ARCUS

CLOUD HILL WIND FARM

SCOPING REQUEST

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1 INTRODUCTION

1.1 Overview

This Scoping Report (the Report) has been prepared by Arcus Consultancy Services Ltd (Arcus) on behalf of Cloud Hill Windfarm Ltd (CHWFL), hereafter referred to as 'the Applicant'.

The Applicant is proposing to submit an application for planning permission to the Scottish Government's Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989[1] to construct and operate Cloud Hill Wind Farm (the Development), on land approximately 5 kilometres (km) south-west of Sanquhar, Dumfries and Galloway (the Site). The Development will comprise of up to 14 turbines with a tip height up to 180 metres (m) and associated infrastructure, with a generation capacity exceeding 50 megawatts (MW).

The Report forms the Applicant's written request to the Scottish Government, under Regulation 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations)[2], for its opinion (i.e., 'Scoping Opinion') as to the information to be provided in the Environmental Impact Assessment (EIA) Report for the Development.

The Report is accompanied by the following appendices:

- Appendix A - Figure List;
- Appendix B – Table of Designated Heritage Assets within the 5 km Study Area; and
- Appendix C - List of Suggested Consultees.

The following figures are included in Appendix A and referenced throughout the Report:

- Figure 2.1 - Site Location;
- Figure 2.2 - Site Layout;
- Figure 6.1 - Study Area;
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1.2 The Applicant

Cloud Hill Windfarm Ltd is a working partnership between Blue Energy Ltd and BayWa r.e. UK Ltd (BUK).

Since Blue Energy Ltd was founded in 2010, the team has established itself as a leading developer in the UK renewable energy sector, having developed, funded and constructed over 320 MW of onshore wind and solar generation assets in the United Kingdom.

BUK is a leading, reputable, international renewable energy project developer and service provider with offices in Glasgow, Edinburgh, Milton Keynes and Dublin. In the UK and

[1] UK Government (1989) Electricity Act 1989 [Online] Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents (Accessed 03/03/2022)
[2] Scottish Government (2017) The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed 03/03/2022)

Ireland, BUK has delivered close to 200 MW of wind energy and is currently developing over 300 MW of onshore wind. BUK also provides technical and commercial services, and services and manages more than 1.5 Gigawatts (GW) of operational wind and solar assets.

1.3 Planning History

The Site has been subject to a planning application for Ulzieside Windfarm for which the EIA was submitted in 2006 (Dumfries and Galloway Council Reference: 06/0P/3/0527). Planning permission was sought by North British Wind to erect a windfarm consisting of 20 three-bladed horizontal-axis turbines, with a maximum tip height of up to 120 m and an installed capacity of 49.9 MW.

In 2007, Supplementary Environmental Information (SEI) was submitted for a reduced windfarm of 15 turbines, in which, the turbines located to the east of Glen Burn were removed or relocated, in response to issues raised by consultees. The proposed scheme was further reduced to 12 turbines (up to 120 m to tip) in 2009, including two turbines which would only be erected if Turbines 9 and 13 of Whiteside Hill Wind Farm were not erected.

Primarily due to commercial arrangements, the application was subsequently withdrawn.

Given the planning history, there is a considerable volume of useful information and data regarding the Site however, it is acknowledged much of this is out-of-date. In addition, the Development has different parameters to the previous application on the Site and therefore, while acknowledging the planning history, should be considered on its own merit.

2 THE DEVELOPMENT

2.1 Introduction

The Development will comprise of up to 14 turbines with a tip height up to 180 m and associated infrastructure, with a generation capacity exceeding 50 MW. The ancillary infrastructure will likely include access tracks, electrical infrastructure, temporary construction compounds, a permanent met mast, energy storage and borrow pits. The ancillary infrastructure proposed may change as the final parameters of the Development are identified throughout the iterative EIA process.

2.2 The Site

While the Site entrance is located approximately 0.5 km south-west of Sanquhar, Dumfries and Galloway, the turbines and ancillary infrastructure will likely be located over 5 km from Sanquhar. The Site centre is located at NGR 274072, 605300. The Site extents and location are shown on Figure 2.1.

There are a small number of residential dwellings found within 5 km of the Site, principally located along Blackaddie Road, which runs from Sanquhar to Glenglass Substation to the north of the Site. The Southern Upland Way (SUW), designated as a Core Path (504) in the Dumfries and Galloway Core Paths Map[3], runs south-west through the centre of the Site.

The topography of the Site and immediate vicinity is complex, with elevation ranging from approximately 150 m Above Ordnance Datum (AOD) in the north-east part of the Site to approximately 470 m AOD in the south-east of the Site, at the summit of Corridow Hill. There are a number of other hills within the Site including Mid Rig (437 m AOD), Cloud Hill (451 m AOD) and Whing Head (456 m AOD).

The hills are dissected by a number of watercourses, including Whing Burn, Glenmaddie Burn, Glen Burn, and Glenlarie Burn. Watercourses within the Site flow into the River Nith, and eventually the Nith Estuary within the Solway Firth.

Vegetation across the Site largely consists of open moorland comprising rough grasses, with fields of semi-improved pasture occurring across the lower hills to the east. The Site is adjacent to a number of forestry plantations including Ulzieside Plantation, Mains Plantation and Brown Hill.

The operational Whiteside Hill Wind Farm is located immediately to the west of the Site and the operational Twentyshilling Hill Wind Farm is approximately 2 km to the south-east. In addition, there are also nine turbines of Sanquhar to the north and the more extensive Hare Hill and Extension further north-west. Although comprising only two turbines at 62 m, there is also Sunnyside Farm on the northern side of Sanquhar.

2.3 The Infrastructure

2.3.1 *Turbines*

The proposed details are as follows:

- Approximate number of turbines: up to 14;
- Approximate height to blade tip: up to 180 m;
- Approximate generating capacity (per turbine): 5 MW; and
- Total generation capacity including energy storage: approximately 70 MW.

The Site Layout is shown in Figure 2.2.

[3] Dumfries and Galloway Council (2019) Core Paths: Walking and Cycling in Dumfries and Galloway [Online] Available at: https://info.dumgal.gov.uk/mapviewers/pathsmap.aspx (Accessed 03/03/2022)

This layout will be subject of a number of iterations and refinements following survey work and technical assessments during the EIA. For the purposes of the EIA, a precautionary approach will be taken and, for each assessment, a worst case scenario will be identified within the design parameters. This allows a conservative scenario to be assessed.

2.3.2 *Access*

It is assumed that the proposed route to the Site for turbine components will be from the King George V Dock in Glasgow, then via the M8, M74, A75 and A76 to Sanquhar. From Sanquhar, a number of access points to the Site are being considered, including an access via Blackaddie Road or via Eliock Bridge and then the C125N. This is currently the subject of detailed investigation and may change following the ongoing evaluations.

2.3.3 *Electrical Infrastructure*

Underground cabling, laid where possible alongside the access tracks, will link the turbine transformers to an on-site substation. The substation will likely take the form of a single storey building housing the electrical infrastructure, although certain elements may be external located within a fenced compound.

The grid connection to the electricity network falls under a separate consent process and will be subject to a separate environmental investigation and associated consent application if required. As such, the grid connection will not be considered as part of the EIA for the Development.

2.3.4 *Temporary Construction Compound*

A temporary construction compound will be required during the construction of the Development, forming an area of hardstanding providing space for portacabins, parking, lay down areas and potentially concrete batching.

2.3.5 *Anemometry Mast*

An anemometry mast will be required for the life span of the wind farm, of a height similar to the hub height of the proposed wind turbines.

2.3.6 *Energy Storage*

Energy systems may be included as part of the Development; such systems are designed to complement renewable energy generation. In terms of appearance, the system would likely be comparable to the on-site substation however, would be confirmed during the design process.

2.3.7 *Borrow Pits*

On-site borrow pits may be utilised to source aggregate for the construction of site access tracks, crane hardstanding areas, and potentially concrete batching. Sourcing aggregate from within the Site, rather than an off-site quarry, has the advantage of reducing the number of Heavy Goods Vehicles (HGV) on public roads.

Following construction, the borrow pits would be restored. The restoration will likely include replacing any surplus or unused material, soil or turf materials to restore the slopes to a stable profile and allow regeneration.

2.4 Development Phases

It is expectant that the construction phase of the Development will take approximately 12 to 18 months, depending on the final design. This period is weather dependent and could

be affected by on-site conditions. It is envisaged that the construction programme would follow this broad outline:

- Construction of site entrance, temporary construction compound, tracks and hardstanding areas;
- Excavation and construction of turbine foundations;
- Construction of substation;
- Excavation of cable trenches and the laying of cables;
- Erection and commissioning of turbines; and
- Reinstate land and remove temporary infrastructure.

It is proposed that the Development will be operational for a period of at least 30 years, following which time it is expected that the Development will be decommissioned or a new consent will be sought.

Decommissioning will typically involve all above ground infrastructure being dismantled and removed, whilst turbine foundations will be removed to 1 m below ground level and covered with topsoil. All wind turbine infrastructure including transformers would be removed from the Site and recycled or disposed of in accordance with good practice guidance and available local facilities that operate at that time. It is expectant that access tracks and cables (1 m below ground level) will be left in situ. A Decommissioning Plan, to include timescales and transportation methods, will be agreed in advance of decommissioning with the Council and is frequently a condition of consent.

3 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Requirement for EIA

EIA is an iterative assessment process with the aim of avoiding or reducing the potential effects resulting from the Development through the continual refinement of its design. These effects can occur throughout all phases of the Development from construction, through operation and during decommissioning. Any potential effects will be mitigated utilising the mitigation hierarchy of avoid, reduce, offset and compensate.

The requirement for EIA in Scotland for wind farm generating stations with an electrical output capacity in excess of 50 MW is provided under Part 4 of the EIA Regulations.

Schedule 2 of the EIA Regulations lists developments for which an EIA is required for certain types of development where there are likely to be significant effects on the environment by virtue of factors such as the nature, size or locations of the development proposed. The Development falls within Category 3(i) of Schedule 2 which is for Energy Industry - Installation for the harnessing of wind power for energy production (wind farms). As the Development exceeds the applicable threshold for Category 3(i) of (i) installation of more than two turbines and (ii) hub height of any turbine exceeds 15 m, Schedule 3 of the EIA Regulations is applicable.

Following consideration of the characteristics of the Development, the location of the Site and the characteristics of the potential impacts, as outlined within Schedule 3 of the EIA Regulations, the Applicant recognises that this is an 'EIA Development'.

3.2 Scope of the EIA

The aim of the Scoping process is to identify environmental issues at an early stage, to determine which elements of the Development are likely to result in significant effects on the environmental and to establish the extend of survey and assessment required for the EIA.

Schedule 4 of the EIA Regulations details the information required to be included within the EIA Report and states:

3. A description of the relevant aspects of the current state of the environment (the "baseline scenario") and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of relevant information and scientific knowledge.

4. A description of the factors specified in regulation 4(3) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

The results of the EIA will be presented in an EIA Report, which, as prescribed in the EIA Regulations is required include a "description of the likely significant effects" of the Development; effects which are not considered to be significant do not need to be described. It is therefore necessary for the scope of the EIA to be appropriately defined to ensure all significant effects are covered.

This Report therefore provides details of the technical areas which will be included within the EIA Report to meet the information requirements are set out in Schedule 4 of the EIA Regulations. These technical areas are detailed in Sections 5 to 16 of this Report, and comprise of the following:

- Section 5 – Policy and Legislative Context;
- Section 6 – Landscape and Visual;
- Section 7 – Ornithology;
- Section 8 – Ecology;
- Section 9 – Archaeology and Cultural Heritage;
- Section 10 – Hydrology and Hydrogeology;
- Section 11 – Geology and Peat;
- Section 12 – Noise;
- Section 13 – Traffic and Transport;
- Section 14 - Socio-economics, Recreation and Tourism;
- Section 15 - Climate Change; and
- Section 16 - Other Issues.

Throughout the EIA process, effects arising during the construction, operation and decommissioning phases will be assessed and mitigation measures will be considered for each assessment area, where appropriate. These considerations will also be detailed within the EIA Report.

3.3 Approach to EIA

EIA is an iterative process aimed at identifying and assessing the potential effects arising as a result of a proposed development. Any effects identified will be used to inform and refine the design of the Development. Where adverse effects are identified that cannot be avoided through embedded mitigation, suitable mitigation measures to reduce or offset effects will be proposed. In addition, the EIA will be used to identify potential enhancement measures that could be applied to maximise beneficial effects.

