assets within a 10km study area, with consideration of nationally important assets beyond that distance; ■ Cumulative setting effects will be considered in relation any assets identified as having the potential for inter-effects between the Development and other developments in the area; and ■ The potential for indirect effects such as dewatering of archaeological deposits within peat remains under review.	Based on baseline conditions, theoretical visibility and distance from the Site, it is proposed that the following are scoped out: ■ Direct physical effects during operation (since physical effects can only occur during construction); ■ Inter-relationship effects between environmental topics (i.e. indirect physical effects on sites or features of national, regional or local cultural heritage value as a consequence of vibration, dewatering or changes in hydrology (since such effects are unlikely, and will definitely not be significant, given the scale and nature of the development)); and ■ Cumulative physical effects (these are considered unlikely given the nature of the scheme).
Noise	■ Noise during operation of the Proposed Development;	■ Vibration resulting from operation of the wind farm;

Topic	Scoped In	Scoped Out
	■ Cumulative noise impacts during operation with other nearby wind farms; and ■ Noise and vibration associated with the construction activities and associated traffic (including cumulative noise impacts with other nearby wind farms) and blasting activities.	■ Noise associated with the operation of the substation and routine maintenance visits and operational traffic; and ■ Infrasound and low frequency noise.
Traffic and Transport	■ The temporary change in traffic flows and the resultant, temporary effects on the study network receptors during the construction phase; and ■ Works to existing infrastructure to facilitate the delivery of abnormal loads. The consideration of appropriate and practical mitigation measures to offset any temporary effects.	
Aviation	■ Consultation with relevant aviation consultees to gather updated baseline information to assess operational effects on aviation and telecommunication. Effects of the Proposed Development on: ■ Licensed Aerodromes (Prestwick Airport); ■ MOD Radars; ■ Low Flying Zones; ■ NATS En Route Ltd (NERL) communication, navigation and surveillance infrastructure; and ■ Radio-communication links and television.	■ Met Office Radars; and ■ Other Licensed Aerodromes (Glasgow and Edinburgh International Airport).
Socio-Economics	■ Potential effects on employment and the economy, including employment opportunities for local suppliers with relevant construction and maintenance experience during the construction and operational phases; ■ Potential effects upon tourism and recreation; and ■ Potential effect on land management practices.	

Topic	Scoped In	Scoped Out
Telecommunications	Consultation with relevant telecommunications consultees to gather updated baseline information to assess operational effects on telecommunication.	
Shadow Flicker	In the event that turbines are proposed within a distance of 10x rotor diameter from a property, the potential for effects from shadow flicker to arise will be considered.	
Climate Change	■ Carbon Calculator tool assessment on the effect of the Proposed Development on climate change; ■ Assessment of other EIA topics (scoped in) in a future climate scenario; and ■ Assessment of Proposed Development's vulnerability and resilience to climate change.	

Appendix A

Phase 1 Peat Survey Report

Statkraft

Appin Wind Farm

Phase 1 Peat Survey

Final

January 2022

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Project Director:	*Sally Stewart*
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1. Introduction

Kaya Consulting Limited was commissioned to undertake Phase 1 peat probing survey (100 x 100 m grid) for a proposed wind farm development at Appin, north-west of Thornhill, Dumfries & Galloway, as part of the Environmental Impact Assessment process.

The site covers an area of 853.5 ha and comprises mixed upland heath, grassland, occasional pockets of bog and commercial forestry. The terrain is hilly towards the north, west and south and slopes towards the valley floor, and a meandering river (the Appin Burn) that cuts through the centre of the site, with steep valley slopes. The site is primarily used for conifer plantation, some of which have been previously felled.

The majority of turbine locations currently under consideration are situated on the hilltops located in a u-shape pattern throughout the site. The terrain on the hilltops ranges between gentle to moderate slopes and is composed of mixed woodland, forest plantation, bog, and grass. The topography in this upland area is likely to affect the peat distribution.

This report provides a summary of the work carried out for the Phase 1 Peat Survey and presents the data collected.

2. Methodology

2.1 Survey Methodology

The 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 survey was undertaken over seven days between September and October 2021 using a standard extendable peat probe. Peat depth results were verified using a gouge corer at key locations where necessary. 619 georeferenced peat depths were recorded.

The peat depth data was plotted and interpolated between the points using an Inverse Distance Weighting Interpolation (IDW) method in QGIS software. Locations that were not probed, due to reasons outlined below, were removed from the interpolated grid.

2.2 Limitations

The site was very steep in places, with new growth forest in previously felled areas, making ground conditions very difficult underfoot. Some areas of the site were not accessed for safety reasons. In addition, dangerous terrain occasionally limited access to exact point locations. Where this was the case, the peat depth probes were taken as near as possible to the location specified.

3. Results

3.1 Peat Depth Survey

A summary of the peat depth data is presented in Table 1 and Figure 1. Results of all 619 individual peat depth measurements recorded (along with eastings and northings, vegetation type, slope, substrate, surface hydrology and additional notes taken by the surveyors) are provided in Table 2 for reference.

A map of peat depths is presented in Figure 2, overlain on the carbon and peatland classification from SNH (now NatureScot) (2016) Carbon and Peatland mapping. With regards to Scottish Planning Policy 2014, carbon-rich soils, deep peat and priority peatland habitat importance Class 1 and 2 are considered areas of significant protection, where it is necessary to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation. Figure 2 shows there is an area of Class 1 peatland on the hilltops in the west of the site and Class 2 peatland on hilltops in the south. Apart from the hilltops the majority of the site is classed as Mineral Soils (Class 0) with pockets of Class 3, 4 and 5 peatlands.

The majority of the surveyed area did not record any significant peat. Areas which did record peat were isolated to the hilltops, close to watercourses or within forest plantation firebreaks. Throughout the site the surface substrate was largely composed of unconsolidated minerogenic sediments (alluvium and glacial till). Where peat was found, it was largely confined to the north-west of the site boundary on the hilltops where the SNH Peat Classification map indicated the presence of Class 1 peat was likely to be found. During the site survey there were isolated pockets which exceeded 200cm however most of the peat probed was <50cm in depth (Table 1).

Table 1. Peat Probing Data Summary

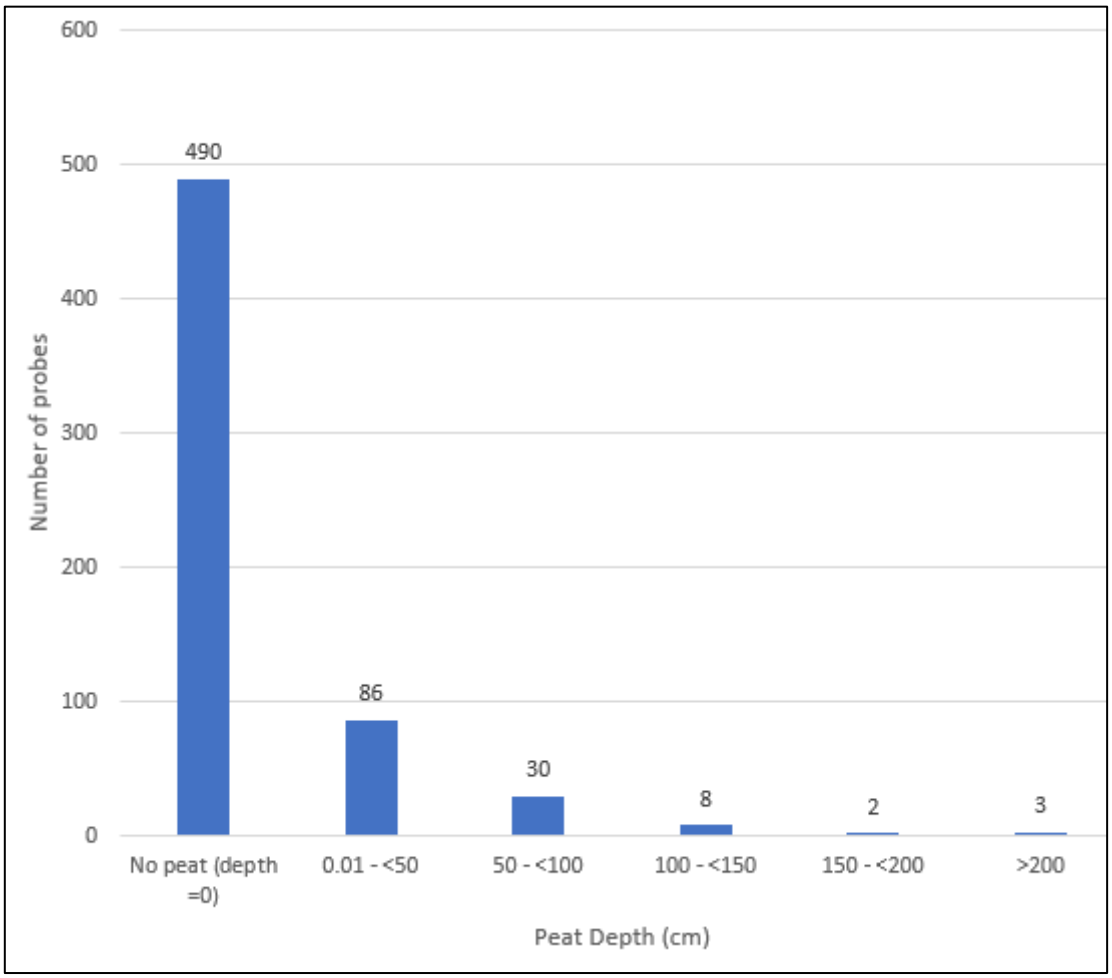
Peat Depth (cm)	Number of Probes	Percentage Coverage (of Total Area Surveyed)
No peat (depth =0)	490	79.2
0.01 - <50	86	13.9
50 - <100	30	4.8
100 - <150	8	1.3
150 - <200	2	0.3
>200	3	0.5
TOTAL	**619**	**100**

The results show that 79.2% of the probed depths recorded no peat (i.e., depth of 0cm) and a further 13.9% of the site had shallow peat of <50cm deep. Only 6.9% of the surveyed depths were deeper than 50cm, with the deepest peat recorded as 250cm.

Figure 2 shows the location of the peat probes taken and their associated depths in cm, Figure 3 shows interpolated peat depths and Figure 4 shows the slopes within the survey area, based on the available

LiDAR topographic data. At the time of writing there was no DTM topographic data covering the western part of the site, but the contours on the 1:25,000 indicate the steep valley slopes.

Figure 1: Probed Peat Depth Histogram



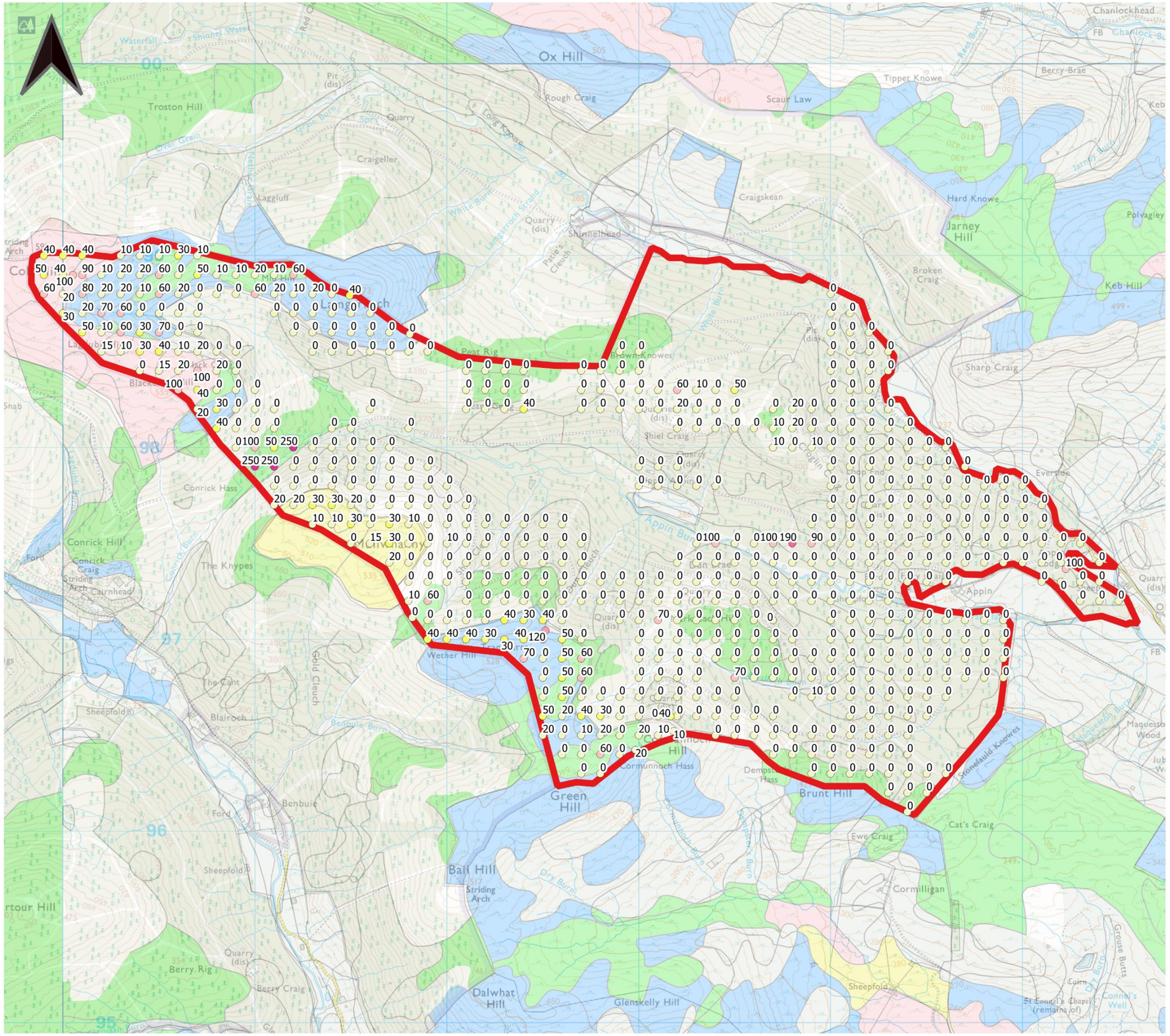


Figure 2: Appin Peat Depths (in cm) Overlain on the SNH (2016) Carbon and Peatland Classification

Legend

- Site Boundary

SNH (2016) Peat Classification

- Unknown soil type (Class -1)
- Non-soil (Class -2)
- Mineral Soil (Class 0)
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Peat Depths (cm)

- < 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

0 1,000 m

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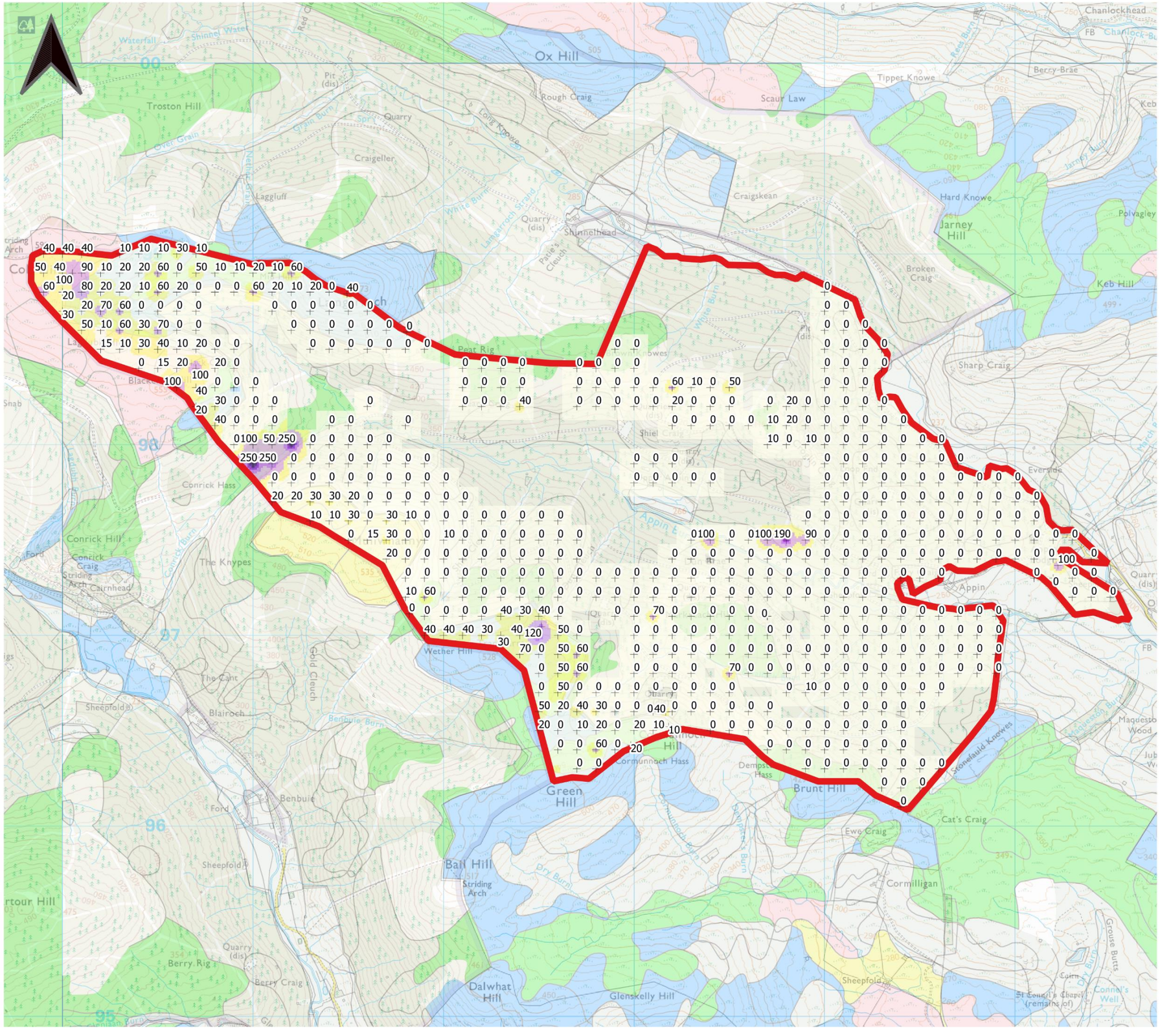