The main steps of the EIA process are broadly summarised as follows:

- Scoping - The Scoping Opinion from ECU and feedback from EIA consultees will be used to define the scope of the EIA;
- Baseline studies - Desk-Based Assessment (DBA), baseline surveys and site visits will be undertaken, where appropriate, in order to determine the baseline conditions of the environment and area that may be affected by the Development;
- Assessing effects - Potential interactions between the Development and the baseline conditions will be considered. The nature of the effects (e.g., direct or indirect; positive or negative; long, medium or short term; temporary or permanent) will be predicted and assessed. Potential cumulative effects arising from Development in conjunction with other proposed or consented developments will also be considered;
- Mitigation and assessment of residual effects - In line with the mitigation hierarchy identified in Planning Advice Note (PAN) 1/2013[4], where adverse effects are identified that cannot be avoided through layout design and embedded mitigation, suitable mitigation measures to reduce or offset effects will be proposed. The residual effects will then be assessed to determine any effects predicted to remain following implementation of the recommended mitigation measures; and
- Production of the EIA Report - The results of the EIA will be set out in the EIA Report.

3.4 Assessment Methodology

In order to assess the potential effects arising from the Development, the significance of such effects will be determined, in accordance with the EIA Regulations. The determination of significance relates to the sensitivity of the resource or receptor being affected and the magnitude of change as a result of the effect. The assessment of effects will combine professional judgement together with consideration of the following:

[4] Scottish Government (2013) PAN 1/2013: Environmental Impact Assessment [Online] Available at: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/ (Accessed 03/03/2022)

- The sensitivity of the resource or receptor under consideration;
- The magnitude of the potential effect in relation to the degree of change which occurs as a result of the Development;
- The type of effect (i.e., adverse, beneficial or neutral);
- The probability of the effect occurring (i.e., certain, likely or unlikely); and
- Whether the effect is temporary, permanent and/or reversible.

A generalised methodology for assessing significant effects is detailed below, however each individual technical area will have a specific assessment methodology which may vary from that detailed in the following subsections.

3.4.1 *Sensitivity of Receptors*

The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

Table 3.1 details a general framework for determining the sensitivity of receptors. Each technical assessment will specify their own appropriate sensitivity criteria that will be applied during the EIA and details will be provided in the relevant EIA Report chapter.

Table 3.1: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

3.4.2 *Magnitude of Change*

The magnitude of potential change will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

General criteria for assessing the magnitude of change are presented in Table 3.2. Each technical assessment will apply their own appropriate magnitude of effects criteria during the EIA, with the details provided in the relevant EIA Report Chapter.

Table 3.2: Framework for Determining Magnitude of Change

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the asset, leading to total loss or major alteration of character.

Magnitude of Effects	Definition
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.
Negligible	A barely distinguishable change from baseline conditions.

If change of zero magnitude (i.e. non/no change) are identified, this will be made clear in the assessment.

3.4.3 *Significance of Effect*

The sensitivity of the asset and the magnitude of the predicted change will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 3.3 summarises guideline criteria for assessing the significance of effects.

Table 3.3: Framework for Assessment of the Significance of Effects

Magnitude of change	Sensitivity of Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the above table.

Zero magnitude effects upon a receptor will result in no effect, regardless of sensitivity.

3.5 Mitigation

Where the EIA identifies likely significant adverse environmental effects, mitigation measures will be proposed in order to avoid, reduce, offset or compensate those effects. These mitigation measures may be embedded in the design or compensatory. Such embedded mitigation measures will likely include the movement or loss of turbines, access tracks and other infrastructure; and management and operational measures.

In line with the mitigation hierarchy identified in PAN 1/2013, the strategy of avoidance, reduction, offsetting and compensation seeks:

- First to avoid significant adverse effects;
- Then to minimise those which remain; and
- Lastly, where no other remediation measures are possible, to propose appropriate compensation.

In addition, enhancement measures may be incorporated into design of the Development to maximise environmental benefits.

3.6 Residual Effects

Taking cognisance of the suggested mitigation (and enhancement) measures, the predicted effects will be re-assessed to determine whether any residual effects remain.

3.7 Cumulative Effects

In accordance with the EIA Regulations, this EIA will also give consideration to 'cumulative effects'. By definition, these are effects that results from incremental changes caused by past, present or reasonably foreseeable future actions together with the Development. For cumulative assessment, two types of effects will be considered:

- The combined impact of individual effects from the same development (e.g., noise, airborne dust or traffic) on a single receptor; and
- The combined impact from the effects of several developments that may on an individual basis be insignificant but, cumulatively may be significant.

In line with good practice, the methodology to be adopted for assessing the cumulative effects of wind energy developments will be in accordance with advice from NatureScot (formerly SNH)[5,6] and the Scottish Government[7,8]. The extent of any cumulative assessment relative to each technical assessment will be agreed during the consultation process and can include both existing and proposed wind farm developments as well as other forms of development.

At the time of writing, it is known that there are other operational wind farms located in the vicinity of the Site (notably Twentyshilling Hill Wind Farm and Whiteside Hill Wind Farm).

Cumulative effects will be considered for each technical area assessed within the EIA. The extent of the cumulative assessment relative to each technical assessment are proposed in the following sections.

3.8 Alternatives

Schedule 4, Part 2 of the EIA Regulations requires an outline of reasonable alternatives (such as technology, location, size and scale) considered and the main reasons why the Development was chosen, taking into account the environmental effects. Details of this will be provided within the EIA Report.

The final layout of the Development will be based on a range of technical criteria, such as separation distances between turbines, wind speed, prevailing wind direction, existing infrastructure, topography, ground conditions, local environmental issues and landscape and visual considerations. The identification of these criteria is an iterative process. As they are identified, the layout of the Development, including ancillary infrastructure, will undergo a series of modifications to avoid or reduce potential effects through careful design. This process will be set out in the EIA Report.

[5] SNH (2012) Assessing the Cumulative Impacts of Onshore Wind Energy Developments [Online] Available at: https://tethys.pnnl.gov/sites/default/files/publications/SNH-2012-CumulativeOnshoreWind.pdf (Accessed 18/03/2022)

[6] NatureScot (2014) A handbook on environmental impact assessment: Guidance for competent authorities, consultees and others involved in the Environmental Impact Assessment process in Scotland [Online] Available at: https://www.nature.scot/doc/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others (Accessed 18/03/2022)

[7] Scottish Government (2020) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/pages/2/ (Accessed 18/03/2022)

[8] Scottish Government (2021) Environmental assessment [Online] Available at: https://www.gov.scot/policies/environmental-assessment/#:~:text=The%20Environmental%20Assessment%20(Scotland)%20Act,are%20sought%20to%20avoid%20adverse (Accessed 18/03/2022)

3.9 Structure and Content of the EIA Report

The content of the EIA Report will broadly follow the specifications detailed within Schedule 4 of the EIA Regulations. The EIA Report will consist of three volumes and a Non-Technical Summary (NTS).

- Volume 1 – EIA Report text;
- Volume 2 – Figures (divided into figures and visualisations); and
- Volume 3 – Technical appendices.

The front end of the EIA Report text will include:

- An introduction, including a summary of the EIA process and methodology;
- Description of the Site and its surroundings;
- Details of alternatives considered within the context of how the design of the Development has considered the environmental and economic balance; and
- A summary of the relevant planning policy and environmental context.

The technical chapters of the EIA Report will present details of the assessments undertaken, including any cumulative effects, required mitigation and residual effects.

3.10 Questions for Consultees

- Q3.1 - Do Consultees agree with the general strategy for assessing the effects?
- Q3.2 - Can the Consultees provide any further information on developments that they think should be included in the cumulative assessment?

4 SCOPING PROCESS

EIA is an iterative process that aims to avoid or reduce the potential effects resulting from the Development through the continual refinement of its design. This document provides supporting information to help the ECU to form a Scoping Opinion for the Development. This is intended to guide the information to be included within the EIA Report, which will accompany any subsequent application for planning permission.

To aid this process, this Report includes the following:

- A description of the location of the Development including figures identifying the Site and the parameters of the Development;
- Figures identifying the designated and sensitive environmental receptors surrounding the Site; and
- A brief description of the nature and purpose of the Development and its potential resultant effects.

This Report identifies the different aspects of the environment likely to be significantly affected by the Development and proposes those topics which require further consideration as part of the EIA. Proposed methodologies are outlined, with a view to obtaining comments on the approach to the EIA and the content of the EIA Report. As appropriate, and to aid consideration, the Report summarises survey work undertaken to date.

Given the iterative nature of the EIA process, the final layout of the Development will be led by the forthcoming EIA process. This Report includes illustrations of a preliminary turbine layout which represents an indicative geographical spread of turbine and infrastructure across the Site that may change in time. The results of the Scoping process will feed into the iterative design of the Development. For the purposes of the EIA, a precautionary approach will be taken and a worst-case scenario will be identified and assessed for each receptor as appropriate.

5 POLICY AND LEGISLATIVE CONTEXT

5.1 Legislative Context

Applications to construct and operate power stations of capacity over 50 MW are made to Scottish Ministers under Section 36 of the Electricity Act 1989.

The following set of regulations applies to applications made under Section 36:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended;
- The Electricity (Applications for Consent) Regulations 1990[9]; and
- The Electricity (Applications for Consent) Amendment (Scotland) Regulations 2013[10].

Consent under Section 36 of the Electricity Act 1989 usually carries with it deemed planning permission from the Scottish Ministers under Section 57 of the Town and Country Planning (Scotland) Act 1997[11] as amended by the Planning etc. (Scotland) Act 2006[12] .

The relevant legislation will be considered throughout the application process along with the other documents as set out in the sections below.

5.2 International and European Policy Context

5.2.1 *COP26*

The 26th United Nations (UN) Climate Change Conference of the Parties (COP26) which took place in Glasgow in November 2021, brought the world leaders of over 200 counties together to address climate change and seek to agree universal objectives and measures that can be enforced to over the next decade to further cut carbon emissions.

COP26 outcomes included the Glasgow Climate Pact[13], an agreement with the aim of keeping the rise in global temperature to within 1.5ºC. All participating countries agreed to revisit and strengthen their 2030 carbon emissions targets.

5.2.2 *Paris Agreement*

On 12th December 2015, 196 Parties to the UN Framework Convention on Climate Change (UNFCCC) adopted the Paris Agreement, a legally-binding framework for an internationally coordinated effort to tackle climate change. The Paris Agreement's key aim is to strengthen the global response to climate change by keeping a global temperature rise this century below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 ºC. The UK is legally bound through commitment to the Paris Agreement.

5.3 UK Policy Context

The following documents set out the UK Governments binding commitments to cut carbon emissions through the deployment of renewable energy:

[9] UK Government (1990) The Electricity (Applications for Consent) Regulations 1990 [Online] Available at: https://www.legislation.gov.uk/uksi/1990/455/contents/made (Accessed 18/03/2022)
[10] Scottish Government (2013) The Electricity (Applications for Consent) Amendment (Scotland) Regulations 2013 [Online] Available at: https://www.legislation.gov.uk/ssi/2013/58/introduction/made (Accessed 18/03/2022)
[11] UK Government (1997) Town and Country Planning (Scotland) Act 1997 [Online] Available at: https://www.legislation.gov.uk/ukpga/1997/8/introduction (Accessed 18/03/2022)
[12] Scottish Parliament (2006) Planning etc. (Scotland) Act 2006 [Online] Available at: https://www.legislation.gov.uk/asp/2006/17/contents (Accessed 18/03/2022)
[13] United Nations Climate Change (2021) The Glasgow Climate Pact - Key Outcomes of COP26 [Online] Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26 (Accessed 18/03/2022)

- The Climate Change Act 2008[14];
- National Audit Office Report to the UK Government (December 2020)[15];
- The Sixth Carbon Budget: The UK's path to Net Zero (December 2020)[16];
- HM Government Energy White Paper – Powering our Net Zero Future (December 2020)[17];
- UK Government Announcement on UK Sixth Carbon Budget (April 2021)[18];
- Climate Change Committee (CCC) Progress Report to Parliament (June 2021)[19]; and
- Climate Change 2022 – Impacts, Adaption and Vulnerability (February 2022)[20].

Given the overview of relevant European and UK policy on climate change and renewable energy and the context of the continued need for increased renewable energy generation, it is clear that projects such as the Development must be encouraged due to their environmental, social and economic benefits. If consented, the Development would contribute to meeting the CO_2 emissions reduction targets, as well as the renewable energy targets. The Energy White Paper published in 2020, and the subsequent announcement in April 2021 by the UK Government accelerating the pace at which the UK carbon emissions most be reduced, are both a stark reminder of the urgency with which climate change must be addressed at UK and European levels.

In addition, the Climate Change 2022 – Impacts, Adaption and Vulnerability report provides up to date evidence of the climate emergency we are living in, with an emphasis placed upon the significant amount of work still to be done in order to combat the continuing impacts of climate change globally. The Development is therefore fully in accordance with the objectives of UK and international climate change policy.