Figure 3: Appin Interpolated Peat Depth Model, based on Surveyed Peat Depths (in cm)

Legend

- Site Boundary

SNH (2016) Peat Classification

- Unknown soil type (Class -1)
- Non-soil (Class -2)
- Mineral Soil (Class 0)
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Interpolated Peat Depths (cm)

- <= 25.0
- 25.0 - 50.0
- 50.0 - 100.0
- 100.0 - 150.0
- 150.0 - 200.0
- > 200.0
- Peat Depths (cm)

0 1,000 m

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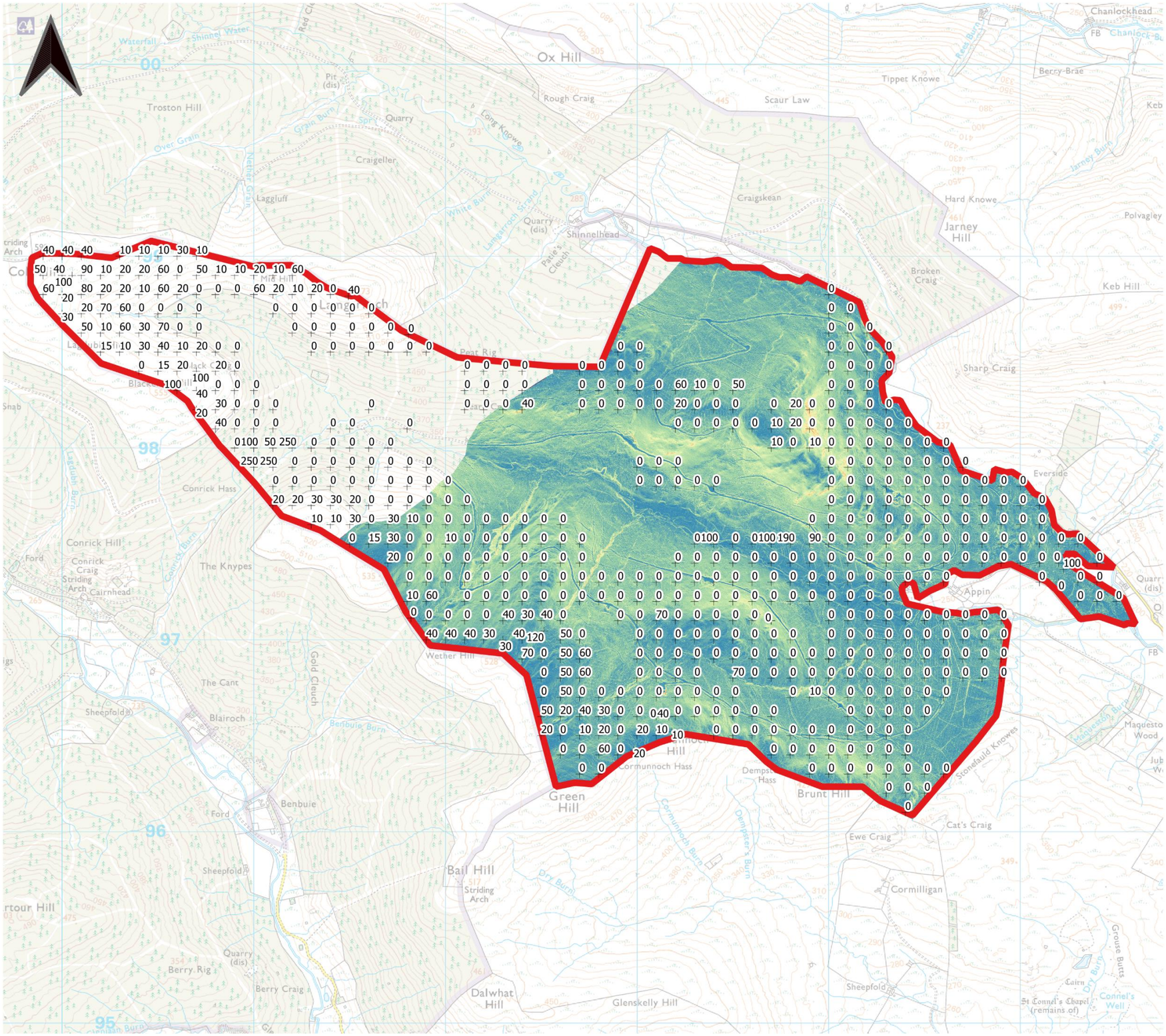

Figure 4: Appin Slope Map (in degrees) with Surveyed Peat Depths (in cm)

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Table 2: Phase 1 Peat Survey Results

ID	Vegetation	Slope	Depth (cm)	Hydrology	Substrate	Easting	Northing
93	Bog	Gentle	40	Damp	Bedrock	269900	599000
94	Bog	Gentle	50	Damp	Gravel	269900	598900
95	Bog	Gentle	60	Boggy	Bedrock	269900	598800
136	Bog	Gentle	40	Damp	Gravel	270000	599000
137	Bog	Gentle	40	Damp	Gravel	270000	598900
138	Bog	Moderate	20	Damp	Gravel	270000	598800
139	Bog	Gentle	30	Damp	Gravel	270000	598700
179	Bog	Gentle	40	Damp	Unknown	270100	599000
180	Bog	Gentle	90	Damp	Unknown	270100	598900
181	Bog	Moderate	80	Damp	Gravel	270100	598800
182	Grass	Steep	20	Damp	Bedrock	270100	598700
183	Bog	Gentle	50	Damp	Gravel	270100	598600
224	Grass	Moderate	20	Damp	Gravel	270200	598800
225	Bog	Moderate	70	Damp	Gravel	270200	598700
226	Grass	Gentle	10	Damp	Gravel	270200	598600
267	Grass	Moderate	20	Damp	Gravel	270300	598800
268	Reeds	Moderate	60	Damp	Bedrock	270300	598700
269	Bog	Moderate	60	Damp	Unknown	270300	598600
310	Grass	Steep	10	Damp	Gravel	270400	598800
311	Reeds	Moderate	0	Damp	Gravel	270400	598700
312	Grass	Moderate	30	Damp	Gravel	270400	598600
353	Grass	Moderate	60	Boggy	Gravel	270500	598800
354	Grass	Moderate	0	Damp	Gravel	270500	598700
355	Reeds	Moderate	70	Boggy	Gravel	270500	598600
396	Grass	Moderate	20	Damp	Gravel	270600	598800
397	Grass	Moderate	0	Damp	Gravel	270600	598700
398	Grass	Steep	0	Damp	Gravel	270600	598600
439	Grass	Moderate	0	Damp	Gravel	270700	598800
440	Grass	Moderate	0	Damp	Bedrock	270700	598700
441	Grass	Steep	0	Damp	Gravel	270700	598600
445	Grass	Moderate	20	Damp	Clay	270700	598200
482	Grass	Moderate	0	Damp	Gravel	270800	598800
488	Grass	Steep	30	Damp	Gravel	270800	598200
489	Grass	Steep	40	Damp	Gravel	270800	598100
525	Grass	Steep	0	Moist	Gravel	270900	598800
531	Grass	Steep	0	Moist	Gravel	270900	598200
532	Grass	Steep	0	Damp	Gravel	270900	598100
568	Grass	Steep	60	Damp	Bedrock	271000	598800
575	Grass	Steep	0	Damp	Gravel	271000	598100
611	Grass	Steep	20	Moist	Gravel	271100	598800
612	Grass	Very Steep	0	Moist	Gravel	271100	598700
617	Grass	Steep	0	Damp	Gravel	271100	598200

618	Grass	Steep	0	Damp	Gravel	271100	598100
621	Grass	Steep	0	Damp	Gravel	271100	597800
622	Reeds	Steep	20	Boggy	Gravel	271100	597700
654	Grass	Steep	10	Moist	Gravel	271200	598800
655	Grass	Steep	0	Moist	Gravel	271200	598700
656	Grass	Steep	0	Dry	Gravel	271200	598600
663	Grass	Steep	0	Moist	Gravel	271200	597900
664	Grass	Steep	0	Damp	Gravel	271200	597800
665	Grass	Steep	20	Damp	Gravel	271200	597700
697	Bog	Moderate	20	Damp	Gravel	271300	598800
698	Grass	Steep	0	Moist	Gravel	271300	598700
699	Grass	Steep	0	Moist	Gravel	271300	598600
700	Grass	Very Steep	0	Moist	Gravel	271300	598500
705	Grass	Steep	0	Moist	Gravel	271300	598000
706	Grass	Steep	0	Damp	Gravel	271300	597900
707	Grass	Steep	0		Gravel	271300	597800
708	Bog	Moderate	30	Damp	Unknown	271300	597700
743	Grass	Steep	0	Moist	Bedrock	271400	598500
747	Reeds	Moderate	0	Damp	Gravel	271400	598100
748	Grass	Steep	0	Damp	Gravel	271400	598000
749	Grass	Steep	0	Damp	Gravel	271400	597900
750	Grass	Steep	0	Damp	Gravel	271400	597800
751	Bog	Moderate	30	Damp	Gravel	271400	597700
786	Grass	Very Steep	0	Dry	Gravel	271500	598500
790	Reeds	Moderate	0	Damp	Gravel	271500	598100
791	Grass	Steep	0	Damp	Gravel	271500	598000
792	Reeds	Steep	0	Damp	Gravel	271500	597900
793	Grass	Steep	0	Damp	Gravel	271500	597800
794	Grass	Steep	20	Damp	Bedrock	271500	597700
829	Grass	Steep	0	Moist	Gravel	271600	598500
834	Grass	Steep	0	Damp	Gravel	271600	598000
835	Grass	Steep	0	Moist	Gravel	271600	597900
836	Grass	Steep	0	Damp	Gravel	271600	597800
837	Grass	Steep	0	Moist	Gravel	271600	597700
872	Grass	Moderate	0	Moist	Gravel	271700	598500
878	Grass	Steep	0	Moist	Gravel	271700	597900
879	Grass	Steep	0	Moist	Gravel	271700	597800
880	Grass	Steep	0	Moist	Gravel	271700	597700
881	Bog	Moderate	30	Damp	Gravel	271700	597600
883	Grass	Gentle	20	Damp	Gravel	271700	597400
915	Grass	Moderate	0	Moist	Gravel	271800	598500
921	Grass	Steep	0	Moist	Gravel	271800	597900
922	Grass	Steep	0	Damp	Gravel	271800	597800
923	Grass	Steep	0	Moist	Gravel	271800	597700
958	Grass	Steep	0	Moist	Gravel	271900	598500

964	Grass	Very Steep	0	Moist	Gravel	271900	597900
965	Grass	Very Steep	0	Moist	Gravel	271900	597800
970	Grass	Steep	0	Damp	Gravel	271900	597300
972	Grass	Steep	0	Damp	Bedrock	271900	597100
973	Reeds	Moderate	40	Boggy	Bedrock	271900	597000
1008	Grass	Very Steep	0	Moist	Bedrock	272000	597800
1012	Grass	Steep	0	Damp	Gravel	272000	597400
1015	Grass	Steep	0	Damp	Gravel	272000	597100
1016	Bog	Moderate	40	Damp	Gravel	272000	597000
1045	Bog	Gentle	0	Boggy	Gravel	272100	598400
1046	Reeds	Steep	0	Damp	Gravel	272100	598300
1047	Grass	Steep	0	Damp	Gravel	272100	598200
1054	Reeds	Moderate	0	Damp	Gravel	272100	597500
1056	Grass	Steep	0	Damp	Bedrock	272100	597300
1057	Bare Ground	Steep	0	Moist	Gravel	272100	597200
1058	Bare Ground	Steep	0	Moist	Gravel	272100	597100
1059	Grass	Gentle	40	Moist	Gravel	272100	597000
1088	Bog	Gentle	0	Boggy	Gravel	272200	598400
1089	Grass	Moderate	0	Damp	Gravel	272200	598300
1090	Grass	Steep	0	Damp	Gravel	272200	598200
1096	Grass	Moderate	0	Damp	Gravel	272200	597600
1097	Grass	Steep	0	Damp	Gravel	272200	597500
1098	Grass	Steep	0	Boggy	Bedrock	272200	597400
1099	Grass	Steep	0	Moist	Gravel	272200	597300
1100	Bare Ground	Steep	0	Moist	Bedrock	272200	597200
1101	Bare Ground	Steep	0	Moist	Gravel	272200	597100
1102	Bog	Gentle	30	Damp	Gravel	272200	597000
1131	Bog	Gentle	0	Boggy	Gravel	272300	598400
1132	Grass	Moderate	0	Damp	Gravel	272300	598300
1133	Grass	Steep	0	Damp	Gravel	272300	598200
1139	Reeds	Very Steep	0	Moist	Gravel	272300	597600
1140	Reeds	Very Steep	0	Moist	Gravel	272300	597500
1141	Grass		0	Moist	Gravel	272300	597400
1142	Grass	Steep	0	Damp	Gravel	272300	597300
1143	Grass	Steep	0	Damp	Gravel	272300	597200
1144	Bog	Moderate	40	Damp	Gravel	272300	597100
1145	Bog	Moderate	30	Damp	Gravel	272300	597000
1174	Bog	Gentle	0	Damp	Gravel	272400	598400
1175	Grass	Moderate	0	Damp	Gravel	272400	598300
1176	Grass	Very Steep	40	Damp	Gravel	272400	598200
1182	Grass	Moderate	0	Damp	Gravel	272400	597600
1183	Grass	Steep	0	Moist	Gravel	272400	597500
1184	Bog	Very Steep	0	Damp	Clay	272400	597400
1185	Grass	Steep	0	Damp	Gravel	272400	597300
1186	Bare Ground	Steep	0	Damp	Clay	272400	597200

1187	Bog	Moderate	30	Damp	Gravel	272400	597100
1188	Bog	Gentle	40	Damp	Gravel	272400	597000
1189	Bog	Moderate	70	Damp	Bedrock	272400	596900
1225	Grass	Steep	0	Moist	Gravel	272500	597600
1226	Grass	Steep	0	Moist	Gravel	272500	597500
1227	Bog	Steep	0	Moist	Bedrock	272500	597400
1228	Grass	Steep	0	Damp	Bedrock	272500	597300
1229	Bare Ground	Steep	0	Damp	Gravel	272500	597200
1230	Reeds	Steep	40	Damp	Bedrock	272500	597100
1231	Reeds	Moderate	190	Very Boggy	Gravel	272500	597000
1232	Grass	Moderate	0	Damp	Gravel	272500	596900
1268	Grass	Steep	0	Moist	Gravel	272600	597600
1269	Grass	Steep	0	Damp	Bedrock	272600	597500
1270	Grass	Very Steep	0	Damp	Gravel	272600	597400
1271	Grass	Steep	0	Damp	Clay	272600	597300
1272	Reeds	Steep	0	Moist	Gravel	272600	597200
1273	Grass	Steep	0	Damp	Gravel	272600	597100
1274	Bog	Moderate	50	Damp	Gravel	272600	597000
1275	Grass	Gentle	50	Damp	Gravel	272600	596900
1276	Bog	Moderate	50	Damp	Bedrock	272600	596800
1277	Bog	Moderate	50	Damp	Bedrock	272600	596700
1303	Grass	Gentle	0	Damp	Gravel	272700	598400
1304	Grass	Moderate	0	Damp	Gravel	272700	598300
1305	Grass	Steep	0	Damp	Gravel	272700	598200
1312	Grass	Steep	0	Damp	Gravel	272700	597500
1313	Grass	Steep	0	Damp	Bedrock	272700	597400
1314	Reeds	Steep	0	Damp	Gravel	272700	597300
1315	Reeds	Steep	0	Damp	Gravel	272700	597200
1317	Reeds	Moderate	0	Damp	Gravel	272700	597000
1318	Bog	Gentle	60	Damp	Gravel	272700	596900
1319	Bog	Moderate	60	Damp	Bedrock	272700	596800
1320	Grass	Moderate	0	Damp	Bedrock	272700	596700
1346	Grass	Moderate	0	Damp	Gravel	272800	598400
1347	Bedrock	Steep	0	Dry	Bedrock	272800	598300
1348	Grass	Steep	0	Damp	Gravel	272800	598200
1357	Grass	Steep	0	Damp	Bedrock	272800	597300
1363	Reeds	Moderate	0	Damp	Gravel	272800	596700
1388	Grass	Gentle	0	Damp	Gravel	272900	598500
1389	Grass	Gentle	0	Boggy	Gravel	272900	598400
1390	Reeds	Moderate	0	Boggy	Gravel	272900	598300
1391	Grass	Moderate	0	Damp	Gravel	272900	598200
1400	Grass	Moderate	0	Damp	Gravel	272900	597300
1401	Grass	Steep	0	Damp	Clay	272900	597200
1402	Grass	Steep	0	Moist	Gravel	272900	597100
1406	Grass	Moderate	0	Damp	Gravel	272900	596700

1431	Grass	Gentle	0	Boggy	Gravel	273000	598500
1432	Grass	Gentle	0	Moist	Gravel	273000	598400
1433	Reeds	Gentle	0	Damp	Gravel	273000	598300
1434	Bog	Steep	0	Damp	Gravel	273000	598200
1437	Grass	Moderate	0	Damp	Gravel	273000	597900
1438	Reeds	Gentle	0	Damp	Gravel	273000	597800
1443	Grass	Steep	0	Damp	Gravel	273000	597300
1444	Bog	Steep	0	Damp	Gravel	273000	597200
1445	Grass	Steep	0	Damp	Clay	273000	597100
1447	Reeds	Moderate	0	Damp	Gravel	273000	596900
1448	Grass	Steep	0	Damp	Gravel	273000	596800
1476	Bare Ground	Gentle	0	Dry	Gravel	273100	598300
1477	Bare Ground	Gentle	0	Dry	Gravel	273100	598200
1480	Reeds	Steep	0	Moist	Gravel	273100	597900
1481	Reeds	Gentle	0	Moist	Gravel	273100	597800
1486	Bog	Steep	0	Damp	Gravel	273100	597300
1487	Bog	Steep	0	Damp	Gravel	273100	597200
1488	Bog	Gentle	70	Damp	Unknown	273100	597100
1489	Grass	Gentle	0	Damp	Gravel	273100	597000
1490	Reeds	Gentle	0	Damp	Gravel	273100	596900
1523	Bare Ground	Gentle	0	Dry	Gravel	273200	597900
1524	Grass	Moderate	0	Moist	Gravel	273200	597800
1529	Grass	Steep	0	Dry	Bedrock	273200	597300
1531	Grass	Moderate	0	Moist	Gravel	273200	597100
1533	Grass	Gentle	0	Damp	Gravel	273200	596900
1567	Grass	Moderate	0	Moist	Gravel	273300	597800
1570	Grass	Steep	0	Moist	Gravel	273300	597500
1572	Grass	Steep	0	Dry	Gravel	273300	597300
1574	Grass	Gentle	0	Moist	Unknown	273300	597100
1576	Grass	Moderate	0	Moist	Unknown	273300	596900
1577	Grass	Moderate	0	Damp	Gravel	273300	596800
1610	Reeds	Moderate	0	Damp	Gravel	273400	597800
1613	Grass	Gentle	100	Moist	Bedrock	273400	597500
1615	Grass	Steep	0	Dry	Bedrock	273400	597300
1617	Grass	Moderate	0	Damp	Gravel	273400	597100
1619	Bare Ground	Moderate	0	Damp	Gravel	273400	596900
1656	Water	Gentle	0	Water	Gravel	273500	597500
1658	Bare Ground	Steep	0	Dry	Gravel	273500	597300
1660	Bare Ground	Moderate	0	Moist	Unknown	273500	597100
1662	Bare Ground	Moderate	0	Damp	Unknown	273500	596900
1664	Grass	Moderate	0	Damp	Gravel	273500	596700
1699	Grass	Gentle	0	Moist	Gravel	273600	597500
1701	Grass	Steep	0	Damp	Gravel	273600	597300
1703	Grass	Steep	0	Moist	Gravel	273600	597100
1705	Bare Ground	Moderate	0	Damp	Gravel	273600	596900

1742	Bog	Gentle	100	Boggy	Bedrock	273700	597500
1744	Grass	Steep	0	Moist	Gravel	273700	597300
1745	Grass	Steep	0		Gravel	273700	597200
1746	Grass	Steep	0	Moist	Gravel	273700	597100
1748	Bog	Moderate	0	Damp	Gravel	273700	596900
1751	Grass	Moderate	0	Damp	Unknown	273700	596600
1752	Reeds	Moderate	0	Damp	Gravel	273700	596500
1753	Reeds	Moderate	0	Damp	Unknown	273700	596400
1785	Reeds	Gentle	190	Boggy	Bedrock	273800	597500
1787	Reeds	Gentle	0	Damp	Gravel	273800	597300
1788	Grass	Steep	0	Moist	Bedrock	273800	597200
1791	Bog	Moderate	0	Moist	Unknown	273800	596900
1796	Reeds	Moderate	0	Damp	Gravel	273800	596400
1829	Grass	Gentle	0	Damp	Gravel	273900	597400
1830	Grass	Gentle	0	Moist	Gravel	273900	597300
1831	Grass	Moderate	0	Damp	Unknown	273900	597200
1839	Reeds	Steep	0	Damp	Gravel	273900	596400
1858	Grass	Moderate	0	Moist	Gravel	274000	598800
1859	Reeds	Steep	0	Moist	Gravel	274000	598700
1860	Grass	Steep	0	Damp	Gravel	274000	598600
1861	Grass	Steep	0	Damp	Gravel	274000	598500
1862	Grass	Steep	0	Moist	Gravel	274000	598400
1863	Grass	Very Steep	0	Damp	Gravel	274000	598300
1864	Grass	Very Steep	0	Moist	Gravel	274000	598200
1865	Grass	Steep	0	Moist	Gravel	274000	598100
1866	Grass	Steep	0	Damp	Gravel	274000	598000
1867	Grass	Steep	0	Moist	Gravel	274000	597900
1868	Grass	Steep	0	Dry	Gravel	274000	597800
1869	Grass	Steep	0	Dry	Gravel	274000	597700
1870	Grass	Steep	0	Moist	Gravel	274000	597600
1871	Bare Ground	Gentle	0	Dry	Gravel	274000	597500
1872	Grass	Gentle	0	Moist	Gravel	274000	597400
1873	Grass	Gentle	0	Damp	Gravel	274000	597300
1874	Bog	Gentle	0	Moist	Unknown	274000	597200
1877	Grass	Moderate	0	Damp	Unknown	274000	596900
1878	Grass	Moderate	0	Moist	Gravel	274000	596800
1882	Reeds	Steep	0	Damp	Unknown	274000	596400
1916	Grass	Gentle	0	Dry	Gravel	274100	597300
1917	Grass	Gentle	0	Moist	Unknown	274100	597200
1920	Grass	Moderate	0	Moist	Gravel	274100	596900
1921	Grass	Moderate	0	Damp	Gravel	274100	596800
1946	Grass	Moderate	0	Damp	Gravel	274200	598600
1947	Grass	Moderate	0	Moist	Gravel	274200	598500
1948	Grass	Moderate	0	Damp	Gravel	274200	598400
1949	Grass	Moderate	0	Moist	Gravel	274200	598300

1950	Grass	Moderate	0	Moist	Gravel	274200	598200
1951	Grass	Moderate	0	Damp	Gravel	274200	598100
1952	Grass	Steep	0	Damp	Gravel	274200	598000
1953	Grass	Steep	0	Moist	Unknown	274200	597900
1954	Reeds	Steep	0	Moist	Gravel	274200	597800
1955	Grass	Steep	0	Damp	Gravel	274200	597700
1956	Grass	Moderate	0	Moist	Gravel	274200	597600
1957	Grass	Steep	0	Moist	Gravel	274200	597500
1958	Bare Ground	Gentle	0	Dry	Gravel	274200	597400
1959	Grass	Gentle	0	Dry	Gravel	274200	597300
1960	Bog	Gentle	0	Damp	Unknown	274200	597200
1962	Grass	Gentle	0	Moist	Gravel	274200	597000
1963	Grass	Steep	0	Damp	Gravel	274200	596900
1964	Grass	Moderate	0	Damp	Gravel	274200	596800
2005	Grass	Gentle	0	Damp	Gravel	274300	597000
2006	Reeds	Moderate	0	Boggy	Unknown	274300	596900
2007	Grass	Moderate	0	Damp	Unknown	274300	596800
2013	Grass	Steep	0	Damp	Gravel	274300	596200
2037	Grass	Flat	0	Damp	Gravel	274400	598100
2038	Grass	Moderate	0	Moist	Gravel	274400	598000
2039	Grass	Steep	0	Damp	Gravel	274400	597900
2040	Grass	Steep	0	Moist	Gravel	274400	597800
2041	Grass	Moderate	0	Damp	Bedrock	274400	597700
2042	Grass	Moderate	0	Moist	Bedrock	274400	597600
2043	Grass	Steep	0	Moist	Gravel	274400	597500
2044	Grass	Steep	0	Moist	Gravel	274400	597400
2045	Grass	Moderate	0	Moist	Gravel	274400	597300
2047	Bare Ground	Gentle	0	Dry	Gravel	274400	597100
2048	Reeds	Gentle	0	Boggy	Unknown	274400	597000
2049	Reeds	Moderate	0	Boggy	Gravel	274400	596900
2050	Reeds	Moderate	0	Damp	Gravel	274400	596800
2053	Grass	Moderate	0	Damp	Unknown	274400	596500
2054	Grass	Moderate	0	Damp	Gravel	274400	596400
2056	Grass	Moderate	0	Damp	Gravel	274400	596200
2057	Grass	Moderate	0	Damp	Gravel	274400	596100
2090	Grass	Gentle	0	Damp	Unknown	274500	597100
2098	Grass	Moderate	0	Dry	Gravel	274500	596300
2099	Grass	Steep	0	Damp	Unknown	274500	596200
2124	Grass	Flat	0	Damp	Gravel	274600	598000
2125	Grass	Moderate	0	Dry	Gravel	274600	597900
2126	Grass	Steep	0	Dry	Gravel	274600	597800
2127	Grass	Steep	0	Moist	Gravel	274600	597700
2128	Bare Ground	Moderate	0	Dry	Gravel	274600	597600
2129	Grass	Moderate	0	Damp	Gravel	274600	597500
2130	Bare Ground	Moderate	0	Dry	Gravel	274600	597400

2131	Grass	Moderate	0	Moist	Gravel	274600	597300
2133	Grass	Gentle	0	Damp	Gravel	274600	597100
2134	Reeds	Gentle	0	Damp	Gravel	274600	597000
2141	Grass	Moderate	0	Damp	Gravel	274600	596300
2176	Reeds	Gentle	0	Boggy	Gravel	274700	597100
2177	Grass	Gentle	0	Boggy	Gravel	274700	597000
2212	Grass	Moderate	0	Dry	Gravel	274800	597800
2213	Grass	Steep	0	Dry	Gravel	274800	597700
2214	Grass	Moderate	0	Moist	Gravel	274800	597600
2215	Grass	Moderate	0	Dry	Gravel	274800	597500
2216	Grass	Moderate	0	Dry	Gravel	274800	597400
2219	Grass	Gentle	0	Damp	Unknown	274800	597100
2220	Grass	Moderate	0	Boggy	Gravel	274800	597000
2262	Reeds	Moderate	0	Boggy	Gravel	274900	597100
2263	Reeds	Moderate	0	Damp	Gravel	274900	597000
2298	Grass	Gentle	0	Damp	Gravel	275000	597800
2299	Grass	Gentle	0	Dry	Gravel	275000	597700
2300	Grass	Moderate	0	Dry	Gravel	275000	597600
2301	Grass	Moderate	0	Dry	Gravel	275000	597500
2302	Grass	Gentle	0	Dry	Gravel	275000	597400
2346	Grass	Gentle	0	Damp	Gravel	275100	597300
2387	Grass	Moderate	0	Moist	Gravel	275200	597500
2388	Grass	Gentle	0	Dry	Gravel	275200	597400
2389	Grass	Steep	0	Moist	Gravel	275200	597300
2475	Grass	Gentle	0	Dry	Gravel	275400	597300
2476	Grass	Gentle	0	Dry	Gravel	275400	597200
1	Reeds	Moderate	100	Boggy	Bedrock	275225	597367
2	Reeds	Moderate	120	Boggy	Gravel	272514	597046
1	Bog	Gentle	40	Damp	Bedrock	271494	598792
2	Grass	Moderate	0	Moist	Gravel	271807	598591
0	Bog	Moderate	100	Boggy	Gravel	270052	598899
223	Grass	Gentle	10	Moist	Unknown	270200	598900
227	Grass	Gentle	15	Moist	Unknown	270200	598500
265	Grass	Gentle	10	Moist	Unknown	270300	599000
266	Grass	Gentle	20	Moist	Unknown	270300	598900
270	Grass	Gentle	10	Moist	Unknown	270300	598500
308	Grass	Gentle	10	Moist	Unknown	270400	599000
309	Grass	Gentle	20	Moist	Unknown	270400	598900
313	Grass	Gentle	30	Moist	Unknown	270400	598500
314	Grass	Gentle	0	Moist	Unknown	270400	598400
351	Grass	Gentle	10	Moist	Unknown	270500	599000
352	Grass	Gentle	60	Moist	Unknown	270500	598900
356	Grass	Gentle	40	Moist	Unknown	270500	598500
357	Grass	Gentle	15	Moist	Unknown	270500	598400
394	Grass	Gentle	30	Moist	Unknown	270600	599000

395	Grass	Moderate	0	Damp		270600	598900
399	Grass	Moderate	10	Moist	Unknown	270600	598500
400	Grass	Moderate	20	Moist	Unknown	270600	598400
401	Grass	Gentle	100	Moist	Unknown	270600	598300
437	Grass	Gentle	10	Moist	Unknown	270700	599000
438	Grass	Gentle	50	Moist	Unknown	270700	598900
442	Reeds	Moderate	20	Moist	Unknown	270700	598500
443	Grass	Moderate	100	Damp	Unknown	270700	598400
444	Grass	Gentle	40	Moist	Unknown	270700	598300
481	Reeds	Moderate	10	Moist	Unknown	270800	598900
485	Grass	Steep	0	Moist	Unknown	270800	598500
486	Grass	Moderate	20	Moist	Unknown	270800	598400
487	Grass	Moderate	0	Moist	Unknown	270800	598300
524	Grass	Moderate	10	Moist	Unknown	270900	598900
528	Grass	Very Steep	0	Damp	Gravel	270900	598500
529	Grass	Very Steep	0	Moist	Unknown	270900	598400
530	Grass	Steep	0	Moist	Unknown	270900	598300
533	Grass	Steep	0	Moist	Gravel	270900	598000
567	Grass	Moderate	20	Moist	Unknown	271000	598900
573	Grass	Very Steep	0	Moist	Clay	271000	598300
574	Grass	Steep	0	Moist	Unknown	271000	598200
576	Grass	Moderate	100	Moist	Unknown	271000	598000
577	Bog	Gentle	250	Boggy	Unknown	271000	597900
610	Grass	Gentle	10	Moist	Unknown	271100	598900
619	Grass	Moderate	50	Damp	Unknown	271100	598000
620	Grass	Gentle	250	Boggy	Unknown	271100	597900
653	Grass	Gentle	60	Damp	Gravel	271200	598900
662	Bog	Moderate	250	Boggy	Unknown	271200	598000
709	Grass	Gentle	10	Damp	Unknown	271300	597600
740	Grass	Gentle	0	Dry	Unknown	271400	598800
741	Grass	Steep	0	Moist	Unknown	271400	598700
742	Grass	Moderate	0	Moist	Gravel	271400	598600
752	Grass	Gentle	10	Moist	Unknown	271400	597600
784	Grass	Moderate	0	Moist	Unknown	271500	598700
785	Grass	Moderate	0	Moist	Unknown	271500	598600
795	Grass	Moderate	30	Moist	Unknown	271500	597600
796	Grass	Moderate	0	Moist	Unknown	271500	597500
827	Grass	Moderate	0	Moist	Unknown	271600	598700
828	Grass	Moderate	0	Moist	Gravel	271600	598600
832	Bare Ground	Moderate	0	Dry	Gravel	271600	598200
838	Grass	Moderate	0	Damp	Unknown	271600	597600
839	Grass	Moderate	15	Damp	Unknown	271600	597500
871	Grass	Moderate	0	Moist	Unknown	271700	598600
877	Bare Ground		0	Dry	Gravel	271700	598000
882	Grass	Moderate	30	Moist	Unknown	271700	597500