5.4 Scottish Policy Context

The following documents set out the Scottish Governments commitment to cut carbon emissions through the deployment of renewable energy:

- The Climate Change (Scotland) Act 2009[21];
- National Planning Framework 3 (NPF3) (June 2014)[22];
- Scottish Planning Policy (SPP) (June 2014)[23];
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[24];

[14] UK Government (2008) Climate Change Act 2008 [Online] Available at: https://www.legislation.gov.uk/ukpga/2008/27/contents (Accessed 24/02/2022)
[15] National Audit Office (2020) NAO - Achieving Net Zero Report [Online] Available at: https://www.nao.org.uk/report/achieving-net-zero/ (Accessed 18/03/2022)
[16] Climate Change Committee (2020) Sixth Carbon Budget - UK's path to Net Zero [Online] Available at: https://www.theccc.org.uk/publication/sixth-carbon-budget/ (Accessed 18/03/2022)
[17] UK Government (2020) Energy White Paper - Powering our Net Zero Future [Online] Available at: https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future (Accessed 18/03/2022)
[18] UK Government (2021) Sixth Carbon Budget Announcement [Online] Available at: https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035 (Accessed 18/03/2022)
[19] CCC (2021) 2021 Progress Report to Parliament [Online] Available at: https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/ (Accessed 18/03/2022)
[20] IPCC (2022) Climate Change 2022: Impacts, Adaption and Vulnerability [Online] Available at: https://www.ipcc.ch/report/ar6/wg2/ (Accessed 18/03/2022)
[21] Scottish Parliament (2009) Climate Change (Scotland) Act 2009 [Online] Available at: https://www.legislation.gov.uk/asp/2009/12/contents (Accessed 18/03/2022)
[22] Scottish Government (2014) National Planning Framework 3 [Online] Available at: https://www.gov.scot/publications/national-planning-framework-3/ (Accessed 18/03/2022)
[23] Scottish Government (2014) Scottish Planning Policy [Online] Available at: https://www.gov.scot/publications/scottish-planning-policy/documents/ (Accessed 18/03/2022)
[24] Scottish Parliament (2019) Climate Change (Emissions Reductions Targets) (Scotland) Act [Online] Available at: Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (legislation.gov.uk) (Accessed 18/03/2022)

- Electricity Generation Policy Statement (2013) (the EGPS)[25];
- Onshore Wind Policy Statement (OWPS) (December 2017)[26];
- Scottish Energy Strategy (December 2017)[27];
- Scotland's Energy Strategy Position Statement (March 2021)[28]
- A Fairer, Greener Scotland? The Government's Programme for Scotland 2021-2022 (September 2021)[29];
- Update to the Climate Change Plan 2018 – 2032 – Securing a Green Recovery on a Path to Net Zero (December 2020)[30];
- Speech by First Minister to Scottish Renewables Annual Conference (March 2021);
- Scotland's National Strategy for Economic Transformation (March 2022)[31]; and
- Draft National Planning Framework 4 (NPF4)[32].

These documents could be considered material to the determination of any subsequent planning application.

Given the overview of the relevant Scottish Government policy on climate change and renewable energy, and the context of continued need for renewable energy development, it is clear that projects such as the Development should be encouraged due to their potential to contribute to decarbonising of the energy sector, whilst providing clean and secure energy supply. The Development would contribute to meeting the CO_2 emissions reduction targets, as well as the renewable energy targets, both of which, are key considerations at the forefront of Scottish policy.

The Development is fully in accord with the most up to date Scottish Government policy on the need to deploy additional renewable energy infrastructure to enable net zero to be attained by 2045, and to address the climate emergency which the government in Scotland have placed at the forefront of their programme. The recently published National Strategy for Economic Transformation highlights the significant opportunities available for Scotland to continue to be a market leader in renewables *"with Scotland enjoying a quarter of Europe's wind potential".*

Overall, the Development draws significant support from Scottish Government policy on energy and climate change and the emerging NPF4 includes further policy that will ensure green energy technologies are continually developed across the country. Whilst a range of renewable technologies are capable of delivering these benefits, it is likely that onshore wind will play the greatest role in the coming years.

It is therefore clear that projects such as the Development should be encouraged due to their environmental, social and economic benefits.

[25] The Scottish Government (2013) Electricity Generation Policy Statement 2013 [Online] Available at: http://www.scotland.gov.uk/Topics/Business-Industry/Energy/EGPSMain (Accessed 03/03/2022)
[26] Scottish Government (2017) Onshore Wind Policy Statement [Online] Available at: https://www.gov.scot/publications/onshore-wind-policy-statement-9781788515283 (Accessed 03/03/2022)
[27] Scottish Government (2017) Future of Energy in Scotland: Scottish Energy Strategy [Online] Available at: https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ (Accessed 18/03/2022)
[28] Scottish Government (2021) Scotland's Energy Strategy Position Statement [Online] Available at: https://www.gov.scot/publications/scotlands-energy-strategy-position-statement/ (Accessed 03/03/2022)
[29] Scottish Government (2021) Programme for Government – A Fairer Greener Scotland? [Online] Available at: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/documents/ (Accessed 03/03/2022)
[30] Scottish Government (2020) Climate Change Plan 2018-2032 Update [Online] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/ (Accessed 18/03/2022)
[31] Scottish Government (2022) Scotland's National Strategy for Economic Transformation [Online] Available at: https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/documents/ (Accessed 03/03/2022)
[32] Scottish Government (2021) Scotland 2045 - fourth National Planning Framework draft consultation [Online] Available at: https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/ (Accessed 18/03/2022)

5.5 Local Policy Context

In the case of the Development, the Local Planning Authority is Dumfries and Galloway Council (the Council). Given the generation capacity of the Development will exceed 50 MW, the Application will be made to the Scottish Ministers for determination under Section 36 of the Electricity Act 1989 however, the Council will act as a statutory consultee and due consideration should be given to the local planning policy context.

The Dumfries and Galloway Local Development Plan 2 (LDP2)[33] was adopted in 2019. It sets out the overarching vision statement and spatial planning policy for the Council area. The overarching aim of LDP2 is that all development proposals should support sustainable development, including the reduction of carbon and other greenhouse gas emissions.

The LDP2 sets out a 'vision' for Dumfries and Galloway, stating that:

"It will be a thriving region with a sustainable economy built on sustainable principles, which recognises the importance of its landscape, natural and historic environments and the need to maintain and enhance its distinctive landscape character while facilitating positive change, promoting growth, maximising the use of existing infrastructure and enhancing connectivity."

The key policy which is of most relevance to the Development is Policy IN1: Renewable Energy, which is supportive of development proposals for all renewable energy generation and/or storage which are located, sited and designed appropriately. The acceptability of any proposed development will be assessed against landscape and visual impact; cumulative impact; impact on local communities; natural and historic environment (cultural heritage and biodiversity); and impacts on tourism, recreation and public access. Policy IN2: Wind Energy is also a key consideration.

LDP2 policies considered relevant to the Development are listed below:

- Policy OP1: Development Considerations;
- Policy OP2: Design Quality and Placemaking;
- Policy HE1: Listed Buildings;
- Policy HE2: Conservation Areas;
- Policy HE3: Archaeology;
- Policy HE6: Garden and Designed Landscapes;
- Policy NE11: Supporting the Water Environment;
- Policy NE12: Protection of Water Margins;
- Policy NE14: Carbon Rich Soil;
- Policy NE15: Protection and Restoration of Peat Deposits as Carbon Sinks;
- Policy IN1: Renewable Energy;
- Policy IN2: Wind Energy; and
- Policy IN7: Flooding and Development.

The LDP2 is also further supported by:

- Supplementary Planning Guidance (SPG) documents including:
  - Design Quality and Placemaking (February 2020)[34];
  - Historic Built Environment (February 2020)[35];
  - Flooding and Development (February 2020)[36];

[33] Dumfries and Galloway Council (2019) Local Development Plan 2 [Online] Available at: https://www.dumgal.gov.uk/ldp2 (Accessed 15/03/2022)
[34] Dumfries and Galloway Council (2020) Design Quality and Placemaking SPG [Online] Available at: https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance (Accessed 18/03/2022)
[35] Dumfries and Galloway Council (2020 Historic Built Environment SPG [Online] Available at: https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance (Accessed 18/03/2022)
[36] Dumfries and Galloway Council (2020) Flooding and Development SPG [Online] Available at: https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance (Accessed 18/03/2022)

- Wind Energy Development: Development Management Considerations (February 2020)[37];
- Part 1 Wind Energy Development: Development Management Considerations Appendix 'C' Dumfries and Galloway Wind Farm Landscape Capacity Study (Adopted February 2020)[38]; and

- Proposals Maps.

5.6 Other Material Considerations

5.6.1 *Dumfries and Galloway Regional Scenic Areas – Technical Paper (January 2018)*[39]

This technical paper examines and defines 10 Regional Scenic Areas (RSAs) which are locally designated scenic areas within Dumfries and Galloway in the context of the Dumfries and Galloway Landscape Assessment. The RSAs form part of a wider framework of designated scenic areas which include the existing National Scenic Areas (NSAs). Together these provide protection to those areas of special scenic interest which form the Council's most important landscape areas. The designations are supported by a range of policies, strategies and guidelines for the wider landscape.

5.6.2 *The State of the Environment Report (January 2017)*[40]

The State of the Environment Report (SOER) by the Council assesses a range of environmental aspects of Dumfries and Galloway's environment, whilst also considering some social and economic issues. The purpose of the SOER is to bring together a multitude of background information, statistics and data, to help create a foundation that can be used to predict and monitor environmental issues within Dumfries and Galloway. The primary aims of the SOER include to provide baselines of the current state of the region in terms of the environment, socially and economically, against which existing and future changes and trends can be compared; and provide a basis for interpreting and reviewing the baseline information in an accessible way.

5.6.3 *Planning Advice Notes (PANs)*

PANs and Specific Advice Sheets set out detailed advice from the Scottish Government in relation to a number of planning issues, and include:

- PAN 1/2013 Environmental Impact Assessment;
- PAN 51 Planning, Environmental Protection and Regulation (Revised 2006)[41];
- PAN 60 Planning for Natural Heritage (2000)[42];

[37] Dumfries and Galloway (2020) Wind Energy Development: Development Management Considerations [Online] Available at: https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance (Accessed 18/03/2022)
[38] Dumfries and Galloway Council (2020) Part 1 Wind Energy Development: Development Management Considerations Appendix 'C' Dumfries & Galloway Wind Farm Landscape Capacity Study [Online] Available at: https://www.dumgal.gov.uk/article/17034/LDP2-Supplementary-Guidance (Accessed 18/03/2022)
[39] Dumfries and Galloway Council (2018) Regional Scenic Areas – Technical Paper [Online] Available at: https://www.dumgal.gov.uk/article/15343/Technical-Papers-Land-Use-Audits-and-Supporting-Documents (Accessed 15/03/2022)
[40] Dumfries and Galloway Council (2017) State of the Environment Report [Online] Available at: https://www.dumgal.gov.uk/article/15343/Technical-Papers-Land-Use-Audits-and-Supporting-Documents (Accessed 15/03/2022)
[41] Scottish Government (2006) PAN 51: Planning, Environmental Protection and Regulation [Online] Available at: https://www.gov.scot/publications/planning-advice-note-pan-51-revised-2006-planning-environmental-protection/ (Accessed 18/03/2022)
[42] Scottish Government (2000) Planning for Natural Heritage: PAN 60 [Online] Available at: https://www2.gov.scot/Publications/2000/08/pan60-root/pan60 (Accessed 03/03/2022)

- PAN 61 Sustainable Urban Drainage Systems (2001)[43];
- PAN 68 Design Statements (2003)[44];
- PAN 73 Rural Diversification (2005)[45];
- PAN 75 Planning for Transport (2005)[46];
- PAN 3/2010 Community Engagement[47];
- PAN 1/2011 Planning and Noise[48];
- PAN 2/2011: Planning and Archaeology[49]; and
- Transport Assessment and Implementation: A Guide (2005)[50].

5.7 Summary

The above policies and plans reflect the current direction of the UK and Scottish Government's objectives for accommodating wind turbine development. A Planning Statement would accompany any subsequent application for the Development and would undertake an in-depth assessment of compliance with relevant planning policies at the time of submission.