919	Bare Ground	Gentle	0	Dry	Gravel	271800	598100
924	Grass	Moderate	10	Damp	Unknown	271800	597600
925	Grass	Moderate	0	Damp	Unknown	271800	597500
926	Reeds	Moderate	0	Damp	Unknown	271800	597400
927	Grass	Moderate	0	Damp	Gravel	271800	597300
928	Grass	Moderate	10	Damp	Unknown	271800	597200
966	Bare Ground	Moderate	0	Dry	Gravel	271900	597700
967	Grass	Steep	0	Moist	Unknown	271900	597600
968	Bare Ground	Moderate	0	Dry	Gravel	271900	597500
969	Grass	Steep	0	Damp	Gravel	271900	597400
971	Grass	Moderate	60	Damp	Unknown	271900	597200
1009	Grass	Steep	0	Moist	Unknown	272000	597700
1010	Grass	Steep	0	Damp	Unknown	272000	597600
1011	Grass	Moderate	10	Moist	Unknown	272000	597500
1013	Grass	Moderate	0	Moist	Gravel	272000	597300
1052	Grass	Steep	0	Moist	Gravel	272100	597700
1053	Grass	Steep	0	Moist	Gravel	272100	597600
1055	Bare Ground	Gentle	0	Dry	Gravel	272100	597400
1233	Grass	Gentle	0	Moist	Unknown	272500	596800
1234	Grass	Moderate	0	Damp	Unknown	272500	596700
1235	Grass	Gentle	50	Damp	Unknown	272500	596600
1236	Grass	Gentle	20	Damp	Unknown	272500	596500
1278	Reeds	Moderate	20	Boggy	Unknown	272600	596600
1279	Reeds	Gentle	0	Boggy	Unknown	272600	596500
1280	Grass	Moderate	0	Damp	Gravel	272600	596400
1321	Grass	Moderate	40	Damp	Unknown	272700	596600
1322	Grass	Gentle	10	Damp	Unknown	272700	596500
1323	Grass	Moderate	0	Damp	Gravel	272700	596400
1324	Reeds	Gentle	0	Damp	Unknown	272700	596300
1358	Bare Ground	Gentle	0	Dry	Gravel	272800	597200
1364	Grass	Moderate	30	Boggy	Gravel	272800	596600
1365	Grass	Gentle	20	Damp	Unknown	272800	596500
1366	Grass	Moderate	60	Damp	Unknown	272800	596400
1367	Grass	Gentle	0	Moist	Unknown	272800	596300
1407	Grass	Moderate	0	Dry	Gravel	272900	596600
1408	Grass	Moderate	0	Damp		272900	596500
1409	Grass	Gentle	0	Damp	Unknown	272900	596400
1446	Bare Ground	Gentle	0	Dry	Gravel	273000	597000
1449	Grass	Moderate	0	Moist	Gravel	273000	596700
1450	Grass	Moderate	0	Dry	Gravel	273000	596600
1451	Grass	Moderate	20	Boggy	Unknown	273000	596500
1491	Bare Ground		0	Dry	Gravel	273100	596800
1492	Bare Ground	Moderate	0	Dry	Gravel	273100	596700
1493	Grass	Moderate	0	Damp	Gravel	273100	596600
1494	Grass	Gentle	10	Moist	Unknown	273100	596500

1519	Grass	Moderate	60	Moist	Unknown	273200	598300
1520	Grass	Moderate	20	Dry	Unknown	273200	598200
1521	Bare Ground	Moderate	0	Dry	Gravel	273200	598100
1528	Grass	Very Steep	0	Dry	Gravel	273200	597400
1530	Grass	Moderate	0	Dry	Gravel	273200	597200
1532	Grass	Moderate	0	Moist	Unknown	273200	597000
1534	Bare Ground	Moderate	0	Dry	Gravel	273200	596800
1535	Bare Ground	Moderate	0	Dry	Gravel	273200	596700
1536	Bare Ground	Steep	0	Dry	Gravel	273200	596600
1562	Grass	Moderate	10	Moist	Gravel	273300	598300
1563	Bare Ground	Moderate	0	Dry	Gravel	273300	598200
1564	Grass	Moderate	0	Moist	Gravel	273300	598100
1571	Bare Ground	Very Steep	0	Dry	Bedrock	273300	597400
1573	Bare Ground		0	Dry	Gravel	273300	597200
1575	Grass	Gentle	0	Moist	Gravel	273300	597000
1578	Reeds	Moderate	0	Dry	Gravel	273300	596700
1579	Reeds	Steep	0	Dry	Gravel	273300	596600
1605	Grass	Moderate	0	Dry	Gravel	273400	598300
1606	Grass	Moderate	0	Dry	Gravel	273400	598200
1607	Bare Ground	Gentle	0	Dry	Gravel	273400	598100
1614	Bare Ground	Steep	0		Gravel	273400	597400
1616	Grass	Very Steep	0	Dry	Gravel	273400	597200
1618	Grass	Gentle	0	Moist	Unknown	273400	597000
1621	Bare Ground	Gentle	0	Dry	Gravel	273400	596700
1622	Reeds	Steep	0	Damp	Gravel	273400	596600
1623	Grass	Steep	0	Moist	Gravel	273400	596500
1648	Grass	Moderate	50	Moist	Unknown	273500	598300
1649	Bare Ground	Gentle	0	Dry	Gravel	273500	598200
1650	Bare Ground	Moderate	0	Dry	Gravel	273500	598100
1657	Bare Ground		0	Dry	Gravel	273500	597400
1658	Bare Ground	Steep	0		Gravel	273500	597300
1659	Grass	Very Steep	0	Moist	Gravel	273500	597200
1661	Grass	Moderate	0	Moist	Gravel	273500	597000
1663	Grass	Moderate	70	Damp	Gravel	273500	596800
1665	Grass	Steep	0	Damp	Gravel	273500	596600
1666	Reeds	Steep	0	Damp	Gravel	273500	596500
1693	Grass	Moderate	0	Moist	Unknown	273600	598100
1700	Grass	Gentle	0	Damp	Gravel	273600	597400
1702	Grass	Steep	0	Dry	Gravel	273600	597200
1704	Grass	Moderate	0	Moist	Gravel	273600	597000
1706	Grass	Gentle	0	Moist	Gravel	273600	596800
1708	Bare Ground	Gentle	0	Dry	Gravel	273600	596600
1709	Reeds	Very Steep	0	Damp	Gravel	273600	596500
1735	Grass	Steep	0	Dry	Gravel	273700	598200
1736	Grass	Moderate	10	Moist	Unknown	273700	598100

1737	Grass	Very Steep	10	Dry	Unknown	273700	598000
1743	Reeds	Gentle	0	Moist	Gravel	273700	597400
1746	Grass	Very Steep	0	Dry	Bedrock	273700	597100
1747	Grass	Moderate	0	Moist	Unknown	273700	597000
1749	Bare Ground	Moderate	0	Dry	Gravel	273700	596800
1778	Grass	Moderate	20	Moist	Unknown	273800	598200
1779	Grass	Steep	20	Moist	Unknown	273800	598100
1780	Grass	Very Steep	0	Moist	Unknown	273800	598000
1786	Reeds	Gentle	0	Dry	Gravel	273800	597400
1790	Grass	Moderate	0	Moist	Gravel	273800	597000
1792	Grass	Moderate	0	Dry	Gravel	273800	596800
1793	Grass	Moderate	0	Moist	Gravel	273800	596700
1795	Bare Ground	Steep	0	Dry	Gravel	273800	596500
1821	Bare Ground	Very Steep	0	Moist	Bedrock	273900	598200
1822	Grass	Very Steep	0	Moist	Unknown	273900	598100
1823	Grass	Very Steep	10	Moist	Unknown	273900	598000
1827	Bare Ground		0	Dry	Gravel	273900	597600
1828	Grass	Gentle	90	Moist	Gravel	273900	597500
1834	Grass	Steep	0	Dry	Gravel	273900	596900
1835	Grass	Moderate	0	Dry	Gravel	273900	596800
1836	Reeds	Moderate	10	Moist	Gravel	273900	596700
1838	Bare Ground	Gentle	0	Dry	Gravel	273900	596500
1840	Grass	Very Steep	0	Damp	Gravel	273900	596300
1875	Grass	Moderate	0	Dry	Gravel	274000	597100
1876	Grass	Moderate	0	Dry	Gravel	274000	597000
1877	Grass	Moderate	0	Dry	Gravel	274000	596900
1879	Bare Ground		0	Dry	Gravel	274000	596700
1881	Bare Ground	Moderate	0	Dry	Gravel	274000	596500
1883	Reeds	Steep	0	Damp	Gravel	274000	596300
1902	Grass	Moderate	0	Damp	Gravel	274100	598700
1903	Bare Ground	Flat	0	Dry	Gravel	274100	598600
1904	Bare Ground	Moderate	0	Dry	Gravel	274100	598500
1905	Grass	Steep	0	Dry	Gravel	274100	598400
1906	Grass	Very Steep	0	Moist	Gravel	274100	598300
1907	Grass	Steep	0	Moist	Gravel	274100	598200
1908	Grass	Very Steep	0	Moist	Bedrock	274100	598100
1909	Grass	Steep	0	Moist	Gravel	274100	598000
1910	Grass	Gentle	0	Dry	Gravel	274100	597900
1911	Grass	Moderate	0	Dry	Gravel	274100	597800
1912	Grass	Steep	0	Dry	Gravel	274100	597700
1913	Grass	Steep	0	Moist	Gravel	274100	597600
1914	Bare Ground	Steep	0	Dry	Gravel	274100	597500
1915	Grass	Moderate	0	Dry	Gravel	274100	597400
1918	Grass	Gentle	0	Dry	Gravel	274100	597100
1919	Grass	Moderate	0	Dry	Gravel	274100	597000

1922	Grass	Moderate	0	Moist	Gravel	274100	596700
1923	Bare Ground	Very Steep	0	Dry	Gravel	274100	596600
1924	Grass	Steep	0	Dry	Gravel	274100	596500
1925	Grass	Steep	0	Moist	Gravel	274100	596400
1926	Grass	Steep	0	Damp	Gravel	274100	596300
1961	Reeds	Gentle	0	Dry	Gravel	274200	597100
1965	Grass	Steep	0	Dry	Bedrock	274200	596700
1966	Grass	Gentle	0	Dry	Gravel	274200	596600
1967	Bare Ground	Gentle	0	Dry	Gravel	274200	596500
1968	Grass	Steep	0	Moist	Gravel	274200	596400
1969	Grass	Very Steep	0	Moist	Gravel	274200	596300
1990	Bare Ground	Flat	0	Dry	Gravel	274300	598500
1991	Grass	Flat	0	Dry	Gravel	274300	598400
1993	Bare Ground	Flat	0	Dry	Gravel	274300	598200
1994	Grass	Gentle	0	Moist	Gravel	274300	598100
1995	Grass	Steep	0	Dry	Gravel	274300	598000
1996	Grass	Steep	0	Dry	Gravel	274300	597900
1997	Grass	Moderate	0	Dry	Gravel	274300	597800
1998	Grass	Gentle	0	Dry	Gravel	274300	597700
1999	Grass	Moderate	0	Dry	Gravel	274300	597600
2000	Grass	Steep	0	Dry	Gravel	274300	597500
2001	Grass	Moderate	0	Dry	Gravel	274300	597400
2002	Grass	Gentle	0	Dry	Gravel	274300	597300
2003	Grass	Gentle	0	Moist	Gravel	274300	597200
2004	Grass	Flat	0	Moist	Gravel	274300	597100
2008	Grass	Moderate	0	Dry	Gravel	274300	596700
2009	Grass	Moderate	0	Dry	Gravel	274300	596600
2010	Bare Ground		0	Dry	Gravel	274300	596500
2011	Grass	Steep	0	Dry	Gravel	274300	596400
2012	Grass	Moderate	0	Moist	Gravel	274300	596300
2051	Grass	Gentle	0	Dry	Gravel	274400	596700
2052	Grass	Moderate	0	Moist	Gravel	274400	596600
2054	Grass	Moderate	0	Dry	Gravel	274400	596400
2055	Grass	Steep	0	Dry	Gravel	274400	596300
2081	Grass	Moderate	0	Dry	Gravel	274500	598000
2082	Grass	Steep	0	Dry	Gravel	274500	597900
2083	Grass	Steep	0	Dry	Gravel	274500	597800
2084	Grass	Flat	0	Dry	Gravel	274500	597700
2085	Grass	Moderate	0	Moist	Gravel	274500	597600
2086	Grass	Moderate	0	Moist	Gravel	274500	597500
2087	Grass	Moderate	0	Dry	Gravel	274500	597400
2088	Grass	Steep	0	Dry	Gravel	274500	597300
2090	Grass	Gentle	0	Dry	Gravel	274500	597100
2091	Grass	Gentle	0	Moist	Gravel	274500	597000
2092	Grass	Gentle	0	Moist	Gravel	274500	596900

2093	Grass	Gentle	0	Damp	Gravel	274500	596800
2094	Grass	Gentle	0	Moist	Gravel	274500	596700
2095	Grass	Gentle	0	Moist	Gravel	274500	596600
2124	Reeds	Gentle	0	Moist	Gravel	274600	598000
2135	Bare Ground	Gentle	0	Dry	Gravel	274600	596900
2136	Grass	Gentle	0	Dry	Gravel	274600	596800
2137	Bare Ground	Gentle	0	Dry	Gravel	274600	596700
2168	Grass	Gentle	0	Dry	Gravel	274700	597900
2169	Grass	Gentle	0	Dry	Gravel	274700	597800
2170	Grass	Steep	0	Dry	Gravel	274700	597700
2171	Grass	Moderate	0	Moist	Gravel	274700	597600
2172	Grass	Moderate	0	Dry	Gravel	274700	597500
2173	Grass	Moderate	0	Dry	Gravel	274700	597400
2178	Grass	Moderate	0	Moist	Gravel	274700	596900
2179	Bare Ground	Gentle	0	Dry	Gravel	274700	596800
2221	Grass	Moderate	0	Dry	Bedrock	274800	596900
2222	Bare Ground	Gentle	0	Dry	Gravel	274800	596800
2255	Grass	Steep	0	Dry	Gravel	274900	597800
2256	Grass	Gentle	0	Dry	Gravel	274900	597700
2257	Grass	Moderate	0	Dry	Gravel	274900	597600
2258	Grass	Steep	0	Dry	Gravel	274900	597500
2259	Grass	Moderate	0	Dry	Gravel	274900	597400
2264	Grass	Gentle	0	Dry	Gravel	274900	596900
2265	Grass	Gentle	0	Dry	Gravel	274900	596800
2342	Grass	Moderate	0	Dry	Gravel	275100	597700
2343	Grass	Gentle	0	Dry	Gravel	275100	597600
2344	Grass	Moderate	0	Dry	Gravel	275100	597500
2345	Bare Ground	Moderate	0	Dry	Gravel	275100	597400
2430	Grass	Gentle	0	Dry	Gravel	275300	597500
2432	Grass	Gentle	0	Dry	Gravel	275300	597300
2433	Grass	Steep	0	Moist	Gravel	275300	597200
2474	Bare Ground	Flat	0	Dry	Gravel	275400	597400
2519	Grass	Gentle	0	Moist	Gravel	275500	597200
1	Grass	Moderate	40	Moist	Gravel	273166	596599
23	Grass	Moderate	0	Moist	Unknown	271820	597113
24	Grass	Gentle	20	Damp	Unknown	272983	596424
25	Grass	Moderate	10	Moist	Unknown	273182	596521

Appendix B

Cultural Heritage Scoping Table

B.1 The following tables contain a list of all designated assets within 10km of the Site that have been identified as having theoretical visibility of the Proposed Development (scoping layout) according to a bare earth ZTV. The use of a bare earth ZTV means that actual visibility is likely to be less than initially indicated. The assets have been scoped in or out of the assessment based on a high-level understanding of their heritage significance (including the contribution made by setting) and the potential interaction with the Proposed Development. Understanding of the latter has been informed by review within Google Earth and of street view imagery.