[43] Scottish Government (2001) PAN 61: Planning and Sustainable Urban Drainage [Online] Available at: https://www2.gov.scot/Publications/2001/07/pan61 (Accessed 03/03/2022)
[44] Scottish Government (2003) PAN 68: Design Statement [Online] Available at: https://www.gov.scot/publications/planning-advice-note-68-design-statements/ (Accessed 03/03/2022)
[45] Scottish Government (2005) PAN 73: Rural Diversification [Online] Available at: https://www.gov.scot/publications/rural-diversification-planning-advice/ (Accessed 03/03/2022)
[46] Scottish Government (2005) PAN 75: Planning for Transport [Online] Available at: https://www.gov.scot/publications/planning-advice-note-pan-75-planning-transport/ (Accessed 03/03/2022)
[47] Scottish Government (2010) PAN 3/2010: Community Engagement [Online] Available at: https://www.gov.scot/publications/planning-advice-note-3-2010-community-engagement/ (Accessed 03/03/2022)
[48] Scottish Government (2011) PAN 1/2011: Planning and Noise [Online] Available at: https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/ (Accessed 23/02/2022)
[49] The Scottish Government (2011) Planning Advice Note 2/2011 [Online] Available at https://www.gov.scot/publications/pan-2-2011-planning-archaeology/ (Accessed 01/02/2022)
[50] The Scottish Government (2005) Transport Assessment and Implementation: A Guide [Online] Available at: http://www.renfrewshire.gov.uk/media/1920/Transport-Assessment-and-Implementation-A-Guide/pdf/transport_assessment.pdf?m=1459521044997 (Accessed 23/02/2022)

6 LANDSCAPE AND VISUAL

6.1 Introduction

This section of the Report sets out the proposed methodology and approach to be applied in the production of the Landscape and Visual Impact Assessment (LVIA) to be included in the EIA Report for any subsequent application for the Development. This section presents the suggested scope of the LVIA in terms of those landscape and visual receptors to be scoped in and scoped out of the EIA process based on a preliminary assessment of relevant receptors to the Development.

The purpose of the LVIA is to identify and record the potential significant effects that the Development may have on physical elements of the landscape; landscape character; areas that have been designated for their scenic or landscape-related qualities; and views from various locations such as settlements, routes, hilltops and other sensitive locations. The potential cumulative effects that may arise from the addition of the Development in conjunction with other wind farms are also considered.

The LVIA will consider the potential effects of the Development during the following development stages:

- Construction and decommissioning; and
- Operation.

Receptors may not be affected at all three development stages.

6.2 Study Area

In accordance with guidance[51] and with a proposed turbine height of up to 180 m, the Study Area for the LVIA of the Development will cover a radius of 45 km from the nearest turbine, as shown in Figure 6.1 (the LVIA Study Area). This is considered to be the maximum radius within which a significant landscape and / or visual effect could arise given the height of the turbines that are being considered.

A review of the broad wind farm context within a 45 km radius has been undertaken, based on the latest NatureScot mapping of large-scale wind farm development. It is considered that any cumulative effects that would occur, would arise as a result of the pattern of development within the LVIA Study Area radius, rather than as a result of changes beyond this.

Following a detailed review of the cumulative sites within the area, it is proposed that a plan will be produced showing the locations of wind farms within the LVIA Study Area that are operational, under construction, consented or at application stage and where the turbines are greater than 50 m to blade tip. These wind farm developments would, therefore, be included within any cumulative assessment for the Development.

The Council and NatureScot will be consulted over the final list of sites to be considered within the detailed cumulative assessment. Scoping stage sites may also be included, at the request of the Council or NatureScot, where they are considered to be of specific relevance to the cumulative effect of the Development. Cumulative wind farms, known at the time of writing, within the LVIA Study Area are shown in Figure 6.6.

[51] SNH (2017) Visual Representation of Wind Farms Version 2.2 [Online] Available at: https://www.nature.scot/doc/visual-representation-wind-farms-guidance (Accessed 30/03/2022)

6.3 Assessment Methodology

6.3.1 *Guidance and Standards*

The LVIA will follow Optimised Environment Ltd's (OPEN) methodology devised specifically for the assessment of wind farm developments and generally accords with 'Guidelines for Landscape and Visual Impact Assessment: Third Edition' (Landscape Institute and IEMA, 2013) (GLVIA3)[52], the key source of guidance for LVIA.

Other sources of guidance that will be used and referenced in the LVIA include the following:

- Visual Representation of Wind Farms Version 2.2 (SNH, February 2017)[53];
- Assessing impacts on Wild Land Areas - Technical Guidance (NatureScot, 2020)[54];
- Technical Guidance Note 02/19 Residential Visual Amenity Assessment (Landscape Institute, 2019)[55];
- Technical Guidance Note 02/21 Assessing landscape value outside national designations (Landscape Institute, 2021)[56];
- Guidance – Assessing the cumulative landscape and visual impact of onshore wind energy development (NatureScot, 2021)[57];
- Landscape Character Assessment Guidance for England and Scotland (SNH and TCA, 2002)[58];
- Siting and Designing of Windfarms in the Landscape: Version 3 (SNH, 2017)[59];
- Policy Statement No 02/02: Strategic Locational Guidance for Onshore Windfarms in Respect of the National Heritage (SNH, 2009)[60];
- Spatial Planning for Onshore Wind Turbines – Natural Heritage Considerations Guidance (SNH, 2015)[61]; and
- Good Practice During Windfarm Construction, Version 4 (SNH, 2019)[62].

6.3.2 *Desk Study*

The assessment has been initiated through a desk study of the Site and LVIA Study Area, combined with a good working knowledge of this area. This study has identified aspects of the landscape and visual resource that will need to be considered in the LVIA, including:

- Landscape character typology;
- Landscape-related planning designations;
- Wild Land Areas (WLA);
- Potential cumulative wind farms;
- Routes (including roads, National Cycle Routes and long-distance walking routes); and
- Properties and settlements.

The desk study has also utilised Geographic Information System (GIS) software to explore the potential visibility of the scoping layout for the Development. The resultant Zone of

[52] The Landscape Institute (2015) GLVIA3 [Online] Available at: Guidelines for Landscape and Visual Impact Assessment (GLVIA3) | Landscape Institute (Accessed 17/03/2022)
[53] SNH (2017) Visual Representation of Wind Farms Version 2.2.
[54] NatureScot (2020) Technical Guidance - Assessing impacts on Wild Land Areas.
[55] Landscape Institute (2019) Technical Guidance Note 02/19 - Residential Visual Amenity Assessment.
[56] Landscape Institute (2021) Technical Guidance Note 02/21 - Assessing landscape value outside national designations.
[57] NatureScot (2021) Guidance – Assessing the cumulative landscape and visual impact of onshore wind energy development.
[58] SNH and The Countryside Agency (2002). Landscape Character Assessment Guidance for England and Scotland.
[59] SNH (2017) Siting and Designing of Windfarms in the Landscape: Version 3.
[60] SNH (2009) Policy Statement No 02/02: Strategic Locational Guidance for Onshore Windfarms in Respect of the National Heritage.
[61] SNH (2015) Spatial Planning for Onshore Wind Turbines – Natural Heritage Considerations Guidance.
[62] SNH (2019) Good Practice During Windfarm Construction, Version 4.

Theoretical Visibility (ZTV) diagrams (Figures 6.2 to 6.5) have provided an indication of which landscape and visual receptors are likely to have key sensitivities to the Development.

6.3.3 *Categories of Effects*

The LVIA is intended to determine the significant effects that the Development would have on the landscape and visual resource. For the purpose of assessment, the potential effects on the landscape and visual resource are grouped into the following categories:

- Physical effects - physical effects are restricted to the area within the Site and are the direct effects on the existing fabric of the Site. This category of effects is made up of landscape elements, which are the components of the landscape such as rough grassland and moorland that may be directly and physically affected by the Development;
- Effects on landscape character - landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements or through visibility of the Development that may alter the way in which the pattern of elements is perceived. This category of effects is made up of landscape character receptors, which fall into two groups; landscape character types and landscape-related designated areas;
- Effects on the special qualities of the National Park (NP) and NSA - a Special Landscape Qualities Impact Assessment is carried out to cover the potential for significant effects on the landscape qualities as identified in the NatureScot published report for each NP or NSA, including in some cases, qualities such as a sense of wildness/seclusion/remoteness;
- Effects on wild land - the assessment of the effects on the wild land qualities of the WLAs through consideration of the impacts on the physical attributes and perceptual responses identified as identified in NatureScot's WLA Descriptions;
- Effects on views - the assessment of the effects on views is an assessment of how the introduction of the Development would affect views throughout the LVIA Study Area. The assessment of effects on views is carried out in relation to representative viewpoints and principal visual receptors;
- Effects on views from properties - Residential Visual Amenity Assessment (RVAA) is carried out for properties within 2 km in line with Landscape Institute (LI) technical guidance;
- Effects of turbine lighting - should visible aviation lighting be required, a night time visual impact assessment is prepared to assess the potential visual impact of the turbine lights; and
- Cumulative effects - cumulative effects arise where the study areas for two or more wind farms overlap so that both of the wind farms are experienced at a proximity where they may have a greater incremental effect, or where wind farms may combine to have a sequential effect. In accordance with guidance, the LVIA assesses the effect arising from the addition of the Development to the cumulative situation.

6.3.4 *Assessment Approach*

The objective of the LVIA is to predict the likely significant effects on the landscape and visual resource. In line with the EIA Regulations, the LVIA effects are assessed to be either significant or not significant.

The significance of effects is assessed through a combination of two considerations: the sensitivity of the landscape receptor or view and the magnitude of change that would result from the addition of the Development.

The geographic extent over which the landscape and visual effects would be experienced is also assessed, which is distinct from the size or scale of effect. This evaluation is not combined in the assessment of the level of magnitude but instead is used in determining the extent in which a particular magnitude of change is experienced and the extent of the significant and non-significant effects. The extent of the effects would vary depending on the specific nature of the development proposed and is principally assessed through analysis of the geographical extent of visibility of the Development across the visual receptor.

The duration and reversibility of effects on views are based on the period over which the Development is likely to exist and the extent to which the Development will be removed, and its effects reversed at the end of that period. Duration and reversibility are not incorporated into the overall magnitude of change and may be stated separately in relation to the assessed effects.

The 'nature of effects' relates to whether the effects of the Development are adverse, neutral or beneficial. Guidance provided in GLVIA3 states that "*thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity*" but does not provide an indication as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and reasoned professional opinion.

OPEN generally adopts a precautionary approach which assumes that significant landscape and visual effects will be weighed on the negative side of the planning balance, although positive or neutral effects may arise in certain situations.

6.4 Baseline Conditions / Key Sensitivities

6.4.1 *Site Context*

The Site is located in the broad area of Southern Uplands defined by the Nith Valley to the north and east, and the Carsphairn Lane / Water of Deugh to the south-west. The Southern Uplands form a broad group of hills, mostly ranging between 400 and 500 m, with some higher summits in the Carsphairn Hills to the south-west and Lowther Hills to the north-east. The Southern Uplands are characterised by steep slopes and rounded summits, which collectively form long and gently undulating ridgelines. Land cover is predominantly open moorland used for rough grazing, but also with some large areas of commercial forestry.

In the area around the Site, the hill ridges follow an east-west orientation, with watercourses flowing eastwards to join the River Nith. The size of the hills steps up from the narrow valley of the Upper Dale, with Welltrees Tappin (473 m AOD) forming the largest hill on the eastern side of the Site, where Cloud Hill (451 m AOD) and adjacent Mid Rig (437 m AOD) form the high points. In contrast to the steeply sloping sides to the south, the northern slopes of Cloud Hill, where the Site is located, are more gently sloping.

A network of small burns flow northwards into Euchan Water, which then flows eastwards into the River Nith. The ground cover is mostly open moorland comprising rough grasses, with fields of semi-improved pasture occurring across the lower hills to the east. While larger plantations of commercial forestry occur across the hills further to the west, there are only smaller blocks around the Site, including Ulzieside Plantation to the north and Brown Hill to the east.

Settlement is limited to a few rural farmsteads and properties, which are set along the dead-end, minor roads, following Euchan Water to the north and Scar Water to the south.

The section of the SUW that connects St John's Town of Dalry in the south-west, with Sanquhar in the north-east, passes through the Site. While the landscapes to the south and east become increasingly rural and remote, with few visual receptors other than

walkers and rural farmers or foresters, in the landscapes to the north and east, there is a greater concentration of people, with road-users on the A76 and residents in the series of settlements along its route.

The A76 is the main road connecting Dumfries in the south with Kilmarnock in the north. Although not a heavily trafficked road, it is well-used and does afford open views across the surrounding landscapes. Sanquhar is the largest of the settlements in this area and although most of the properties are inward looking along the roads, there are also some substantial areas where views open out. The predominant orientation of this settlement is south-west across the valley and towards the Southern Uplands which form the defining enclosing ridgeline. Other settlements in this area include Kirkconnel and Kelloholm to the north and the smaller settlement of Mennock to the south, and although these settlements do not have such a direct visual connection with the Site, it is still readily visible from notable parts.