Table B.1: Scheduled Monuments

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
SM6285	Grennan Hill fort	The monument consists of an Iron Age hillfort situated on a knoll on the south slope of Grennan Hill, about 250m from the summit. The fort is oval in plan. The inner area is 46m east to west by 24m. This is enclosed by a deep ditch on the north and west and by very steep slopes elsewhere: almost vertical on the east side. The ditch is up to 11.5m wide and 3.5m deep. Outside it is a bank up to 0.8m high. The ditch has a low internal rampart on the west side. Neither ditch nor rampart is continued on the east side, where the vertical rock face appears to have been adequate defence, nor is the ditch very pronounced on the south side. The entrance has been on the north-east side, entering the fort at a diagonal angle to the ditch and bank. Two level areas about 5m in diameter within the interior may be the sites of circular houses contemporary with the fort.	The heritage significance of this asset is derived primarily from its evidential (scientific) and historical illustrative value as a fine example of a small Iron Age hillfort. It illustrates the use of natural topography to minimise necessary defensive works and has the potential, through excavation and analysis, to provide important information about prehistoric defensive enclosures and domestic economy. Its open upland setting and the ability to visually appreciate its topographical siting are important to understanding its illustrative value as a defensive structure.	High	21 to 25	This asset is located 7.3km to the south-east of the Site. The ZTV suggests that 21-25 turbines may be visible from and potentially in-combination with the asset. Review of the proposed turbines in Google Earth suggests that only the top of the turbines would be visible over the hill line of the opposite side of the valley. Further investigation will be undertaken to understand this potential change in setting and its effect on the asset's heritage significance, if any.	In	Wireframe
SM1043	Stroanfreggan Bridge, cairn	Stroanfreggan Cairn, situated at the edge of a bank on low-lying ground, is a large circular cairn. Designed to be a highly visible monument in the landscape, it measures 26.5m in overall diameter and survives 1.6m high on its south side. Heavily robbed, it has possibly been used as a quarry and in 1910 a cist burial was found within it. This measured 3ft 5ins by 2ft by 2ft 3ins internally, beneath a cover stone, 5ft by 4ft. The cist is only partially visible beneath its cover stone, sunk into the floor of the cairn. Three set stones (and three probable socket holes) suggest an intermittent kerb. Found with the burial was a plano-convex flint knife, now in the NMAS. In 1910, some loose soil lying in the neighbourhood yielded four small chippings of flint and bone fragments mixed with charcoal. Flints, clay luting and a fragment of thin bronze (possibly from a bifid razor) recovered from this cairn are in Dumfries Museum. There are a number of other cairns recorded in the area of this one.	The heritage significance of this asset is derived primarily from its evidential (scientific) and historical illustrative value as a good example of a prehistoric cist cairn. It illustrates prehistoric burial rites in the area and has the potential, through excavation and analysis, to further our understanding of social/religious practice in prehistory, potentially revealing local or regional variations. Its open rural setting allows for an appreciation of its monumental function, and it may have some designed intervisibility with the other nearby cairns.	High	11 to 15	This asset is located 9.7km south-west of the Site. According to the bare earth ZTV up to 15 turbines may be visible from or potentially in-combination with this asset. Review in Google Earth suggests that only the top part of the turbines will be visible, and this visibility may be decreased further by intervening forest. (The Whether Hill turbines may already be visible, 5.5km to the north-east.) The ability to perceive the turbines in distant views will not diminish the ability to understand the cairn's monumental function, nor should it change any potential intervisibility between the cairn and those near to it.	Out	N/A
SM2238	Craigengillan, cairn	This circular cairn is located on the crest of the moorland, amidst forest. It measures 77ft in diameter north to south by 82ft and is 10ft high. At the base is a kerb of large, rounded boulders, contrasting with the angular fragments of stone on the surface. Two walls have been erected to form a sheep shelter on top of the cairn.	The heritage significance of this asset is derived primarily from its evidential (scientific) and historical illustrative value as a good example of a prehistoric cist cairn. It illustrates prehistoric burial rites in the area and has the potential, through excavation and analysis, to further our understanding of social/religious practice in prehistory, potentially revealing local or regional variations. Its enclosure by forestry diminishes the ability to appreciate its monumental function and means that there is no potential intervisibility with nearby cairns.	High	16 to 20	This asset is located 8.2km to the south-west of the Site. The bare earth ZTV suggests that 16-20 turbines may be visible from and potentially in combination with the asset. However, due to the forest that surrounds no intervisibility with the site is anticipated.	Out	N/A
SM633	Capenoch Loch, long cairn	A well-preserved Neolithic long cairn situated on a gentle hill slope, amidst forest. It measures 34.0m north-east to south-west; 16.0m wide at its south-west end tapering to 8.5m. For approximately one third of its length from the north-east it has been robbed to within 0.5m of ground level, elsewhere it is up to 3.1m high. There are intermittent traces of wall face (up to two courses of masonry) visible 1.8m inside the present edge of the cairn near the centre of the south-east side	The heritage significance of this asset is derived primarily from its evidential (scientific) and historical illustrative value as a good example of a prehistoric cairn. It illustrates prehistoric burial rites in the area and has the potential, through	High	11 to 20	This asset is located 8.9km from the Site. The bare earth ZTV suggests that up to 20 turbines could be visible from or in-combination with the asset. However, due to the forest that surrounds no intervisibility with the Site is anticipated.	Out	N/A

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
		and along the north-east edge for approximately 8.0m from the north-east corner. The purpose of this walling is not clear.	excavation and analysis, to further our understanding of social/religious practice in prehistory, potentially revealing local or regional variations. Its enclosure by forestry diminishes the ability to appreciate its monumental function.					
SM13711	Drumlanrig, Roman fort and annexe 400m south-east of Drumlanrig Castle	This asset is located within Drumlanrig Castle Garden and Designed Landscape, with extensive woodland to the east of it. The monument comprises the upstanding and buried remains of an Antonine Roman Fort and annexe, dating to the 2nd century AD. The monument has been recorded as parchmarks visible on aerial photographs, with some surviving banks and ditches. The fort is rectangular on plan with an annexe attached on the northeast. The remains of ramparts survive as low banks and ditches around the south side of the fort. The monument occupies a level terrace above the River Nith, at about 70m above sea level. The fort measures around 240m north-west to south-east by about 150m. A complex ditch system of up to five parallel ditches is visible on aerial photographs on the north-east and north-west. Parchmarks record up to three banks and ditches around the south of the fort, which survive as low ramparts and slight terracing above the steep slope of the terrace edge. Elements of the internal street plan, comprising roads and blocks of buildings have also been recorded as parchmarks and through geophysical survey. A number of ditches to the north-east of the fort, recorded on aerial photographs and detected by geophysical survey, indicate the presence of an attached annexe, measuring at least 200m north-west to south-east by about 60m. The fort has been subject to geophysical survey and small-scale excavation. Excavation in the interior of the fort revealed the stone walls, beam slots, possible postholes and floor surfaces of a number of buildings as well as metalled surfaces representing the edges of the internal streets. A trench across the defences on the northeast side uncovered a ditch 7m wide and 3m deep, along with the remains of a turf rampart with stone foundations. The excavation uncovered evidence for more than one phase of construction and use. It showed that the abandonment of the fort was preceded by its deliberate destruction involving the demolition and burning of the structures. A network of forts and fortlets were constructed in southern Scotland following the Roman invasions of the 1st and 2nd centuries AD. Forts were permanent or semi-permanent bases for Roman soldiers controlling an area of territory. They were linked by military roads and played a key role in the military control of Scotland. The Roman fort at Drumlanrig formed part of this wider network. Durisdeer Roman fortlet (scheduled monument SM670; Canmore ID) lies around 7.5km north-east, the probable fortlet at Sanquhar (Canmore ID 45490) around 14km north-west and Carzield Roman fort (scheduled monument SM673; Canmore ID 65890) around 20km south-east. A Roman temporary camp (Canmore ID 65201) lies around 90m south-east of the fort. It has been recorded only partially and it is possible that the features noted relate to two separate camps. Although its date is not known, it may have provided temporary accommodation for soldiers working on the construction of the fort or could be related to military campaigning in the region. A further camp is known at Islafoot on the other side of the river Nith (Canmore ID 128582). It may have been occupied at the same time as the fort at Drumlanrig, but its position on the opposite bank of the river Nith suggests it was not directly connected. The fort at Drumlanrig is therefore an important and well-preserved example of a Roman fort which formed a key part of the wider network of Roman military control in southern Scotland. It has the potential to tell us about the nature and logistics of Roman	The heritage significance of this asset is derived primarily from its evidential (scientific) value and ability to further our understanding of the character, layout and functioning of the fort, as well as the lives of Roman soldiers while in the field. Any artefacts and environmental material would enhance understanding of contemporary economy, land-use and environment. Its upstanding remains also have some historical illustrative value and its topographic siting helps to illustrate its defensive character.	High	1 to 5	This asset is located 9.9km to the east of the Site. The bare earth ZTV suggests that 1-5 turbines would be visible from the north-east corner of the fort, with the rest of the fort having no visibility. Review of the 3D turbines in Google Earth suggest no visibility. Furthermore, the ZTV does not take into account the woodland to the east of the site, within the GDL. This woodland means that it should not be possible to experience the Development as part of this asset's setting.	Out	N/A

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
		military control in this region and the differing roles of Roman military establishments. Roman forts were constructed in strategic locations, usually on communications routes and close to river crossings. The fort at Drumlanrig occupies a prominent position overlooking the River Nith. It was built on a raised terrace and made use of this topographic feature within its southern defences. The main Roman road from the south followed the east bank of the River Nith. The branch road to the fort probably forded the river below it. The road may then have continued past the fort towards the fortlet at Sanquhar. The fort was probably positioned here to control movement along the road and to monitor the river crossing.						
SM699	Maxwelton, motte	Mottes were mounds, usually artificially constructed, with a defensive wooden or stone castle tower built on the flat top. They were introduced into Scotland by Norman settlers in the 12th century and are relatively common within Dumfries and Galloway. The motte at Maxwelton is situated on the southern side of the Cairn Valley in a small clearing in a plantation which has encroached on the edge of the site; beyond this its setting is agricultural fields. The motte rises from the centre of a natural gravel ridge, adjacent to a B road. Its level, oval summit measures 70ft north-north-west to south-south-east by 60ft transversely. Some 13ft below the summit on the south-south-east is a ditch, 26ft wide, and an upcast mound 3ft high on the lower side. As it passes west, it flattens to a terrace, but at the north-north-west end of the ridge the ditch resumes, 16ft wide, but shallow, with another, shallower, ditch 30ft beyond. The east side has been mutilated by cultivation. The counterscarps of the ditches are very stony, as if they had been faced, or more probably surmounted by a wall. There is no sign of a bailey. This motte is situated 1.8km west of Maxwelton Motte, which stands on the northern side of the Cairn Valley and given their defensive function it is likely that the two were located so as to be intervisible.	The heritage significance of this asset is derived primarily from its evidential (scientific) value as a well-preserved motte with a high potential for archaeological deposits that inform our understanding of construction, use and abandonment. The asset also has some lesser historical illustrative value derived from its upstanding remains (i.e. earthworks), which illustrate the presence of a high status defensive settlement. The asset's potential intervisibility with the nearby Maxwelton Motte helps to illustrate its defensive function.	High	1 to 5	This asset is located 9.5km to the northeast of the Site. The bare earth ZTV suggests that 1-5 turbines may be visible from or in-combination with the asset, however the turbines could not be seen when viewed within Google Earth, suggesting that at that distance from the Site the turbines are largely screened by intervening topography. In addition, the vegetation around the monument will have a screening effect. It is therefore considered unlikely the Development will be experienced as part of this asset's setting and if the tips of some turbines are visible it will not affect the way in which the assets setting contributes to its significance.	Out	N/A
SM695	Lower Ingleston, motte and bailey	This motte and bailey castle is probably of late 12th century date. The motte, 31ft in diameter on the summit, surrounded by a ditch 25ft wide, 12ft in depth from the summit and 5ft below the counterscarp, has been erected at the west-south-west end of a natural hillock. The bailey has been formed by levelling the summit, and steeply scarping the sides of the hillock towards the east-north-east where a second ditch has been dug, 43ft from the actual end of the hillock. It is some 213ft long and 95ft wide at the west-south-west, tapering to 36ft at the opposite end. A bank-lined roadway leads from the bailey shown down to a squarish platform at the foot of the slope to the south. A piece of glazed medieval pottery was found in 1967 in a molehill on the bailey; this and other pottery from the site, are in Dumfries Museum. A watching brief was undertaken during OHL works in 2019. The results of this watching brief are unknown. This motte is situated 1.8km west of Lower Ingleston Motte, which stands on the southern side of the Cairn Valley and given their defensive function it is likely that the two were located so as to be intervisible.	The heritage significance of this asset is derived primarily from its evidential (scientific) value as a well-preserved motte with a high potential for archaeological deposits that inform our understanding of construction, use and abandonment. The asset also has some lesser historical illustrative value derived from its upstanding remains (i.e. earthworks), which illustrate the presence of a high status defensive settlement. The asset's potential intervisibility with the nearby Lower Ingleston Motte helps to illustrate its defensive function.	High	1 to 10	This asset is located 8.2km to the south-east of the Site. The bare earth ZTV suggests that up to 10 turbines may be visible from or in conjunction with the asset, with the greatest visibility from the south-west corner. Review of the turbines in Google Earth suggest that they will be largely concealed by intervening topography with only the upper blades of a few visible distantly above the hill line (and these could potentially be further screened by intervening vegetation). Visibility of these turbines would not affect the potential intervisibilty between this motte and that at Maxwelton nor diminish the ability to appreciate its defensive function.	Out	N/A

Table B.2: Conservation Areas

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
CA178	Moniaive	The settlement at Moniaive developed in the Cairn valley on the east side of the Dalwhat Water. Glencairn was an important cross-over point, where the east to west road met the road going north via Ayrshire to the kingdom of Dál Riada. In the 17th century the town was granted a market licence and extended west to its current location. In the mid-1880s it started to become a popular upland resort and in 1905 the Cairn Valley Light Railway opened, bringing visitors from Dumfries. The railway line closed in the 1950s. The village includes 21 listed buildings, including the category A Kilneiss House, several category B cottages, banks and the George Hotel and Martyrs Monument. Category C listed buildings include the Church and further cottages. The village is characterised by generally small-scale white cottages and houses, with some larger hotels such as the George and the Craigdarroch Arms. At the centre stands the marketplace and with a market cross on a circular base in the roadway. At the end of the Market Place stands the Tower House villa, which unusually features a tall clock tower. The village has a relatively open linear street plan, with limited back plot development, allowing for views into the surrounding countryside. The village has associations with the Victorian painter James Paterson, James Renwick and the Covenanters (who wanted a church without Bishops).	The heritage significance of this conservation area is derived primarily from a combination of its architectural and fortuitous, picturesque (aesthetic) value and historical illustrative value as a fine example of a historic uplands village. It also has some lesser historical associative value. Its wider rural setting contributes to its picturesque character and its illustrative value as an example of its kind.	Medium	1 to 15	This conservation area is located c.5.5km to the south-east of the Site. The bare earth ZTV suggests that most of it will have some visibility of the Development, with 1-15 turbines potentially visible; this visibility increase east to west across the village. Review of the turbines in Google Earth suggests that most of the turbines are largely concealed by intervening topography but that at least three have their hubs and blades visible. Intervening vegetation and built development may also have some further screening effect in some locations but the widespread visibility need to be further investigated to understand the potential interaction of the Development with the conservation area and what level of effect the introduction of an industrial feature into its otherwise picturesque rural setting would have on the character and appearance of the conservation area.	In	Wireframe
CA179	Tynron	Tynron stands in the Shinnel Valley. It is a very small village comprised mainly of small cottages set around a small 19th century church. The church designed by William Burn, is now category A listed. Four of the cottages are also category B listed, as is the road bridge that crosses the Shinnel Water to the south of the village. The conservation area also includes the category C listed Kirkland House, a late 18th century country house. Its setting comprises the wider valley, which includes Auchengibbert Wood to the north and Lann Hall and its former designed landscape to the south-west, as well as agricultural fields.	The heritage significance of this conservation area is derived primarily from a combination of its architectural and fortuitous, picturesque (aesthetic) value and historical illustrative value as a fine example of a small agricultural upland's village with very little modern intervention. It also has some lesser associative value due to the church being designed by William Burn. Its wider rural setting contributes to its picturesque character and its illustrative value as an example of its kind.	Medium	1 to 25	This conservation area is located 6.3km to the south-east of the Site, at its closest. The bare earth ZTV suggests that there is theoretically visibility of up to 25 turbines from the conservation area, with this maximum number being visible only from the site of the war memorial. This potential visibility is limited to the higher southern and western areas of the conservation area, the northern edge (beyond the Church and around Kirkland House) theoretically has no visibility. Review of the proposed turbines in Google Earth (bare earth) suggests that the turbines would be visible in the distance when looking directly along the Shinnel Valley and that although intervening topography would screen the larger part of most of the turbines at least three would be largely visible, alongside the partial blade tips of the others. The presence of woodland to the north of the conservation area will also have a screening effect, given which visibility of the of the turbines is likely to be minimal, albeit greater in winter than in summer. The Development would introduce an industrial element into an otherwise predominantly rural setting with little modern intervention, this should not visually be appreciable from the core of the conservation area but may be glimpsed from the western edge of the conservation area. The effect of this is unlikely to be significant, but the asset has been scoped in as a precaution.	In	Wireframe

Table B.3: Gardens and Designated Landscapes

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
GDL00143	Drumlanrig Castle	In the 14th century, the Douglas family were granted land in Nithsdale by King Robert the Bruce, and they built their stronghold on the site of Drumlanrig Castle. This was largely rebuilt in the early 17th century by the 1st Earl of Queensberry and a note on a plan, dated 1618, suggests that this Castle could have been designed by William Bruce. Drumlanrig and some of the Queensberry titles passed through the female line to a distant cousin, Henry, who was already the 3rd Duke of Buccleuch and thus the two dukedoms were joined in one family. Both the 3rd Duke and his son began improving the neglected property. Walter Francis, the 5th Duke of Buccleuch, who succeeded in 1819, spent the next 65 years restoring the Castle and improving the grounds. Sir Walter Scott was a close family friend and stayed at Drumlanrig on several occasions. Between 1812 and 1840, William Atkinson, William Elliot, Edward Blore, William Burn, William S. Galpin and Sir Charles Barry were all asked to produce designs for these improvements. During this period, Drumlanrig was made into one of the foremost designed landscapes in the country. Drumlanrig Castle is situated off the A76(T), some 3 miles (5km) north of Thornhill and about 17 miles north of Dumfries. It lies in the Southern Uplands in the upper reaches of Nithsdale overlooking the River Nith. The policies are mainly enclosed by woodlands but in some areas the surrounding hills form the boundaries of the designed landscape. Drumlanrig Castle sits at the southern end of a ridge between the River Nith and its small tributary, the Marr Burn, which runs just below the Castle to the south. In the 17th century the large formal landscape extended across the Marr Burn. The present size of the designed landscape is 5,004 acres (2,025ha) but this does not include the whole of the valley which forms its setting. The Castle is surrounded by a mixture of agricultural land, mainly pasture, woodland and, on the higher hills, open moorland. From the Castle there are 180 degree panoramic views over the Lowther Hills to the east and long views south towards Criffel Hill 1,868ft (570m) away on the Solway Firth. There is a shorter view north-west to Cairnkinna Hill 1,817ft (553m). The contrast between dense woodland and open parkland provides variety to the surrounding upland scenery from the A76(T) and A702. The policies stretch northwards up the valley and run southwards along the escarpment of the Nith Valley. To the south of the Castle, the gardens fall steeply in a series of terraces and banks. The kitchen garden lies about half a mile (1km) away to the southeast. Drumlanrig Wood extends around the gardens to the north, west and south. Drumlanrig Castle and its Outbuildings, Pavilion blocks, Balustrades, Quadrant Walls and Gardens Urns are all listed category A. Drumlanrig Laundry, listed category B, was built in the early to mid-19th century, remodelled in about 1871 by Charles Howitt and converted into two cottages in 1924 by J. Laird of Glasgow. The Mains and Offices, listed category B, were built in the style of William Burn in the early 19th century and altered by J. Laird in 1924. The Mains Cottages, listed category C(S), were also built early in the 19th century. The Park was laid out between 1810 and 1840 by the 4th and the 5th Dukes of Buccleuch. They were influenced by the ideas of Sir Walter Scott, who was a great friend of the 4th Duke. In 1833, in the Gardeners' Magazine, John C. Loudon wrote about 'the extensive improvements now carrying on in the grounds' and Alan Tait considers that these were probably after a scheme drawn up by William S. Gilpin whose plans for the flower garden were carried out. Informal clumps and small copses were planted with mainly hardwood trees such as oak, beech, ash, and some lime. There are one or two majestic remnants of the 18th century planting, including a 300-year-old sycamore which is the largest in Britain. In the late 19th century, over 80 miles of driveways were recorded running through the park, policies and woodlands. These scenic drives were carefully laid out to view the picturesque qualities of the landscape and they can be seen on the 1st edition OS plan. The gardens lie to the south of the Castle and the great terraces were cut out of the steep slope running down towards Marr Burn. The present framework of terraces connected by flights of steps and steep grass banks was laid out in 1738 by David Low, who was the gardener to the 3rd Duke of Queensberry. He overlaid his design on the terraces which could have been constructed by the 1st Earl in the mid-17th century. The terraces on the east and west side of the Castle were restored by 1817 and the layout can be seen in an undated sketch plan. Throughout the 19th century, these terraces were considered to be one of the 'foremost' gardens in the country. Articles extolling their layout and praising the complexity of the planting appeared regularly in gardening magazines and, in 1902, in Country Life. Some of the bedding out continued until just after World War II, when most of the terraces were grassed over. Recently two have been replanted. The walled kitchen garden was built in about 1830, probably at the same time as William Burn designed the Garden Cottage. It contained a large number of glass houses and was considered in 1883 'to have few equals in this country'. All the glasshouses and ancillary buildings	The heritage significance of this asset is derived from a combination of its designed and architectural aesthetic value and historical value, both illustrative and associative.	High	1 to 25	This asset is located 7.8km to the east of the Site at its closest. The bare earth ZTV suggests that the majority of the parkland will not have any visibility of the Development but indicates two areas of potential visibility of up to 25 turbines along the eastern and western edges of the northern half of the park. Review of the turbines in Google Earth indicates that this bare earth visibility is limited to some extent by intervening topography, with the turbines hubs largely obscured. Due to the mix of woodland and open grass within the GDL there is the potential for the turbines to be visible from and in combination with parts of the asset. Further investigation is required to fully understand the extent of this interaction and its potential effect.	In	Photomontage (in combination from east side of the park)

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
		disintegrated between the World Wars, and the garden is now covered with grass. A corrugated iron shelter has been erected around the walls to protect cattle and sheep which over-winter in it. Drumlanrig Bridge, listed category B, was probably late medieval, repaired by William Lukup in 1710, and widened in 1860 by Charles Howitt. Adjacent to it is the Bridge Cottage, listed category B, probably designed by William Burn in about 1840. Drumlanrig Creel Bridge, listed category B, was built in the early to mid-19th century out of slender cast-iron columns with iron stays and a timber walkway which has been renewed. This delicate structure, hanging over the ravine of the River Nith, is probably part of the 'picturesque' layout of W.S. Gilpin. The Gardener's Cottage in the garden is listed category C(S) and was built in the mid-19th century. Charles Howitt designed the Glasshouse near the cottage in about 1877 and it is listed category B. St Geoffrey's Bridge, listed category C(S), was built over the Marr Burn in the mid-19th century. The mid-19th century Summerhouse listed category B, is situated north of the Duchess Well and known as the Heather House. The rustic design is constructed out of split logs and twisted roots on an octagonal plan and decorated with hearts and crowns made out of shells and heather twisted into rope-like coils. There is a similar rustic Summerhouse lying to the southwest of the Castle also listed category B. Another two of a similar date are situated in the woodlands across the Marr Burn. Plans for the Garden Cottage to the west of the kitchen garden were prepared by William Burn in 1831. The Kitchen Garden complex was built in the 19th century and contained several large ranges of glasshouses and other ancillary buildings, all of which have gone. The ruins of Tibbers Castle lie just to the east of the walled garden on the riverbank. An Icehouse with an arched roof is completely buried on the east side of Bridgeknowe Loch.						
GDL00276	Maxwelton (Glencairn Castle)	Maxwelton House is situated on the north banks of the Cairn Water about 4 miles (6.5km) east of Moniaive on slightly rising ground above the B729 at the junction between the A702 Thornhill to St. John's Dalry road. The surrounding lowlands are farmed, protected from the north by the Keir Hill. There are extensive views south across to the moorland of the Dalmacallan Forest especially to Slatehouse Hill and Bogrie Hill. To the west there is a long view up the Cairn Water to Moniaive. The mature shelterbelts provide a woodland canopy in an open landscape. The house and associated buildings, white in colour, are highly significant from the B729. Maxwelton lies within 139 acres (56ha) of designed landscape, which extends north to the lodge, south beyond the B729 to the Cairn Water, west to Shancastle and east to the Chapel. Documentary evidence of the development of the designed landscape is provided by General Roy's map of c.1750, the 1st edition OS map of c.1860 and the 2nd edition of c.1900. Comparison of these maps shows that the designed landscape was extended to roughly its present form between the mid-18th and 19th centuries but was further extended to the east after 1868 when the Chapel was built. The designed landscape was laid out during the 19th century based on an earlier landscape, probably 17th century, shown on the map produced by General Roy in 1750. There are no known landscape designers. In the late 15th century, Glencairn Castle was built by the Cunninghams, Earls of Glencairn. A small portion of the estate and the castle was sold in 1611 to Stephen Laurie, a prosperous merchant from Dumfries, and the name was changed to Maxwelton House. Stephen's eldest son John probably altered the house and grounds in 1641 as noted on the armorial stone. His great-granddaughter, Annie Laurie, was the subject of the song made famous by Lady John Scott (Alicia Spottiswoode of Spottiswoode) sister-in-law of the 5th Duke of Buccleuch. Admiral Sir Robert Laurie (1764-1848) inherited the estate in 1805. He built the wheel stair to the house in 1823 in the course of an extensive phase of improvements which established the designed landscape indicated on the 1st edition OS map. The property was left to his nephew, John Fector, who took the name of Laurie in 1848. His wife, Isabella, made numerous additions both to the house and gardens after his death and built the Chapel as a memorial to her husband. John Laurie's nephew, the Rev. Emilius Bayley, inherited the estate. He too assumed the name of Laurie. Maxwelton remained in his family until 1966, when Major General Sir John Bayley sold it to a firm of property dealers. In that year, the owners obtained permission to partially demolish the house and alter the interior. In 1968, before the proposed work had started, Maxwelton was rescued by Mr & Mrs Hugh Stenhouse. The Stenhouse family embarked on a major restoration programme for the designed landscape which they maintain today. Maxwelton House,	The heritage significance of this asset is derived from a combination of its designed and architectural aesthetic value and historical value, primarily illustrative.	High	1 to 10	This asset is located 9.6km to the south-east of the Site, at its closest. The bare earth ZTV suggests that 1-10 turbines may be visible from the southern half of the GDL, the northern half is not suggested to have any visibility. Review of the turbines in Google Earth suggests that intervening topography will conceal the turbine hubs and part of the blade tips. Review of Google Earth street view imagery suggests that visibility of the turbines from some of the GDL's suggested are of visibility (e.g. near the listed chapel) will be screened by trees, however there remains some albeit limited potential for visibility and in-combination views that should be further investigated to understand the potential effects of the development.	In	Wireframe

Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
		listed category B, was originally built as a 14th century tower house. It was altered and added to in the 18th and 19th centuries and restored between 1968-1972 by Michael Laird and Partners. The South and North Gatepiers are both listed category C(S) and were built c.1800. The North and South Lodges were both built in the 19th century. The Game Larder is an 18th century octagonal building recently converted to toilets for garden visitors. The Chapel, listed category B, was built in 1868. The original architect is unknown but local builders, Wauch & Son, were responsible for restoration work commissioned in 1968. There are several other ancillary buildings around the stable courtyard, some of which have been converted into cottages and others into facilities for the garden visitors, including a museum showing many of the old domestic and farm implements. There are three rustic Summerhouses constructed in the late 19th century, two of which are listed B. The parkland extends south and east from the house and is enclosed by a stone wall. A small group of lime, planted in c.1850, sits on the top of a hillock in the eastern park. There are also specimen trees of lime, sycamore and beech. The parkland to the south stretches down to the Cairn Water and does not appear to have ever been planted with specimen trees. On the hill beyond the Cairn Water are some fine sycamore and ash trees standing in the pasture to the east of Old Crawfordton Farmhouse and these are important to Maxwelton as 'borrowed' landscape. These trees were planted in the 18th century or earlier and are shown on General Roy's plan of c.1750. The terraced lawn to the south of the house was the site of an extensive knot garden, planted during Isabella Laurie's time c.1830 and well-illustrated in the old photographs. It became overgrown and was finally removed c.1970. The garden has been replanted by Mrs Stenhouse who began the task in 1968. On the western side of the house, a path leads to the kitchen garden flanked by lawns in which drifts of daffodils are naturalised under lime trees planted c.1880. At the bottom of the garden overlooking the park is a delightful Victorian rustic summerhouse, made with an interesting oak branch construction and a shingle roof which has replaced the original heather thatch. To the south of the kitchen garden there is a small 19th century water garden with a 12' cascade which has recently been planted up with unusual trees and shrubs including Snakebark maples.						

Table B.4: Listed Buildings

Category	Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
A	LB3886	Drumlanrig Castle, outbuildings and pavilion blocks piers, balustrades and quadrant walls and garden urns	Courtyard-plan castle built in red sandstone with skewed south range and north-west corner tower shown on plans dated 1608 and 1615 was largely built for 7th Lord Drumlanrig (d.1578); 1618 scheme proposed rebuilding south range and adding corner towers (executed with some modifications): note on one plan suggests that Sir William Bruce may have advised on design. Closely related to Holyrood, particularly in treatment of main elevation. Other architects associated with Drumlanrig include John Erskine, Earl of Mar, Edward Blore, John Smallwood, Peregrine Cust, Charles Barry and J Laird. Sir G. G. Sott built a chapel within the courtyard – demolished circa 1930. Besides the pavilion blocks to the north, there was formerly a further 4 ogee-roofed pavilions (by Smith) placed around the house (shown on David Lowe's plan, 1738-see SRO RHP 9459); also gatepiers to north with Douglas crest and iron railings; lead statuary originally adorned north elevation. Plan in VITRUVIUS BRITANNICUS shows quadrants linking northern to southern towers and balustrades linking main stair to flanking pavilions. Peter Rae. notes (circa 1740) that the ground floor was vaulted for service use *"excepting that part of the front which is reserved for a chapel"*. Burrel's tour (1758) (NLS MS2911 p.7b) notes of Drumlanrig *"...they have whitewashed 3 sides of it..."*. Owned since 1388 by the Douglas family and their representatives (now Dukes of Buccleuch and Queensberry). The house stands at the centre of an 18th century designed parkland (now a GDL). Orientated roughly N-S it is approached by a long drive from the north, through open parkland that extends to the east. To the south of the house, are formal terraced gardens and to the west extensive woodland (Drumlanrig Woods). This means that the key views to/from the house are south, north, and west. Views to the east are curtailed by the woodland. The estate includes several other listed buildings including workers cottages, glasshouses and bridges.	The heritage significance of this asset is derived from its architectural (aesthetic), historical illustrative value as one of the finest examples of 17th Century Renaissance architecture in Scotland. It also has historical associative value because of its long ownership with the Douglas family and a variety of architects.	High	1 to 10	This asset is located 9.8km to the east/ southeast of the Site. The bare earth ZTV suggests that there 1-10 turbines could theoretically be visible. Review in Google Earth suggests that these turbines must be almost wholly concealed by intervening topography as the turbines were not visible. Additional, screening would be provided by the historic woodland to the east of the house. It is considered highly unlikely that the Development will be experienced within the setting of the house given the intervening topography and vegetation but given the importance of the asset it has been scoped in as a precaution.	In	Wireframe
A	LB10298	Moniaive village Kilneiss house	In 1884, the Scottish Edwardian architect Sir John J Burnet of Glasgow, noted for a number of prominent buildings in Glasgow and London, re-constructed a simple cottage in an Arts and Crafts manner for James Paterson, a Scottish landscape and portrait painter associated with The Glasgow Boys movement of artists. He is best known for his landscape paintings of Dumfriesshire, where he lived, at Moniaive from 1885 to 1905. The cottage, now Kilneiss House, is now an irregular single-storey and attic house, with 2-storey rear wing, and linked by a porch and conservatory to a former studio arrangement forming patio, open to south. Mostly harled; ashlar dressings, some timber framing. Variety of roof types and levels, mostly with projecting eaves. Windows mostly have small panes. The house stands to the north of the B792, on the edge of the village of Moniaive, which is now a conservation area. It is surrounded by gardens beyond which lie further domestic dwellings and open countryside.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical value, both illustrative and associative, as a good example of an Arts and Craft design by the imminent architect J.J. Burnet, that belonged to renowned artist, J. Paterson. Its gardens add to its illustrative value.	High	11 to 15	This asset is located 5.8km to the south-east of the Site. However, intervening topography screens much of the turbines, and vegetation in the garden and surrounding area will have a further screening effect. Distant visibility of the Development Would introduce an industrial element into what appears to be a largely rural setting that reinforces the arts and crafts movement of rejecting industrialisation and machinery and reconnecting with traditional crafts and the vernacular/cottage aesthetic.	In	Wireframe
A	LB17222	Tynron village Tynron parish church	This church was built in 1837 to designs by the Scottish architect William Burn. T-plan, small Gothic church, with gabled central vestry on long south wall, porch in both re-entrant angles. All stugged pink ashlar with polished dressings. Large 3-light window with shafted jambs and moulded reveals to each gable (projecting on north jam to support square apex belfry) with hoodmould linked to angle buttresses; smaller, similar window to vestry, with hoodmould continued over depressed-arched doors in porches: single windows to body of church flanking both vestry and north jam. Grotesque gargoyles over angles; shaped skews. Wallhead stack above vestry, 2 twisted circular flues. Belfry has angle buttresses, hoodmoulded pointed openings, diminutive grotesque gargoyles over angles, and finialed pyramidal roof. Church roofed with graded slates.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a fine example of a church of Neo Gothic design. It also has some historical associative value due to it being designed by William Burn. Its church yard adds to its	High	1 to 5	This asset is located 6.8km to the south-east of the Site. The bare earth ZTV suggests that there may theoretically be 1-5 turbines visible. Review of the turbines in Google Earth suggests that due to intervening topography only the blades of up to three or four turbines may be visible. Further screening would be provided by the vegetation within the churchyard and the woodland to the	Out	N/A