There are a number of operational wind farms located in this part of the Southern Uplands, which indicates that there has been some sort of strategy to cluster these developments in this area. While these wind farms all establish this type of development as a baseline feature of these hills, they do all comprise turbines which are smaller in size than those being considered as part of this feasibility study.

6.4.2 *Landscape Character*

In early 2019, NatureScot published an update to the characterisation of Scotland's landscape as a digital resource. The information builds on the characterisation studies published in the 1990's. NatureScot describe the recent publication as now superseding the 1990s landscape character descriptions and mapping adding that:

"where there are topic-specific landscape capacity or sensitivity studies, they would take precedence for informing that development type, e.g. windfarms."

The 'topic specific' characterisation studies which cover the 20 km radius around the Development are as follows;

- Dumfries and Galloway Local Development Plan 2 Supplementary Planning Guidance: Part 1 Wind Energy Development: Development Management Considerations Appendix 'C' - Dumfries and Galloway Wind Farm Landscape Capacity Study (February 2020)[63];
- East Ayrshire Landscape Wind Capacity Study (2018)[64]; and
- South Lanarkshire Landscape Capacity Study for Wind Energy (February 2016)[65].

These three sources of information form the most up to date characterisation studies across the LVIA Study Area and, as such, form the basis of character assessment that will be undertaken in the LVIA.

NatureScot's dataset and the capacity studies divide the landscape into areas of distinctive character which are generally referred to as Landscape Character Types (LCTs). Many of these LCTs are extensive, sometimes covering several areas that are geographically separate. In order to distinguish between different areas of the same LCT and identify these areas in respect of their specific location, a sub classification of Landscape Character Units (LCUs) has been applied for the purposes of the LVIA.

The Dumfries and Galloway Wind Farm Landscape Capacity Study shows the Site to be located in a LCT classified as LCT19 Southern Uplands. LCT19a Southern Uplands with

[63] Dumfries and Galloway Council (2020) Dumfries and Galloway Local Development Plan 2 - Supplementary Planning Guidance: Part 1 Wind Energy Development: Development Management Considerations - Appendix 'C' - Dumfries and Galloway Wind Farm Energy Development Landscape Capacity Study.

[64] East Ayrshire Council (2018) East Ayrshire Landscape Wind Capacity Study.

[65] South Lanarkshire Council (2016) South Lanarkshire Landscape Capacity Study for Wind Energy.

Forest occurs to the west, LCT 9 Upper Dale of the River Nith to the east, and a mix of LCT18 Foothills and LCT10 Upland Glens occurring to the south. Landscape Character is shown in Figure 6.2 with the blade tip ZTV of the scoping layout overlaid. Where more than one area of a LCT occurs, these will be distinguished in the LVIA as LCUs with a geographic name derived from that location used in the naming.

Given the prominent existing baseline of wind farm development within the immediate context of the Site, effects on landscape character are likely to occur within the baseline context of other large scale wind development. As a result, the potential for significant effects is considered to be limited in extent and would not occur beyond approximately 20 km. It is proposed therefore that the assessment of the effects on landscape character should focus on the area lying within a 20 km radius of the Development.

Agreement from the Council and NatureScot to the proposed scope for the LVIA is sought through this scoping exercise in order to enable the LVIA to be focussed on key considerations.

6.4.3 *Landscape Designations and Wild Land*

The Site is not covered by any national or local level landscape designations which would otherwise denote a special scenic value. There are, however, a number of different landscape designations occurring across the 45 km study area, which are shown in conjunction with the scoping layout ZTV in Figure 6.3. At the national level, The Nith Estuary is the only NSA in the LVIA Study Area, albeit with only its northern edge covered by the southern boundary. There are also eleven Gardens and Designed Landscapes (GDLs) spread across the LVIA Study Area, the closest being Drumlanrig Castle at approximately 10 km to the south-east of the Site.

Local landscape designations are designated through the LDP2 and denote the local value of these landscapes. In the area of the LVIA Study Area covered by the Council, there are five Regional Scenic Areas (RSAs), with the north-western boundary of the Thornhill Upland adjacent to the southern boundary of the Site. In the South Lanarkshire Council area of the LVIA Study Area, there are five Special Landscape Areas, in the East Ayrshire Council area there are three Sensitive Landscape Areas, and in the South Ayrshire Council area there are five Local Landscape Areas (LLAs).

WLAs are not a landscape designation but a Mapped Interest, defined and described by NatureScot and considered to be of national importance in SPP. There are two WLAs in the LVIA Study Area, as shown in conjunction with the scoping layout ZTV in Figure 6.3. These are associated with the upland areas to the north-east and south-west of the LVIA Study Area.

6.4.4 *Preliminary Assessment of Landscape Designations and Wild Land*

Table 6.1 below lists the landscape designations and WLAs that lie within the LVIA Study Area and provides information about their distance to the scoping layout and relationship to the ZTVs, as shown in Figure 6.3. Thereafter, each is assessed in the final column whether or not, in OPEN's opinion, these areas should be scoped in or out of the assessment, that is unless changes to the layout during the detailed design process materially alter the potential for significant effects. The boxes that are shaded grey will be assessed further within the LVIA.

Agreement from the Council and NatureScot to the proposed scope for the LVIA is sought through this scoping exercise in order to enable the LVIA to be focussed on key considerations.

Table 6.1: Landscape Planning Designations and WLAs

Receptor Name	Nearest turbine approx. (km)	Subject to ZTV?	Need to assess effects further within LVIA?
National Scenic Areas			
Nith Estuary	38	Yes	No, owing to the following reasons: - Separation distance of 38 km+ means the Development will appear distant and small scale; - ZTV shows very small patches of theoretical visibility on the summits of the higher hills with the remainder of the NSA unaffected; and - Other closer range operational wind farms already have an influence on this NSA.
RSA (Dumfries and Galloway)			
Thornhill Uplands	0	Yes	Yes, owing to the following reasons: - Separation distance of 0 km+ means the Development will appear close range and large scale; - ZTV shows theoretical visibility to occur across this RSA with the main patches to the north and east; and - The Development will present the one of the closest wind farms to the RSA despite other wind farms in the area.
Galloway Hills	11.3	Yes	Yes, owing to the following reasons: - Separation distance of 11.3 km+ means the Development will appear middle range and medium scale; - ZTV shows theoretical visibility to occur in patches across the more elevated east facing slopes and in small patches across the north-eastern corner; and - There are a number of operational wind farms in this area and potential for cumulative effects.
Moffat Hills	30.6	Yes	No, owing to the following reasons: - Separation distance of 30 km+ means the Development will appear distant and small scale; - ZTV shows very small patches of high-level theoretical visibility concentrated on Hart Fell and Swatte Fell; - Other closer range operational wind farms already have an influence on this RSA.
Terregles Ridge	26.0	Yes	No, owing to the following reasons: - Separation distance of 26 km+ means the Development will appear distant and small scale; - ZTV shows very small patches of theoretical visibility on the elevated north-facing slopes and summits; and - Other closer range operational wind farms already have an influence on this NSA.

Receptor Name	Nearest turbine approx. (km)	Subject to ZTV?	Need to assess effects further within LVIA?
Torthorwald Ridge	33.4		No, owing to the following reasons: - Separation distance of 33 km+ means the Development will appear especially distant and small scale; - ZTV shows small patches of low to medium level theoretical visibility across north-east facing slopes; and - Other closer range operational wind farms already have an influence on this RSA.
Special Landscape Areas (South Lanarkshire)			
Leadhills and the Lowther Hills SLA	14.8	Yes	No, owing to the following reasons: - Separation distance of 14 km+ means the Development will appear middle range and medium scale; - ZTV shows very small patches of theoretical visibility on summits and elevated parts of south-west facing slopes; and - Other closer range operational wind farms already have an influence on this SLA.
Douglas Valley	21.4	Yes	No, owing to the following reasons: - Separation distance of 21 km+ means the Development will appear distant and small scale; - ZTV shows very small patches of theoretical visibility around the margins of the SLA with the vast majority of the SLA unaffected; and - Other closer range operational wind farms already have an influence on this SLA.
Tweedsmuir Uplands	29.6	Yes	No, owing to the following reasons: - Separation distance of 29 km+ means the Development will appear distant and small scale; - ZTV shows very small patches of theoretical visibility across elevated south and south-east facing slopes with the majority of the SLA unaffected; and - Other closer range operational wind farms already have an influence on this SLA.
Upper Clyde Valley and Tinto	25.9	Yes	No, owing to the following reasons: - Separation distance of 25 km+ means the Development will appear distant and small scale; - ZTV shows patches of theoretical visibility across the south facing slopes of Tinto and Dungavel Hill with the majority of the SLA unaffected; and - Other closer range operational wind farms already have an influence on this SLA.

Receptor Name	Nearest turbine approx. (km)	Subject to ZTV?	Need to assess effects further within LVIA?
Middle Clyde Valley	33.9	Yes	No, owing to the following reasons: - Separation distance of 33 km+ means the Development will appear distant and small scale; - ZTV shows small patches of low-level theoretical visibility in the north-east of the SLA with the majority of the SLA unaffected; and - Other closer range operational wind farms already have an influence on this SLA.
Sensitive Landscape Areas (East Ayrshire)			
New Cumnock SLA	5.7	Yes	Yes, owing to the following reasons: - Separation distance of 5 km+ means the Development will appear close range and large scale; - ZTV shows theoretical visibility to occur in patches across south and south-east facing slopes; and - The Development will add to an already busy cumulative context extending across the eastern side of this SLA.
Catrine SLA	21.1	Yes	No, owing to the following reasons: - Separation distance of 21 km+ means the Development will appear distant and small scale; - ZTV shows patches of theoretical visibility across the south-east facing slopes of Blackside and Middlefield with the remaining majority of the SLA unaffected; and - Other closer range operational wind farms already have an influence on this SLA.
Craigengillan SLA	21.2	No	No, as there is no theoretical visibility shown on the ZTV.
LLAs (South Ayrshire)			
The Ayr Valley	32.2	No	No, as there is no theoretical visibility shown on the ZTV.
Doon Valley	37.3	No	No, as there is no theoretical visibility shown on the ZTV.
Water of Girvan Water Valley	31.2	No	No, as there is no theoretical visibility shown on the ZTV.
The Stinchar Valley	36.0	No	No, as there is no theoretical visibility shown on the ZTV.
High Carrick Hills	27.6	No	No, as there is no theoretical visibility shown on the ZTV.
GDL			

Receptor Name	Nearest turbine approx. (km)	Subject to ZTV?	Need to assess effects further within LVIA?
Drumlanrig Castle	9.8	Yes	No, owing to the following reasons: - ZTV shows small patch of low-level visibility comprising 1 to 3 turbines, occurring on north-east edge of GDL and coinciding with woodland plantation. The majority of the GDL will be unaffected.
Scot's Mining Company House	15.9	No	No, as there is no theoretical visibility shown on the ZTV.
Maxwelton	16.6	No	No, as there is no theoretical visibility shown on the ZTV.
Craigengillan	24.8	No	No, as there is no theoretical visibility shown on the ZTV.
Dumfries House	21.7	No	No, as there is no theoretical visibility shown on the ZTV.
Dalswinton	27.7	No	No, as there is no theoretical visibility shown on the ZTV.
Raehills	32.6	No	No, as there is no theoretical visibility shown on the ZTV.
Blairquhan	34.8	No	No, as there is no theoretical visibility shown on the ZTV.
Skeldon House	35.4	No	No, as there is no theoretical visibility shown on the ZTV.
Auchincruive	36.3	No	No, as there is no theoretical visibility shown on the ZTV.
Carnell	36.2	No	No, as there is no theoretical visibility shown on the ZTV.
Loudon Castle	37.3	No	No, as there is no theoretical visibility shown on the ZTV.
Lanfine	34.8	No	No, as there is no theoretical visibility shown on the ZTV.
The Falls of Clyde	36.5	No	No, as there is no theoretical visibility shown on the ZTV.
WLA			
01. Merrick	30.9	Yes	No, owing to the following reasons: - Separation distance of 30 km+ means the Development will appear as small-scale and distant; - ZTV shows theoretical visibility occurring as very small patches on the higher summits, with the vast majority of the WLA unaffected; and - There are a large number of operational wind farms with a closer-range influence on this WLA.

Receptor Name	Nearest turbine approx. (km)	Subject to ZTV?	Need to assess effects further within LVIA?
02. Talla – Hart Fell	33.4	Yes	No, owing to the following reasons: - Separation distance of 33 km+ means the Development will appear as small-scale and distant; - ZTV shows theoretical visibility occurring as small patches on Hart Fell and Swatte Fell and other summits to the north-east, with the vast majority of the WLA unaffected; and - There are a large number of operational wind farms with a closer-range influence on this WLA.

This preliminary assessment has highlighted those landscape designations and WLAs with potential to be significantly affected. This includes the Thornhill Uplands RSA, Galloway Hills RSA and New Cumnock Sensitive Landscape Area. The effects of the Development on these regional landscape designations will be carried out following the LVIA methodology outlined above.

In respect of the GDLs, a detailed assessment will be carried out in the Archaeology and Cultural Heritage section following guidance set out by Historic Environment Scotland (HES). As per Section 9 of the Report, there are no GDLs recorded within the 5 km of the Site however, may be included in the heritage assessment where the assets lie in elevated positions or their setting incorporates long distance views towards the Development. The inclusion of GDLs in the assessment will be confirmed with consultees.

6.4.5 *Visual Receptors and Visual Amenity*

The LVIA will undertake an assessment of the likely visual effects of the Development through consideration of the specific visual effects at a selection of representative viewpoints and by considering the wider effects on visual amenity with reference to principal visual receptors. Representative viewpoints and principal visual receptors are shown in conjunction with the scoping layout ZTV in Figures 6.4 and 6.5 respectively.

6.4.6 *Visualisations*

Visualisations and figures will be produced to NatureScot's standards as set out in 'Visual Representation of Wind farms: Version 2.2'[66] (February 2017). In line with NatureScot guidance, it is proposed that photomontages will be prepared for viewpoints where they are located within a 20 km radius of the outermost turbines of the Development.

6.4.7 *Viewpoint Selection*

A preliminary list of Viewpoint Locations is shown in Table 6.2 below, along with the visual receptors they represent and the landscape designations in which they occur. The Viewpoint Locations are shown in Figure 6.4. The final list will be established through fieldwork and the scoping process and in agreement with the Council and NatureScot. The viewpoints have been selected to represent sensitive visual receptors with the potential to undergo significant effects. They have also been selected to represent landscape receptors and with consideration of the potential for cumulative effects to arise.

Agreement from the Council and NatureScot to the proposed scope for the LVIA is sought through this scoping exercise in order to enable the LVIA to be focussed on key considerations.

[66] SNH (2017) Visual Representation of Wind farms: Version 2.2

Table 6.2: Preliminary Representative Viewpoint Locations

ID	Viewpoint name	Grid ref. (Preliminary)		Dist. nearest turbine (km)	Receptors represented / Landscape Designations
1	A76 Sanquhar Castle	278700 E	609345 N	3.4	Road-users / residents / walkers
2	Sanquhar Church Road	277845 E	610236 N	3.5	Road-users / residents / walkers
3	Kirkconnel	273733 E	612097 N	3.6	Road-users / residents / walkers
4	Euchan Water minor road	277034 E	609161 N	0.8	Road-users / residents / walkers
5	Shiel, Scar Water minor road	274454 E	603958 N	0.9	Road-users / residents / walkers Thornhill Uplands RSA
6	Mennock	281067 E	607838 N	4.1	Road-users / residents / walkers Thornhill Uplands RSA
7	Southern Upland Way east of Sanquhar	279210 E	610782 N	4.6	Walkers Thornhill Uplands RSA
8	Polgown, Scar Water minor road	271838 E	603814 N	1.7	Road-users / residents / walkers
9	Durisdeer	289379 E	603657 N	10.8	Road-users / residents / walkers Thornhill Uplands RSA
10	Wauk Hill	284117 E	590952 N	14.4	Walkers Thornhill Uplands RSA
11	Benbrack	268056 E	597092 N	11.7	Walkers
12	Cairnsmore of Carsphairn	259457 E	598013 N	11.6	Walkers Galloway Hills RSA
13	Blackcraig	264758 E	606458 N	5.3	Walkers New Cumnock Sensitive Landscape Area
14	Corsencon Hill	267149 E	614701 N	14.4	Walkers
15	Todholes Hill	274524 E	615045 N	5.8	Walkers
16	Lowther East Mount	287853 E	609979 N	10.2	Walkers Leadhills and the Lowther Hills Special Landscape Area

6.4.8 *Residential Visual Amenity Assessment*

While effects on individual properties will not be assessed in this LVIA, those that lie within a 2 km radius of the Development will be included in the RVAA. The RVAA will be prepared in accordance with the Landscape Institute's Technical Guidance Note 2/19 'Residential Visual Amenity Assessment'[67] (RVAA). This guidance sets out the 'Steps' to be followed when undertaking a RVAA and highlights how it should be informed by the principles and processes of GLVIA3. The purpose of the RVAA is to identify those properties where the effect of the Development leads to the 'Residential Visual Amenity Threshold' being reached or, in other words, where the effect could be described as overwhelming or overbearing. The RVAA Study Area is set at a 2 km radius in line with the maximum radius recommended in the technical guidance. The RVAA will consider the effect on views from each property, as well as views from the associated garden grounds and access tracks. Field work will be undertaken from publicly accessible locations, and considered in conjunction with aerial photography, in order to ascertain these potential effects.

6.4.9 *Night-time Lighting Assessment*

A key factor in the development of turbines greater than 150 m in tip height is the likely requirement for them to have visible red, medium intensity (2,000 candela) lights fitted to turbines in accordance with Civil Aviation Authority (CAA) guidance. The details of the lighting requirements for the Development are currently being defined along with potential mitigation measures.

OPEN will, if required, prepare a night-time impact assessment section and visualisations illustrating turbine lighting at night, for inclusion in the LVIA. The hub height ZTV will be used to identify where there would be direct line of sight of the lights from the surrounding area. OPEN has undertaken night-time lighting assessments and visualisations for several other wind farm projects in the UK which will inform the approach to assessment of turbine lighting and the basis of our professional judgement about the level of effect arising from the proposed lighting.

In order to inform this assessment, OPEN will take photographs from three of the readily accessible viewpoints at dusk with photographs to be taken after the period of civil twilight. OPEN will prepare visualisations to represent the effects of lighting on these views. It is proposed that the following three viewpoints be used to represent the effects of night-time lighting:

- Viewpoint 1: A76 Sanquhar Castle;
- Viewpoint 4: Kirkconnel; and
- Viewpoint 6: Mennock.

These have been selected to represent the effects on road-users and residents in this local area who would be most likely to be affected. Night-time visualisations will be prepared in accordance with NatureScot guidance.

6.5 Key Sensitivities

- Potential effects on local landscape character, including cumulative effects, particularly on the host LCT19 Southern Uplands and neighbouring LCT19a Southern Uplands with Forests, LCT 9 Upper Dale and LCT10 Upland Glens;
- Potential effects on the special landscape qualities of the nearby Thornhill RSA;
- Views from sensitive visual receptors including from nearby routes and settlements along the Nith Valley;
- Potential effects on the residential visual amenity of properties within a 2 km radius;
- Views from sensitive visual receptors on surrounding hill tops;

[67] Landscape Institute (2019) Technical Guidance Note 2/19 - Residential Visual Amenity Assessment

- Cumulative effects on sensitive landscape and visual receptors especially along the Nith Valley; and
- Visibility of the Development at night due to turbine lighting if required.

6.6 Potential Effects Assessment

Table 6.3 summarises those landscape and visual receptors to be scoped in and out of the LVIA.

Table 6.3: Summary of aspects scoped in and out of the EIA process.

Receptor Type	Scoped In	Scoped Out
Landscape character	Landscape Character and designations within 20 km of the Development. A preliminary assessment will accompany the LVIA to ascertain which landscape character receptors are assessed in detail. Landscape designations highlighted in Table 6.2.	Landscape Character and designations outwith 20 km of the Development. Landscape designations not highlighted in Table 6.2.
Visual	Effects on representative viewpoints. Effects on key settlements, roads and paths. RVAA effects. Night-time effects.	Effects on visual receptors with limited or no visibility of the Development. A preliminary assessment will accompany the LVIA to ascertain which visual receptors are assessed in detail.

6.6.1 *Questions for Consultees*

- Q6.1 - Do you have any comments on the proposed methodology?
- Q6.2 - Are you in agreement with the proposed LVIA Study Area (45 km)?
- Q6.3 - Are you in agreement that the assessment of the effects on landscape character receptors should focus on those LCTs/LCUs which lie within a 20 km radius of the Development as shown in Figure 6.2?
- Q6.4 - Are you in agreement that the assessment of the effects on landscape designations and WLAs should focus on those areas which are highlighted as being relevant to the LVIA in Table 6.1?
- Q6.5 - Do you have any comments or suggestions in relation to the Preliminary Representative Viewpoint Locations shown in Table 6.2 and illustrated in Figure 6.4?
- Q6.6 - Do you have any comments on the approach to assessing the effects of the Development on Residential Visual Amenity?
- Q6.7 - Do you have any comments on the approach to assessing the effects of turbine lighting or the selection of three night-time viewpoints?
- Q6.8 - Do you have any comments or suggestions on the approach to cumulative landscape and visual assessment?

7 ORNITHOLOGY

7.1 Introduction

This section of the Report defines the proposed methodology and approach undertaken for the ornithological assessment that will be included within the EIA Report.

This section summarises the methods used to establish the baseline conditions within the Site and its surroundings, the results of the baseline surveys, and the process used to determine the sensitivity of the habitats and species' populations present.

The ways in which habitats or species might be affected (directly or indirectly) by the construction, operation and decommissioning of the Development will be assessed prior to and after any mitigation measures are considered. In addition, any cumulative effects will be considered, taking together effects of other wind farm projects in the area, whether operational, consented or at application stage, along with the significance of any predicted effects associated with the Development.

7.2 Study Area

7.2.1 *Desk Study*

The ornithology assessment will consider the following study areas which will be generated based on the final turbine layout and associated infrastructure (with the exception of the Natural Heritage Zone (NHZ) scale as these are pre-defined by NatureScot):

- Designated sites – the Development and a 20 km study area buffer (SNH 2016[68]);
- Collision Risk Modelling (CRM) – the results of the flight activity surveys will be used to inform collision modelling. A Collision Risk Analysis Area (CRAA) will be created using GIS Delaunay triangulation[69] from the proposed turbine locations to create a wind farm area which will then be buffered by 500 m (as per SNH 2017[70]). Figure 7.1 details viewshed coverage;
- Scarce[71] breeding birds – the Development and a 2 km study area buffer (SNH 2017[70]);
- Black grouse – the Development and a 1.5 km study area buffer (SNH 2017[70]);
- Breeding upland waders and wintering waders, raptors, owls and wildfowl – the Development and a 500 m study area buffer (SNH 2017[70]); and
- Cumulative assessment – as per NatureScot guidance (SNH 2018b[72]), the NHZ level is considered practical and appropriate for breeding species of wider countryside interest.

7.2.2 *Desk Study and Consultation*

A desk-study will be undertaken to gather information from a variety of sources and from consultation with several key stakeholders and conservation organisations, such as those outlined below:

- NatureScot Sitelink[73] for designated sites information; and

[68] SNH (2016) Assessing connectivity with Special Protection Areas

[69] Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here: https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html

[70] Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore wind farms.

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

[72] SNH (2018b) Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note.

[73] https://sitelink.nature.scot/home

- The South Strathclyde Raptor Study Group (SSRSG) and/or the Dumfries and Galloway Raptor Study Group (DGRSG) for historical breeding raptor data.

In addition to this, ornithological information available in the public domain relating to applications for local wind farm projects will be reviewed and referred to where relevant, in order to gather additional baseline information and further local/regional context.

7.2.3 *Field Surveys*

Ornithological fieldwork for the Development commenced in March 2018 and was completed in March 2020, and comprised the following surveys:

- Flight activity surveys: March 2018 to March 2020;
- Scarce breeding bird surveys: March to August 2018 and March to August 2019;
- Black grouse surveys: April and May 2018 and April and May 2019;
- Breeding bird surveys: April to July 2019 and April to July 2020; and
- Winter walkover surveys: November 2018, December 2018, February 2019, November 2019, January 2020 and February 2020.

Baseline survey methodology followed guidance from NatureScot (SNH 2017[70]), 'Bird Monitoring Methods' (Gilbert et al. 1998[74]) and 'Raptors: Field Guide to Surveys and Monitoring' (Hardey et al. 2013[75]).

7.3 Assessment Methodology

7.3.1 *Legislation, Policy and Guidance*

The assessment will be undertaken in line with the following European legislation and guidance:

- Directive 2009/147/EC on the Conservation of Wild Birds (the EU Birds Directive);
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (the Habitats Directive); and
- Environmental Impact Assessment Directive 2014/52/EU (the EIA Directive).

The following national legislation and policy advice will be considered as part of the assessment:

- The Wildlife and Countryside Act 1981 (as amended);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations);
- Circular 1/2017; The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment, Revision 1.0 (Scottish Government 2017).

The following guidance will be considered as part of the assessment:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018[76]) Guidelines for Ecological Impact Assessment;

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

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

[76] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.