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			The interior reportedly features timber and plaster rib-vaulted ceiling; panelled octagonal pulpit. Canopied sounding board with small finials and pendants; some leaded windows; west window by Cottier & Co., circa 1892; north window circa 1878; single window on south wall circa 1912. Walled churchyard enclosure contains some interesting 17th-19th century stone monuments and is entered by steps at south with polished red ashlar balustrade, square gatepiers with shaped caps. The church is no longer in active use and is privately owned. Setting: The church is located on the eastern side of the Shinnel valley in the centre of Tynron, a conservation area. It is surrounded by a churchyard, which is lined by cottages to the east and south. Beyond this, the setting of the church is rural, with woodland to the north.	historical illustrative and aesthetic value, with its rural setting aiding in its legibility as a rural parish church.			north of it, which extends along the valley between the church and the Site. This should prevent the Development form being visible within the setting of the church and as such, its heritage significance should not be affected.		
B	LB10338	Caitloch house and gatepiers	Circa 1860. Baronial re-casting and additions to existing (probably 19th century) 2-storey, 3-bay house. Rubble-built, with red ashlar dressings; mostly ivy-clad. East elevation: original house has central ground floor bipartite (replacing original door), and 4-pane sashes: small turrets corbelled over angles linked by crenellated parapet with scalloped mock corbel course; original end stacks. Addition comprises 2-storey square tower and linking bay; shallow porch in latter, Tudor-arched door, and parapet with brackets, 1st floor window with gablet dormer head. Tower is advanced, with corbelled and crenellated angle turrets and crenellated parapet; tripartite to each floor; shaped stack on projecting and corbelled base; full-height 2-bay rear wing. Slate roofs. Interior: original house has pilastered and round-arched doorcase in dining room; wide, Tudor-arched link with addition; rebuilt wooden stair; drawing room (in tower) has marble chimney piece and ribbed ceiling paper. Castellated, circular, red ashlar gate-piers; pedestrian gates flank main entrance; curved low coping links with terminal piers; simple iron gates and railings. The house is in grounds that are wooded to the northwest and north, providing privacy from the road that passes by.	The heritage significance of this building is primarily derived from its architectural (aesthetic) and historical value, both illustrative and associative.	High	6 to 10	This asset is located 4.6km to the south-east of the Site. Intervening topography and vegetation means that visibility will be considerably less than indicated by the bare earth ZTV, if any at all. The ability to perceive the turbines in the distance within the setting of this asset would not affect any element of its heritage significance, or its understanding.	Out	N/A
B	LB17293	Chanlockfoot farmhouse and steading	Architect probably Walter Newall (the leading architect in the Dumfries area, from the 1820s until his retirement), circa 1830. 2-storey 3-bay farmhouse with detached courtyard steading to rear (west). All built of whin rubble with contrasting ashlar dressings; all roofed with graded slates. House: east elevation: round-headed central doorway behind corniced plain doorpiece, panelled door with fanlight; sash windows with bracketed cornices; bipartites at ground with lying-pane glazing, single 1st floor windows plate-glass. Corniced end stacks; piended roof. Low rear wing. Steading: essentially 4 ranges built around cobbled quadrangular court; tall 2-storey barn at west with 3-bay stable, cartshed and winnowing doorway; boarded and glazed loft openings; other ranges single storey; detached south range with loft at west, forestair on south wall, and door in either gable. Louvered or axial roof ventilators to other ranges. Rubble-walled central midden. Good stone dykes linked to steading.	The heritage significance of this building is primarily derived from its architectural (aesthetic) and historical illustrative value, and potentially some associative value with Newall. Its agricultural setting contributes to its illustrative value.	High	6 to 10	This asset is located 5km from the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB49982	Dalmakerran with stable range, cottage, gatepiers, balustrade and steps	Dalmakerran is evidently a farm that prospered greatly during the 19th century. The oldest surviving building is the 2-storey cottage and byre behind the stable yard. This dates from about 1800, and probably replaced an earlier (single storey) dwelling. A building is shown on this spot on William Crawford's map of 1804, and 'Dalmakerran' is marked on General Roy's map of circa 1760 (although here no buildings seem to be marked). The building consists of a 2-storey, 2-bay cottage at the south-east end of the building, and a byre with loft above at the other end. The remains of other buildings of roughly the same date lie to the south-west, but they have suffered extensive 20th century alterations. The main house appears to date from the 1840s or '50s and was probably built by the son or grandson of the person who built the cottage. It is shown on the 1st	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical (illustrative) value as a good example of an early 19th century cottage and slightly later farmstead with an unusually well-appointed stable block that survives relatively unaltered. Its	High	1 to 5	This asset is located 6.7km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A

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			edition OS map, with the outshot to the rear, but without the side wings. The side wings appear on the 2nd edition OS map, no doubt the addition of the next generation. The stable block, which is exceptionally well-designed and fitted out with all the latest technology of the time (including heating pipes, tiled walls, and a relatively well-appointed room for the groom with a fireplace), was built in the second half of the 19th century, possibly in about 1880. The stables at Duncow (situated a few miles North of Locharbriggs and built in 1878) have very similar green tiles, stall partitions etc. which were probably supplied by the same firm of stable fitters. The balustrade in front of the house was put up in about 1950 but came from another house and dates from about 1820. The farm stands to the south of Dunreggin Brae and is surrounded by agricultural land often featuring tree lined field boundaries.	agricultural setting contributes to the legibility of the farm's function (e.g. its illustrative and value).					
B	LB10309	Ingleston martyrs' monument	Stone monument erected circa 1685 against north wall of farmhouse garden to commemorate execution of 5 martyrs. Comprising a simple upright slab, with shaped top, inscribed on south face. Inscription reads *"In this yard were shot John Gibson, James Bennoch, Robert Edgar, Robert Mitchell & Robert Grierson, April 28: 1685 by Colerell (sic) Douglass & Livingstouns Dragoons for adhering to Christs Kingly Government (sic) in his Church against Tyrannie perjurie & prelacie"*. Their tombstones are in the Parish Churchyard (no 232 in INVENTORY).	The heritage significance of this monument is derived primarily from its historical associative value with the Covenanter movement and its illustrative value in highlighting this aspect of the area's social history. The monument itself is of limited architectural (aesthetic) design. The key aspect of its setting relating to its heritage significance is its location, a direct connection to where the event it commemorates took place (i.e. its associative value).	High	21 to 25	This asset is located 8.4km to the south-east of the Site. The ZTV suggests that up to 25 turbines could be visible, but these will be screened to a large extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB17178	Killiewarren farmhouse and adjoining steading range	Rectangular-plan altered 3-storey farmhouse built probably early 18th century, earlier fabric incorporated at ground; full-depth single storey and attic 2-bay west wing probably by Charles Howitt, circa 1860. Circa 1820 long, low steading range adjoining to rear (north) with waterwheel, altered, (? by Howitt) with porch added in re-entrant angle. All rubble-built with ashlar dressings; house is whitewashed; all roofs slated. Original house: south elevation: 3 ground floor windows (modern bipartite right), inner window formed in 19th century door slapping; 2 wide, regular bays above. Original north-facing segmental-arched and roll-moulded doorway behind porch, single small window above latter. Sash windows with 4-pane glazing in chamfered reveals. 19th century skews and end stacks. Wing: 1617 panel incorporated above round-headed doorway, gabled dormer head over remaining bay; bull-faced dressings. Steading range: Whin rubble, original dressings red ashlar, alterations with pink ashlar dressings. Cast-iron and timber overshot wheel and gearing on west wall (interior machinery removed), lade carried over 2 red ashlar supporting piers. Square-headed openings; banked loft door in north gable.	The heritage significance of this building is primarily derived from its architectural (aesthetic) and historical illustrative value. Its agricultural setting contributes primarily to its illustrative value.	High	1 to 10	This asset is located 5.6km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB17183	Lann hall house and walled garden	Late 18th century symmetrically planned small mansion house: 2 storeys over raised basement, 3 bays. Single storey flanking wings recessed from main north front, with lower flat-roofed square bays in re-entrant angles. Painted harl, dressings and rusticated quoins. North elevation: central Roman Doric-columned doorpiece approached by small, polished ashlar perron, with steps oversailing basement area, and cast-iron railings; Band course over basement, and plate glass sashes above; eaves course and cornice; late 19th/early 20th century pedimented tripartite dormer (similar dormer to flanks); symmetrically placed corniced stacks; steep-pitch piended and platform roof. Basement door and ground floor window to flanking square bays; flanking wings also piended and	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of a small country house. The remains of its former parkland and gardens contribute to its illustrative value and are specifically	High	21 to 25	This asset is located 7.3km to the south-east of the Site. The ZTV suggests that up to 25 turbines could be visible, but these will be screened to some extent by intervening topography, vegetation and in the walled garden by the structure itself. Any ability to perceive the Development in distant views from or in combination with the asset will not	Out	N/A

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			set behind cast-iron railings. Interior: some decorative ceiling plasterwork; panelled doors in architraves. House forms part of north wall of rectangular-plan walled garden enclosure (dated 1807; rubble-built). The house is orientated roughly north-east to south-west with formal gardens to the rear (south-west) and a drive leading through woodland (remnant shelterbelts from the former parkland) to the front. At the northern end of the drive stands the lodge house and gatepiers (now cat. B listed). Historic maps denote an area of parkland beyond the woodland to the northeast, but this is now agricultural land. A series of buildings set in courtyard plan stand to the north-east of the house amongst the woodland and there are modern agricultural buildings to the west to north-west. Further modern buildings have been constructed along the driveway to the north, between the lodge and house.	designed in response to the house.			change the way its setting contributes to its significance.		
B	LB17184	Lann hall north lodge and gatepiers	Late 18th/early 19th century. Symmetrical single storey 3-bay lodge. Harled, with painted margins and rusticated quoins. East elevation: central door with rectangular fanlight; 12-pane sashes in outer bays and to flanks; symmetrically placed corniced square stacks; piended slate roof. Original gateway now widened; on west side of drive are 2 ball-finialed, corniced, square, painted and rusticated ashlar piers linked by decorative cast-iron railings on low coping; 2 cut-down piers survive on east side of drive, and 1 at least is re-sited.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of a lodge house and gate piers. The key setting relationships of this asset are with the driveway and boundary wall of the estate; it also has an important functional relationship to the main house.	High	21 to 25	This asset is located 7.3km to the south-east of the Site. The ZTV suggests that up to 25 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB10323	Lower Ingleston gatepiers	Dated 1801. 2 rubble-built square gatepiers corniced, with ball finials, that to north inscribed “T & M Smith” and dated.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of early 19th century gate piers. The key setting relationships of this asset are with the driveway and boundary wall.	High	11 to 15	This asset is located 8.1km to the south-east of the Site. The ZTV suggests that up to 15 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB10324	Maxwelton house	Maxwelton House is situated on the north banks of the Cairn Water about 4 miles (6.5km) east of Moniaive on slightly rising ground above the B729 at the junction between the A702 Thornhill to St. John's Dalry road. Maxwelton, which was originally known as Glencairn Castle, is a 17th-century tower house of two storeys and an attic, although an older castle, dating from the 14th and 15th centuries, may be incorporated. To this has been added a large mansion around three sides of a courtyard. The tower stands at one end of a later wing, and has a round tower, formerly containing a stair, in the re-entrant angle. The house has been much altered inside, but part of the basement is vaulted. The house stands at the centre of an 18th century designed landscape, which extends north to the lodge, south beyond the B729 to the Cairn Water, west to Shancastle and east to the Chapel. Woodland shelter belts focus views through the parkland to the north-east and south-west. The estate includes several other historic buildings, including a summer house and chapel that are now listed. The house and associated buildings, white in colour, are highly visible from the B729.	The heritage significance of this asset is derived from its architectural (aesthetic) and historical illustrative value as a complex example of 17th century tower house, incorporating the remains of an earlier building. It has some evidential value as a result of the earlier building remains and potentially from both buildings' construction and materials. It also has historical associative value as a result of its history of ownership, particularly with Annie Laurie. Its designed	High	1 to 5	This asset is located 10km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Review of the turbines in Google Earth suggests that they will be almost wholly concealed by intervening topography and the vegetation around the house will provide further screening. It is highly unlikely therefore that the development will be perceptible within the setting of this asset. However, any ability to perceive the Development in distant views from or in combination with the asset will not	Out	N/A

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			The property originally belonged to the Dennistouns but passed by marriage to the Cunninghams of Kilmaurs in the 15th century. The property was sold to the Laurie family in 1611, and they changed the name to Maxwelton, which was the name of a neighbouring property. This was the home of the heroine of the song 'Annie Laurie'.	landscape and associated historic buildings contributes to its illustrative as a high-status dwelling and an appreciation of its aesthetic value.			change the way its setting contributes to its significance.		
B	LB10328	Maxwelton house summerhouse to southwest of house	Late 19th/early 20th century. Rustic semi-circular summerhouse. Timber framed, outer wall panels of split twigs in herring-bone, diamond and square patterns: open at south below gable, latter supported on simple columns; cobbled floor; seats along inner wall face. Shingle roof. This asset is in the garden 50m west of the Maxwelton House, adjacent to a shelter belt of trees.	The heritage significance of this asset is primarily architectural (aesthetic) and historical illustrative. Its key setting relationship is with the garden in which stands, which helps to make legible its function.	High	1 to 5	This asset is located 10km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Review of the turbines in Google Earth suggests that they will be almost wholly concealed by intervening topography and the vegetation around the house will provide further screening. It is highly unlikely therefore that the development will be perceptible within the setting of this asset. However, any ability to perceive the Development in distant views from or in combination with the asset will not change the way its setting contributes to its significance.	Out	N/A
B	LB10331	Moniaive village Broomfield bank	Early 19th century. Single storey 3-bay cottage, set on slope, with basement, raised at front, and attic. Painted rubble and margins. South elevation: steps, with twisted iron balusters, spanning basement area, lead to round-headed doorway with cavetto reveals, panelled door with fanlight. 12-pane sashes to outer bays and to basement. Central modern flat-roofed tripartite dormer. Straight skews; corniced end stacks; slate roof. Basement door in west gable; 3 windows to north wall. Located within gardens and agricultural land at the edge of Moniaive Conservation Area.	The heritage significance of this asset is primarily architectural (aesthetic) and historical illustrative as a good example of an early 19th century cottage. The cottage has a functional/historical relationship with its garden plot.	High	11 to 15	This asset is located 5.7km to the south-east of the Site. The ZTV suggests that up to 15 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect its heritage significance.	Out	N/A
B	LB10332	Moniaive village Broomfield house and gatepiers	Earlier 19th century. Symmetrical 2-storey 3-bay villa with raised basement & bowed outer bays; single storey and attic recessed west wing and additional east bay. All harled, with painted margins. South elevation: house has central Roman Doric-columned porch approached by steps, round-headed doorway in cavetto moulding, panelled door with fanlight. Band course at ground, all windows above 4-pane sashes. Symmetrically placed stacks: piended slate roof, curved over bowed bays. West wing has 3 bays to south elevation, upper floors supported on 2 Tuscan columns. 2 circular corniced painted ashlar gatepiers to south. Located within Moniaive Conservation Area.	The heritage significance of this asset is primarily architectural (aesthetic) and historical illustrative as a good example of an early 19th century villa. The cottage has a functional/ historical relationship with its garden plot.	High	6 to 10	This asset is located 5.7km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect its heritage significance.	Out	N/A
B	LB10333	Moniaive village Chapel street bank, Bank house and gatepiers	Formerly the union bank, now residential. Early 19th century single storey over basement 3-bay centre-doored cottage, alterations, and additions later in century, including taller gabled wing to south. Original cottage (now bank house) built of painted whin rubble (additions rendered as ashlar) with margins and rusticated quoins. Roman Doric-columned porch, wall-head attic gable raised above with round-headed light; band course above ground; plate glass sashes in outer bays. Gabled addition (bank office) has 3 segmental-headed arcaded ground floor openings, consisting of door, and 2 windows with apron panels, all in shaped margins: round-headed attic bipartite above. Saw-tooth skews; apex	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. Its setting does not contribute to its significance beyond its central location in the village	High	6 to 10	This asset is located 6.3km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination	Out	N/A