- NatureScot guidance on assessment of effects of wind farms on birds (SNH 2000[77]; 2009[78]; 2016[68]; 2017[70]; 2018a[79]; 2018b[72]; 2018c[80]; 2019[81]; NatureScot 2020[82]);
- Scottish Executive Rural Affairs Department (SERAD) (2000[83]);
- The South Lanarkshire Biodiversity Strategy (2018 – 2022)[84];
- Stanbury et al. (2021[85]); and
- The Scottish Biodiversity List (SBL)[86].

7.3.2 *Proposed Scope of Assessment*

The assessment will consider the potential direct, indirect, and cumulative impacts that the construction and operation of the Development could have on Important Ornithological Features (IOFs), as per CIEEM 2018[76] guidance. The assessment will be supported by a technical appendix that will include details of survey methodologies, all survey data and outputs from any CRM.

The assessment will be informed by the baseline ornithology surveys as summarised above. A further desk study will be undertaken to gather any other relevant information (e.g., from other nearby wind farm EIAs or scientific studies), and the SSRSG and/or DGRSG will also be contacted to request historical breeding raptor data for the area.

The ornithology assessment will include the following elements:

- Baseline conditions;
- Scoping in/out of ornithological features and impacts;
- Assessment of potential impacts during construction and operational phases;
- Mitigation;
- Residual effects;
- Cumulative effects assessment; and
- Summary of effects.

Consideration of Special Protection Areas (SPAs) will be undertaken within a Habitats Regulations Appraisal (HRA) context, with information to inform an appropriate assessment being included, should any likely significant effects to any qualifying features be identified.

7.3.3 *Methodology for Assessing IOFs*

Effects on IOFs will be assessed in relation to the species' reference population, conservation status, range and distribution. The assessment of potential effects will follow guidelines published by CIEEM (2018[76]) and NatureScot (listed above).

The assessment involves the following process:

- Identifying potential impacts of the Development;
- Considering the likelihood of occurrence of potential impacts;

[77] SNH (2000) Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note.

[78] SNH (2009) Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees.

[79] SNH (2018a) Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas.

[80] SNH (2018c) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

[81] SNH joint publication (2019) Good Practice during Wind Farm Construction. 4th Edition.

[82] NatureScot (2020) General Pre-application and Scoping Advice to Developers of Onshore Wind Farms.

[83] SERAD (2000) Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('the Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995.

[84] https://www.southlanarkshire.gov.uk/downloads/file/14285/biodiversity_duty_report_2018_-_2020

[85] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114:723-747.

[86] https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

- Defining the Nature Conservation Importance (NCI) and conservation status of relevant populations for each IOF to determine overall sensitivity;
- Establishing the magnitude of the likely impact (both spatial and temporal) on each IOF;
- Based on the above information, making a judgement as to whether or not the consequent effect is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required;
- Considering opportunities for enhancement where appropriate; and
- Concluding residual effects after mitigation, compensation, or enhancement.

Where appropriate, the assessment will use recommended methods of analysis such as CRM using the Band et al. (2007[87]) model.

Determination of the level of sensitivity of an IOF is based on a combination of the feature's NCI (defined on the basis of the geographic scale) and conservation status (based on its distribution and/or population trend).

The magnitude of potential effects will be identified by considering the degree of change to baseline conditions predicted as a result of the Development, how IOFs are likely to respond to the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation. Effects are judged in terms of magnitude in space and time, and effects can be positive, neutral or negative.

The significance of potential effects is determined by integrating the assessments of IOF sensitivity and magnitude of effect in a reasoned way, based on the available evidence and professional judgement.

A set of pre-defined significance criteria will be used in assessing the potential effects of the Development to establish whether there will be any effects which will be sufficient to adversely affect the IOF to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).

7.3.4 *Cumulative Effects*

An assessment of cumulative effects will be undertaken following NatureScot guidance (SNH 2018b[72]).

Cumulative effects may include cumulative disturbance-displacement, collision mortality, habitat loss or barrier effects. Some cumulative effects, such as collision risk, may be summed quantitatively, but according to NatureScot (SNH 2018b[72]):

"In practice, however, some effects such as disturbance or barrier effects may need considerable additional research work to assess impacts quantitatively. A more qualitative process may have to be applied until quantitative information becomes available for developments in the area, e.g., from post-construction monitoring or research".

Cumulative effects on each feature relevant to the Development will be assessed in relation to other wind farm projects subject to the EIA process within a relevant search area, and their effects on a relevant reference population – the NHZ level is considered practical and appropriate for breeding species of wider countryside interest (as per SNH 2018b[72]).

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

7.4 Baseline Conditions

7.4.1 *Designated Sites*

There are no statutory designations with ornithological features within the Site, however there is one SPA (alongside the associated Sites of Special Scientific Interest (SSSIs) that underpins this SPAs) within 20 km of the Development (Figure 7.2): the Muirkirk and North Lowther Uplands SPA (underpinned by the Muirkirk Uplands SSSI and North Lowther Uplands SSSI), located approximately 6.5 km to the north of the Site.

Table 7.1: Qualifying Features of the Muirkirk and North Lowther Uplands SPA (underpinned by the Muirkirk Uplands SSSI^ and North Lowther Uplands SSSI*)

Feature	Qualifying Feature Category	Condition	Description	Foraging Range (SNH 2016[68])
Golden plover, breeding	SPA	June 2015: Unfavourable declining	Breeding population of European importance: estimated minimum of 154 breeding pairs (1999) representing 0.7% of the GB population. Selected as one of the most suitable sites for golden plover in GB.	3 km
Hen harrier, breeding	SPA, SSSI^*	July 2008: Unfavourable declining	Breeding population of European importance: average of 29.2 breeding females (1994-1998) representing 6% of the GB population and more recently an average of 12 breeding pairs (1991-1995) representing 2% of the GB population.	2 km
Hen harrier, non-breeding	SPA, SSSI^	December 2004: Unfavourable declining	Winter on the site in nationally important numbers.	N/A
Merlin, breeding	SPA	July 2009: Unfavourable no change	Breeding population of European importance: average of nine breeding pairs (1989-1998) representing 0.7% of the GB population. Selected as one of the most suitable sites for merlin in GB.	5 km
Peregrine falcon, breeding	SPA	August 2004: Unfavourable no change	Breeding population of European importance: average of six breeding pairs (1992-1996) representing 0.5% of the GB population. Selected as one of the most suitable sites for peregrine falcon in GB.	2 km
Short-eared owl. breeding	SPA, SSSI^	July 1998: Favourable maintained	Breeding population of European importance: average of 26 breeding pairs (1997-1998) representing 3% of the GB population.	2 km
Breeding bird assemblage	SSSI^	May 2015: Unfavourable no change	Mosaic of habitats that supports a diverse upland breeding bird community of national importance including: buzzard, curlew, dunlin, red grouse, redshank, ring ouzel, snipe, stonechat, teal, wheatear and whinchat.	N/A

7.4.2 *Ornithology Activity*

Flight activity surveys between March 2018 and March 2020 recorded ten target species (black grouse, curlew, golden plover, goshawk, hen harrier, merlin, osprey, peregrine falcon, pink-footed goose and red kite), collectively accounting for 69 flights which may be included in the CRM, depending on their location in relation to the final turbine layout.

Breeding wader surveys in 2018 and 2019 recorded two target wader species (curlew and golden plover) of which curlew were identified to be breeding both years (8-15 and 7-14 territories respectively).

Goshawk, hen harrier and red kite were occasionally recorded but were not identified to be breeding within the 2 km survey area. Two peregrine falcon territories were identified to the south of the Site (the nearest location is approximately 1 km from the Site), with evidence of occupation of one territory in 2018 and potential breeding at both territories in 2019. Barn owl were also identified to be roosting at a location just outwith the Site to the north, however no evidence of breeding was recorded.

No black grouse leks were identified during 2018 surveys (although a single female was recorded in 2018), however a lek with four males (and three associated females) in attendance was located on one occasion in June 2019.

7.5 Key Sensitivities

7.5.1 *Design Considerations*

Breeding and key foraging locations of target species will be taken into consideration during the Development design process, to minimise the risk of disturbance, displacement and collision effects. This will include the results of baseline surveys as well as a desk study.

7.5.2 *Scoped in Effects*

The assessment will consider the potential effects for any IOFs identified associated with construction/decommissioning and operation of the Development as detailed below.

Construction/decommissioning effects:

- Temporary and permanent habitat loss/alteration/fragmentation associated with the Development infrastructure, including loss of nesting, lekking, roosting or foraging habitat; and
- Visual and noise disturbance associated with construction activities.

Operational effects:

- Displacement from nesting, lekking, roosting or foraging habitats around operational turbines and other permanent infrastructure, including barrier effects;
- Risk of collisions with operational wind turbine blades or any other permanent infrastructure; and
- Potential lighting effects on birds.

Where appropriate, construction/decommissioning and operational effects will also be considered in a cumulative assessment.

Whilst it is not possible to definitively scope out specific target species from the assessment prior to undertaking CRM, considering the information available regarding the species assemblage and distribution at the Development and on the basis of professional experience, it is considered that black grouse and curlew are likely to be the only species considered as IOFs and therefore scoped into the assessment.

7.5.3 *Scoped Out Effects*

On the basis of baseline data, experience from other relevant projects and policy guidance or standards (e.g., SNH 2018a[79]), the following species will be 'scoped out' since significant effects are unlikely:

- Common and/or low conservation species not recognised in statute as requiring special conservation measures (i.e., not listed as Annex 1/Schedule 1 species);
- Common and/or low conservation species not included in non-statutory lists (i.e., not listed as Amber or Red-listed BoCC[85] species), showing birds whose populations are at some risk either generally or in parts of their range; and
- Passerine species, not generally considered to be at risk from wind farm developments (SNH 2017[70]), unless being particularly rare or vulnerable at a national level.

Following the desk study of designated sites containing ornithological features within 20 km and on the basis of SPA connectivity guidance provided by NatureScot (SNH 2016[68]), there is considered to be no connectivity between the Development and the Muirkirk and North Lowther Uplands SPA on the basis of the foraging ranges for the species for which the SPA is designated (2-5 km, Table 7.1 and SNH 2016[68]).

7.5.4 *Approach to Mitigation*

Good practice during construction and operation of the Development will include the following measures, regardless of the conclusions of the assessment:

- A Bird Disturbance Management Plan (BDMP) would be implemented as part of a Construction Environmental Management Plan (CEMP) or similar during the construction phase, to ensure that all reasonable precautions are taken to adhere to the relevant wildlife legislation;
- Pre- and during-construction surveys carried out by an Ecological Clerk of Works (ECoW) or suitably qualified ornithologist would take place as part of the BDMP; and
- The Applicant will work with the landowner to consider appropriate habitat management with a view to seek to enhance habitat quality for black grouse and curlew/ensure the continued availability of suitable lekking/breeding habitat for these species and to provide wider biodiversity improvements.

Where unmitigated significant effects on IOFs are identified, additional measures to prevent, reduce and where possible offset these adverse effects will be proposed, in order to conclude a non-significant residual effect.

7.6 Questions for Consultees

- Q7.1 - Do consultees agree that the methodology and scope of the assessment is appropriate?
- Q7.2 - Do consultees agree that the data obtained via field surveys (March 2018 to March 2020), as well as a desk study is sufficient to inform a robust impact assessment?
- Q7.3 - Do consultees agree that, subject to further information coming to light from the field surveys and desk study, the scope of IOFs, including designated sites, to be included in the assessment is appropriate?
- Q7.4 - Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ornithology assessment?

8 ECOLOGY

8.1 Introduction

This section of the Report defines the proposed methodology and approach undertaken for the ecological assessment that will be included within the EIA Report.

This section summarises the methods used to establish the baseline conditions within the Site and its surroundings, the results of the baseline surveys, and the process used to determine the sensitivity of the habitats and species' populations present.

The ways in which habitats or species might be affected (directly or indirectly) by the construction, operation and decommissioning of the Development will be assessed prior to and after any mitigation measures are considered. In addition, any cumulative effects will be considered, taking together effects of other wind farm projects in the area, whether operational, consented or at application stage, along with the significance of any predicted effects associated with the Development.

8.2 Study Area and Baseline Survey Methodology

8.2.1 *Study Area*

The area within which the desk-based research and field surveys are undertaken for the Development varies depending on the ecological feature and its search/survey methods and requirements. Details of the extent of each survey area and 'Study Area' are described in the sections below.