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			stacks; slate roofs. Square painted ashlar gatepiers, decorative cast-iron gates and railings, latter raised on ashlar coping. Located within Moniaive Conservation Area. The setting of this asset includes its garden and the historic development in the centre of Moniaive.	aiding in understanding its historic function.			with the asset will not affect its heritage significance.		
B	LB10294	Moniaive village Dunreggin former Free Church manse and stables	Built 1843. Asymmetrical 2-storey former manse. Painted rubble and margins; lying-pane sashes. North (entrance) elevation: advanced gable to right with 2 ground floor windows, piended shallow porch in re-entrant angle, door with flanking narrow lights; 2 gables facing east, that to left recessed, and blind; south elevation has advanced left gable with tripartites, ground floor bipartite to right below single window, narrow upper light in re-entrant angle. Straight skews; some gables finialed. Wall-head and apex stacks, paired, octagonal and corniced flues; slate roofs. Former stables built of painted rubble; 2 depressed-arched cart openings at west end of north wall; octagonal flue over east gable; slate roof. Located within the centre of Moniaive, now a conservation area. It stands adjacent to the church on the southern edge of the village. This area is largely undeveloped agricultural land.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship with the church that can be understood spatially/visually.	High	6 to 10	This asset is located 6.7km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance as it will not change the ability to appreciate the spatial relationship between the church and manse.	Out	N/A
B	LB10295	Moniaive village high street bridge A702 over Dalwhat water	William Stewart mason. Built circa 1801. Single segmental-span bridge. Rubble-built with recessed ashlar arch rings ramped parapet with ashlar coping, eastern approach widely splayed with pyramidal cap to square terminal pier of north parapet, south parapet continued south as a dyke. Widened. The bridge is located along Moniaive High Street and carries it over the Dalwaht Water. Located within Moniaive Conservation Area.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It also has some associative value. It has an important functional relationship with the High Street and the water that it crosses.	High	1 to 5	This asset is located 6.2km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography, vegetation and built development. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
B	LB10296	Moniaive village High Street George hotel	Early/Mid-18th century. 2 adjoining 2-storey 3-bay houses (single storey 5-bay west wing probably late 19th century). Painted rubble and margins. Houses each have central doors entered below present street level, steps down with handrails; house to east has shaped door architrave, and ground floor windows probably widened in 19th century. Some unsympathetic glazing. Corniced axial stacks, graded slate roofs. Door and 4-pane sashes to low wing. Alterations to rear. Located within Moniaive Conservation Area, along the High Street.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship to the High Street.	High	1 to 5	This asset is located 6.2km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography, vegetation and built development. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
B	LB10292	Moniaive village, Dunreggin: Inver cottage and w. Glencross	Mid/late 18th century. 2 adjoining single storey, 3-bay, centre-doored cottages. Painted rubble on boulder base. 8-pane sashes. Original central, and rebuilt end stacks. This asset is located along the A702, within Moniaive Conservation Area. It faces directly onto the road but has a rear garden.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. Its garden makes a limited contribution to its legibility as a domestic dwelling.	High	6 to 10	This asset is located 6.4km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography, vegetation and built development. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting	Out	N/A

Category	Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
							contributes to its heritage significance.		
B	LB10314	Moniave village North Street cottages (formerly Macready's workshop:/corner with high street	Early 19th century. Single storey, dormerless cottage row. Painted rubble and margins. 2 centre-doored, 3-bay cottages, corner towards High Street canted, adding 2 additional bays (door and window), to right house, and narrow pend facing High Street. 12-pane sashes; coped axial stacks, slate roofs. Lower, gabled shed adjoins north gable. Located within Moniaive Conservation Area.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. Its garden makes a limited contribution to its legibility as a domestic dwelling.	High	6 to 10	This asset is located 6.2km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography, vegetation and built development. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
B	LB17271/ LB10215[66]	Scaur bridge (Penpont - Kiermill road over scaur water)	Early/mid-19th century. Road bridge; 2 segmental arches over Scaur water. Squared rubble, bullfaced ashlar central pier with pointed cutwaters; recessed arch rings, band course and parapet coping all polished ashlar. Parapets partly rebuilt, ramped, and splayed at approaches.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship with the road that it carries and the water that it crosses.	High	1 to 5	This asset is located 9.7km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
B	LB17223	Tynron village cottages property of Mr Scott, Stenhouse	3 adjoining single storey cottages, 2 with 3 bays, central doors and end stacks; cottage to east set at an angle; 2 bays, and roofed with graded slates (uniform slates to other cottages). All painted rubble and contrasting margins. Sash windows; lying-panes to inner cottage. Probably late 18th century. The cottages stand at the centre of the village of Tynron, a small agricultural settlement designated as a conservation area. They front directly on to the road and may not have back gardens as the church and church yard appear to stand directly behind them. They form a part of a larger group of cottages within the village, illustrating its agricultural origins.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) value and historical illustrative value as good example of a late 18th century cottage. In terms of setting, they have group value with the other cottages in the village in illustrating its history.	High	1 to 5	This asset is located 6.8km to the south-east of the Site. The bare earth ZTV suggests that there may theoretically be 1-5 turbines visible. Review of the turbines in Google Earth suggests that due to intervening topography only the blades of up to three or four turbines may be visible. However, the front elevation of this row of cottages faces away from the Development (south) and the rear faces onto the valley side and into the church yard, within which further screening would be provided by the church itself as well as the vegetation within the churchyard, and beyond it. The Development should therefore not be visible within the setting of the cottages.	Out	N/A
B	LB17221	Tynron village Tynron bridge (over Shinnel water)	Early 19th century road bridge within the village of Tynron, a conservation area. It comprises a single segmental arch over the Shinnel water. Constructed in Ashlar, it has a recessed arch ring; bull-faced abutments below band course; stugged parapet, ramped, and is splayed at the approaches.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional	High	21 to 25	This asset is located 6.8km to the south-east of the Site. The bare earth ZTV suggests that there may theoretically be 21-25 turbines visible. Review of the turbines in Google Earth suggests that due to intervening topography only the tips of the blades	Out	N/A

[66] This bridge has two separate listings, reflecting the fact that it crosses between different administrative areas.

Category	Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
				relationship with the road that it carries and the water that it crosses.			of a number of turbines may be visible, with three or four turbines potentially being more fully visible. Further screening would be provided by the vegetation along the river and the woodland to the north of it, which extends along the valleyside. This vegetation means that long-ranging views along the valley are limited. In any case, visibility of the turbines would not affect the relationship between the bridge and the river, road or village and as such would not affect the illustrative or architectural values of the bridge.		
B	LB10320	Waulkmill bridge A702 over Craigdarroch water	Late 18th/early 19th century. 2 ball-finialed, corniced, square, rusticated ashlar gatepiers flanking west drive, linked to similar, simpler outer piers by cast-iron railings on low coping: all painted. Decorative cast-iron gates.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship with the road that it carries and the water that it crosses.	High	11 to 25	This asset is located 6.4km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
C	LB10337	Blackstone bridge (Glenwhisk-blackstone road over Castlefairn water)	Earlier/mid-19th century. Road bridge, single segmental arch over Castlefairn Water. Rubble-built with ashlar coping to ramped parapets; latter curved outwards at approaches.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship with the road that it carries and the water that it crosses.	High	16 to 25	This asset is located 7km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
C	LB17215	Lann hall gatepiers at west gate	Late 18th/early 19th century. 2 ball-finialed, corniced, square, rusticated ashlar gatepiers flanking west drive, linked to similar, simpler outer piers by cast-iron railings on low coping: all painted. Decorative cast-iron gates.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a good example of its kind. Its key setting relationship is with the boundary wall that the piers adjoin and the estate with which it marks the entrance to.	High	21 to 25	This asset is located 7.4km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.	Out	N/A
C	LB10330	Moniaive village Ayr Street Carradale	Mid/later 19th century. Symmetrical single storey, 3-bay former police station squared whin rubble with painted ashlar margins, long and short worked window dressings and raised quoins. Elevation to Ayr Street: segmental-headed openings with chamfered reveals; central door in simple doorcase with cornice at eaves level, blocking course above; narrow sidelights; 8-pane sashes in outer	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a good example of its kind. The	High	6 to 10	This asset is located 6.2km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to some extent by intervening topography and vegetation. Any	Out	N/A

Category	Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
			bays. Symmetrically placed stacks; piended slate roof. Windows to flanks have lying panes. Located within Moniaive Conservation Area.	cottages have a functional and aesthetic relationship with their rear gardens.			ability to perceive the Development in distant views from or in combination with the asset will not affect how its setting contributes to its heritage significance.		
C	LB10334	Moniaive village Dunreggin glen Afton Clochnaben Hillview and cottages between and adjoining	Dated 1906. Single storey and attic block of 5 adjoining cottages (2 on return elevation) with Arts and Crafts features. Rubble-built with contrasting red ashlar dressings; mullioned (some in stone) windows both 2 and 3-light; pebble-dashed above wall head. 3 gabled porches to main road (south-west) elevation, 3 wall-head gables and swept-roofed double dormer (datestone between openings) placed off centre; bracketed (timber) oriel at south end, below relieving arch. 2 gables to return (south-east) elevation, and 2 doors behind lean-to timber porch. Corniced stacks, gabled roofs, with red ridging tiles and bracketed eaves; covered with graded slates. The cottages front directly onto the A702, looking south-east and have rear gardens to the north-west. They are located within Moniaive Conservation Area.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a good example of its kind. The cottages have a functional and aesthetic relationship with their rear gardens.	High	1 to 5	This asset is located 5.7km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography and built development within Moniaive. Any ability to perceive the Development in distant views from or in combination with the asset will not affect its heritage significance.	Out	N/A
C	LB10293	Moniaive village Dunreggin shell of former free church	Built 1843. Partially demolished and roofless shell of former Free Church. Rubble-built, with ashlar dressings. Gothic. Long north wall survives to eaves level with 5 buttressed bays; porch at west gable: south transept near east end; south gable survives, with gabled apex bellcote. This asset is located at the southern edge of Moniaive, within the conservation area, but slightly apart from the rest of the village. It stands within an enclosed tree lined churchyard, adjacent to the former Manse.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as an example of its kind.	High	1 to 5	This asset is located 6.7km to the south-east of the Site. The ZTV suggests that up to 5 turbines could be visible, but these will be screened to some extent by intervening topography, built development and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not affect its heritage significance.	Out	N/A
C	LB10297	Moniaive village High Street/Ayr Street Tower house	Mid/later 19th century. 2-storey house with square clock tower above entrance. Built of whin rubble with contrasting painted long and short worked dressings and stop-chamfered margins. Tower has 4 stages, louvered bipartite to each face of 3rd stage, clock each face of top stage and slated short facetted spire, with lucarnes at foot, and weathervane finial. East elevation: 3 bays, tower central, remaining bays (advanced left, recessed right) gabled; windows mostly bipartite; sashes, with 6-pane glazing pattern. End stacks on projecting chimney breasts; slate roof. Located within the centre of Moniaive village, a conservation area it stands within a garden plot and is surrounded by built development.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as an unusual house featuring a tower clock, which acts a prominent landmark with the village due to its central location and height/visibility.	High	6 to 10	This asset is located 6.2km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to a larger extent by intervening topography, built development and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not challenge its prominence within the townscape or affect its silhouette.	Out	N/A
C	LB17219	Stenhouse house and conservatory	Circa 1840. 2-storey (1st floor raised through eaves) country house, with conservatory adjoining south gable. House is stugged ashlar with chamfered margins, sash windows with lying-pane glazing. East elevation: advanced central wide gabled bay with ground floor tripartite, 1st floor bipartite, gabled porch in left re-entrant angle; ground floor bipartites to outer bays; 1st floor windows have gabled dormer heads: all gables have saw-toothed skews; painted, asymmetrically arranged stacks. Roofed with graded slates. Conservatory is gabled, mostly timber-framed with cast-iron brackets inside, band of coloured leaded panes at eaves level. The house stands a short distance to the north of Tynron, within what appears to be the remains of a small parkland. There is a walled garden to the north of the house, adjacent to which are a series of modern agricultural buildings. A driveway provides access from the south and at its entrance is a lodge house. The setting is otherwise open and rural (agricultural), save for Auchengibbert Wood to the north and Stenhouse Wood to the west.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a good example of a small country house. Its key setting relationship is with the remains of its estate and rural setting, which helps illustrate its function and complements its design.	High	16 to 20	This asset is located 6.3km to the south-east of the Site. The ZTV suggests that up to 20 turbines could be visible. These will be screened to some extent by intervening topography and vegetation but as they will stand directly behind (north) of the main elevation in-combination views could affect the ability to appreciate is aesthetic value.	Out	N/A

Category	Designation Reference	Name	Description	Significance	Importance	No. of Turbines Theoretically Visible (Scoping Layout)	Potential Interaction (Scoping Layout)	Scoped	Visualisation
C	LB17220	Stenhouse lodge	Mid-19th century. Symmetrical single storey, 3-bay lodge. Gothic. Painted rubble and ashlar dressings. East elevation: hood-moulded openings; gabled, shallow central porch; Tudor-arched doorway; bipartites in outer bays with chamfered reveals (similar window in south wall); chamfered angles. Piended slate roof (graded slates), central axial stack with 2 diamond flues. This lodge house stands at the entranceway to Stenhouse House.	The heritage significance of this asset is derived primarily from its architectural (aesthetic) and historical illustrative value as a good example of a lodge house. Its key setting relationship is with the remains of the driveway and estate, which help illustrate its function.	High	16 to 20	This asset is located 6.3km to the south-east of the Site. The ZTV suggests that up to 20 turbines could be visible, but these will be screened to a larger extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the understanding of the building's function.	Out	N/A
C	LB10319	Tererran bridge over Dalwhat water	Probably early 19th century. Rubble-built road bridge, stilted segmental span over Dalwhat water, ramped parapets with droved ashlar coping, pyramidal caps to square terminal piers.	The heritage significance of this asset is derived primarily form its architectural (aesthetic) and historical illustrative value as a good example of its kind. It has an important functional relationship with the road that it carries and the water that it crosses.	High	6 to 10	This asset is located 3.9km to the south-east of the Site. The ZTV suggests that up to 10 turbines could be visible, but these will be screened to a larger extent by intervening topography and vegetation. Any ability to perceive the Development in distant views from or in combination with the asset will not change the understanding of the building's function.	Out	N/A

Appendix C

Questions for Consultees

C.1 Comments from consultees are invited in relation to the following questions as detailed within the EIA Scoping Report.

Scoping Report Chapter	Questions
3: Project Site Description	Q3.1: Confirmation is requested on the proposed approach to the assessment of decommissioning.
4: Landscape and Visual Amenity	Q4.1: Are there any comments on the overall methodology proposed to assess effects on landscape and visual receptors, or to assess cumulative effects?
	Q4.2: Are there any comments on the proposed list of assessment viewpoint locations (including night-time assessment viewpoint locations)?
	Q4.3: Are there any further wind farm sites to those shown on **Figure 4.4**, or changes to project development status, which should be considered as part of the cumulative assessment?
	Q4.5: Has the consultee identified 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 there any other relevant consultees who should be consulted with respect to the LVIA?
5: Hydrology, Hydrogeology and Peat	Q5.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, and peat?
	Q5.2: Is the proposed methodology appropriate?
	Q5.3: Are the proposed list of effects which are scoped in appropriate?
	Q5.4: Is the proposed approach to mitigation appropriate?
6: Ecology	Q6.1: Do consultees agree with the range of desk study sources and ecology surveys considered to inform the design and assessment of the Proposed Development?
	Q6.2: Do consultees agree that the full range of likely effects to be assessed within the EIA Report has been adequately identified and is proportionate to the nature of the Proposed Development?
	Q6.3: Are there any other relevant consultees who should be contacted with respect to the ecology assessment and scope of baseline information gathering?
	Q6.4: Do consultees agree with those features that have been scoped out of assessment in respect to ecology (and the rationale for the decision)?
	Q6.5: Do consultees agree with the proposed scope of the cumulative assessment?
7: Ornithology	Q7.1: Do consultees agree with the range of desk study sources and ornithology surveys considered to inform the design and assessment of the Proposed Development? Including the 'Target Species' considered.

Scoping Report Chapter	Questions
	Q7.2: Do consultees agree that the full range of likely effects to be assessed within the EIA Report has been adequately identified and is proportionate to the nature of the Proposed Development?
	Q7.3: Are there any other relevant consultees who should be contacted with respect to the ornithology assessment and scope of baseline information gathering?
	Q7.4: Do consultees agree with those features that have been scoped out of assessment in respect to ornithology (and the rationale for the decision)?
	Q7.5: Do consultees agree with the proposed scope of the cumulative assessment?
8: Cultural Heritage	Q8.1: Have the key concerns relating to cultural heritage been identified correctly?
	Q8.2: Do consultees agree with the designated assets scoped into the assessment or should additional assets also be assessed? (If so, please provide a rationale for why these asset(s) should be assessed).
	Q8.3: Do consultees agree with the proposed approach to baseline gathering and assessment?
	Q8.4: Do consultees agree with the proposed visualisations?
9: Noise and Vibration	Q9.1: Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the IOA GPG to assess operational noise and BS5228 to assess construction noise?
	Q9.2: Can consultees agree that assessment of vibration, low frequency noise, amplitude modulation and decommissioning noise be scoped out of EIA?
10: Traffic and Transport	Q10.1: Is the proposed methodology considered acceptable?
	Q10.2: Are the methods proposed for obtaining traffic flow data acceptable?
	Q10.3: Is the use of Low National Road Traffic Forecasts (NRTF) acceptable for the whole of the study?
	Q10.4: What cumulative traffic flows from committed development should be included in the assessment?
11: Aviation	Q11.1: Does the proposed method for consultation with aviation stakeholders meet the requirements of the ECU?
12: Socio-Economics	Q12.1: Are there any other relevant consultees who should be consulted with respect to the assessment of effects on socio-economics?