8.2.2 *Desk-Study and Consultation*

A desk-study will be undertaken to gather information from a variety of sources and from consultation with several key stakeholders and conservation organisations, such as those outlined below:

- National Biodiversity Network (NBN) Atlas Scotland for historical species records;
- NatureScot Sitelink for designated sites information;
- Scotland's Environment map[88] for the Carbon and Peatland Map 2016 and Ancient Woodland Inventory (AWI) sites within 5 km of the Development;
- Scottish Badgers;
- Scottish Wildlife Trust;
- Deer Distribution Survey results by the British Deer Society[89]; and
- Glasgow Museums Biological Records Centre.

In addition to this, ecological information available in the public domain relating to applications for local wind farm projects will be reviewed and referred to where relevant, in order to gather additional baseline information and further local/regional context.

8.2.3 *Field Surveys*

Ecology baseline surveys were conducted in 2020 and 2021 within the Site and survey areas (Figure 8.1), as required. Surveys followed standard methodologies and guidance, as listed below. The following surveys have been undertaken to date:

- National Vegetation Classification (NVC) habitat surveys following the NVC scheme[90] using standard methods[91] and incorporating Phase 1 Habitat Survey

[88] www.environment.gov.scot/maps/scotlands-environment-map/ (Accessed February 2022)

[89] Deer Distribution Survey - The British Deer Society (bds.org.uk) (Accessed February 2022)

[90] Rodwell, J.S. (Ed) *et al.* (1991 – 2000). *British Plant Communities* (5 volumes). Cambridge University Press, Cambridge.

[91] Rodwell, J.S. (2006). *NVC Users' Handbook*. ISBN 978 1 86107 574 1.

characterisation[92]. Surveys undertaken within majority of the Site boundary during October 2019;

- Protected species surveys following standard methodologies for the following species: otter[93],[94],[95], badger[96],[97], water vole[98], pine marten[99] and red squirrel[100]. Incidental records of reptile sightings, or signs such as shed skins, and features of particular importance (i.e., potential hibernacula) were also recorded (August 2021);
- A Preliminary Roost Assessment (PRA) for bats within the Site in line with guidance[101] (August 2021);
- Seasonal static bat detector (anabat) surveys following recommended guidelines[102] with 12 anabats deployed around the Site seasonally between May and September 2020 inclusive; and
- Fisheries surveys (electrofishing and habitat suitability) for salmonids within the Site and any other suitable sample points, following Scottish Fisheries Co-ordination Centre (SFCC) methods[103],[104], including information on lamprey species and freshwater pearl mussel (FWPM) habitat suitability or likelihood of presence[105] (September 2021).

Given the absence of ponds within the Site, no Great Crested Newt (GCN) surveys are deemed necessary.

The following surveys will be undertaken in 2022 in order to complete survey coverage of the updated site boundary:

- NVC habitat surveys following the NVC scheme using standard methods and incorporating Phase 1 Habitat Survey characterisation;
- Protected species surveys following standard methodologies for the following species: otter, badger, water vole, pine marten and red squirrel including incidental records of reptile sightings, or signs such as shed skins, and features of particular importance (i.e. potential hibernacula); and
- A PRA for bats.

[92] Joint Nature Conservancy Council (2010) *Handbook for phase 1 habitat survey – a technique for environmental audit*. JNCC, Peterborough.
[93] Bang, P., and Dahlstrøm, P. (2001) *Animal Tracks and Signs*. Oxford University Press, Oxford.
[94] Sargent, G., and Morris, P. (2003) *How to Find and Identify Mammals*. The Mammal Society, London.
[95] Chanin, P. (2003) *Monitoring the Otter (Lutra lutra)*. Conserving Natura 2000 Rivers Monitoring Series No.10 English Nature, Peterborough.
[96] Neal, E., and Cheeseman, C.L. (1996) *Badgers*. Poyser Natural History, London.
[97] Scottish Badgers (2018) *Surveying for Badgers*: Good Practice Guidelines. Version 1.
[98] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) *The Water Vole Mitigation Handbook* (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.
[99] O'Mahony D., O'Reilly, C. & Turner, P. (2006) *National Pine Marten Survey of Ireland 2005*. Council for Forest Research and Development, Ireland.
[100] Gurnell, J., Lurz, P. McDonald, R. & Pepper, H. (2009) *Practical Techniques for Surveying and Monitoring Squirrels*. Forestry Commission Practice Note.
[101] Collins, J. (ed) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London.
[102] SNH, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019) *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*.
[103] SFCC (2007) *Habitat Surveys Training Course Manual*. Scottish Fisheries Co-ordination Centre, Pitlochry.
[104] SFCC (2007) *Electrofishing Team Leader Training Manual. Fisheries Management SVQ Level 3: Managing Electrofishing Operations*. Scottish Fisheries Co-ordination Centre, Pitlochry and Inverness College, Inverness.
[105] Skinner, A., Young, M. & Hastie, L. (2003) *Ecology of the Freshwater Pearl Mussel*. Conserving Natura 2000 Rivers Ecology Series No. 2 English Nature, Peterborough.

8.3 Assessment Methodology

8.3.1 *Legislation, Policy and Guidance*

The assessment will be undertaken in line with the following European and National legislation:

- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (Habitats Directive)[106];
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (the Water Framework Directive)[107];
- Environmental Impact Assessment Directive 2014/52/EU[108];
- Nature Conservation (Scotland) Act 2004 (as amended)[109];
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) 'The Habitats Regulations')[110];
- EIA Regulations;
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS)[111];
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011[112];
- The Wildlife and Countryside Act 1981 (as amended)[113];
- The Wildlife and Natural Environment (Scotland) Act 2011 (WANE)[114]; and
- The Protection of Badgers Act 1992[115].

In addition, planning policy and guidance documents that are of particular relevance to this section include:

- UK Post-2010 Biodiversity Framework (2012)[116];
- Scottish Biodiversity Strategy: It's in Your Hands (2004)/2020 Challenge for Scotland's Biodiversity (2013)[117];
- Scottish Planning Policy[118]; and
- Dumfries and Galloway Local Biodiversity Action Plan (LBAP) (2009)[119].

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

[106] Scottish Government (1992) Council Directive 92/43/EEC [Online] Available at: https://www.legislation.gov.uk/eudr/1992/43/contents (Accessed 30/03/2022)
[107] Scottish Government (2000) Directive 2000/60/EC of the European Parliament and of the Council [Online] Available at: https://www.legislation.gov.uk/eudr/2000/60/contents (Accessed 30/03/2022)
[108] Scottish Government (2014) Directive 2014/52/EU of the European Parliament and of the Council [Online] Available at: https://www.legislation.gov.uk/eudr/2014/52 (Accessed 30/03/2022)
[109] Scottish Government (2004) Nature Conservation (Scotland) Act 2004 [Online] Available at: https://www.legislation.gov.uk/asp/2004/6/contents (Accessed 30/03/2022)
[110] Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994 [Online] Available at: https://www.legislation.gov.uk/uksi/1994/2716/contents (Accessed 30/03/2022)
[111] Scottish Government (2003) Water Environment and Water Services (Scotland) Act 2003 [Online] Available at: https://www.legislation.gov.uk/asp/2003/3/contents (Accessed 30/03/2022)
[112] Scottish Government (2011) The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [Online] Available at: https://www.legislation.gov.uk/ssi/2011/209/contents/made (Accessed 30/03/2022)
[113] Scottish Government (1981) Wildlife and Countryside Act 1981 [Online] Available at: https://www.legislation.gov.uk/ukpga/1981/69 (Accessed 30/03/2022)
[114] Scottish Government (2011) Wildlife and Natural Environment (Scotland) Act 2011 [Online] Available at: https://www.legislation.gov.uk/asp/2011/6/contents/enacted (Accessed 30/03/2022)
[115] Scottish Government (1992) Protection of Badgers Act 1992 [Online] Available at: https://www.legislation.gov.uk/ukpga/1992/51/contents (Accessed 30/03/2022)
[116] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012) UK Post-2010 Biodiversity Framework. JNCC, Peterborough.
[117] Scottish Executive (2004) Scottish Biodiversity: It's In Your Hands. Scottish Executive, Edinburgh.
[118] Scottish Government (2014) Scottish Planning Policy. Scottish Government, Edinburgh.
[119] Norman *et al.* (2009) Dumfries Galloway Local Biodiversity Action Plan. Dumfries & Galloway Biodiversity Partnership.

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (version 1.1). Chartered Institute of Ecology and Environmental Management, Winchester[120];
- Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust[121];
- European Commission (2011) Wind Energy Developments and Natura 2000;
- Joint Nature Conservation Committee (JNCC) (2013) Guidelines for selection of biological Sites of Special Scientific Interest (SSSI)[122];
- Scottish Executive (2019) The Scottish Forestry Strategy (SFS)[123];
- Scottish Executive (2000) Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995[124];
- Scottish Government (2001) European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements[125];
- Scottish Government (2010) Management of Carbon-Rich Soils[126];
- Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity[127];
- Scottish Government (2016) Draft Peatland and Energy Policy Statement[128];
- Scottish Government (2017) Planning Advice Note 1/2013 - Environmental Impact Assessment, Revision 1.0[129];
- Scottish Government (2017) Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Government (2018) Climate Change Plan: Third Report on Policies and Proposals 2018-2032[130];
- Scottish Environment Protection Agency (SEPA) (2017) Land Use Planning System Guidance Note 4 - Planning guidance on on-shore windfarm developments[131];
- 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[132];
- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), HES, AEECoW (2019) Good Practice During Windfarm Construction (4th Edition)[133];

[120] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
[121] Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust.
[122] JNCC (2019) Guidelines for selection of biological SSSIs [Online] Available at: https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/ (Accessed 30/03/2022)
[123] Scottish Government (2019) The Scottish Forestry Strategy 2019-2029. Scottish Government, Edinburgh.
[124] Scottish Executive (2000) Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995.
[125] SERAD (2001) European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements.
[126] Scottish Government (2010) Management of Carbon Rick Soils. Scottish Government, Edinburgh.
[127] Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity. The Scottish Government, Edinburgh.
[128] Scottish Government (2016) Draft Peatland and Energy Policy Statement. Scottish Government, Edinburgh.
[129] Scottish Government (2017) Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Scottish Government, Edinburgh.
[130] Scottish Government (2020) Update to the Climate Change Plan 2018-2032. Scottish Government, Edinburgh.
[131] SEPA (2017) Land Use Planning System Guidance Note 4 – Planning guidance on on-shore windfarm developments.
[132] SEPA (2017) Land Use Planning System Guidance Note 31 – Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystem. Version 3.
[133] Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), Historic Environment Scotland & AEECoW (2019). Good Practice During Windfarm Construction (4th Edition).

- NatureScot (2012) Assessing the Cumulative Impact of Onshore Wind Energy Developments[134];
- SNH (2013) Planning for Development: What to consider and include in Habitat Management Plans[135];
- SNH (2015) Scotland's National Peatland Plan[136];
- SNH (2016) Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2)[137];
- SNH (2018) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland[138];
- NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation[139]; and
- NatureScot (2020) General Pre-application and Scoping Advice to Developers of Onshore Wind Farms[140].

8.3.2 *Methodology for Assessing Important Ecological Features*

The EIA Report will include an Ecological Impact Assessment (EcIA). This will consider the potential direct, indirect and cumulative effects that the construction, operation and decommissioning of the Development may have on any Important Ecological Features (IEFs) scoped-in to the assessment. The EcIA will be supported by technical appendices covering; habitats, protected species, bats, fisheries and an Outline Habitat Management Plan (oHMP) (if required).

The assessment method will follow the principles within the guidance detailed by CIEEM (2018[141]).

The evaluation for wider countryside interests (i.e., unrelated to any Natura 2000 sites) involves the following process:

- Identification of the potential ecological effects of the Development, including both positive and negative;
- Considering the likelihood of occurrence of potential effects where appropriate;
- Defining the nature conservation value of the ecological features present;
- Establishing the feature's conservation status where appropriate;
- Establishing the magnitude of change associated with the likely effect (both spatial and temporal);
- Based on the above information, making a judgement as to whether or not the resultant effect is significant in terms of the EIA Regulations;

[134] NatureScot (2021) Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments (update to 2012 guidance). [Online] Available at: https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments. (Accessed 30/03/2022)

[135] SNH (2016) Planning for Development: What to consider and include in Habitat Management Plans. Version 2.

[136] SNH (2015) Scotland's National Peatland Plan [Online] Available at: https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future (Accessed 30/03/2022)

[137] SNH (2016) Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2).

[138] SNH (2018) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

[139] NatureScot (2021) Bats and onshore wind turbines – survey, assessment and mitigation [Online] Available at: https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation (Accessed 30/03/2022)

[140] NatureScot (2020) General pre-application and scoping advice for onshore wind farms [Online] Available at: https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms (Accessed 30/03/2022)

[141] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester.

- If a potential effect is determined to be significant, measures to avoid, reduce, mitigate or compensate for the effect are suggested where required;
- Considering opportunities for enhancement where appropriate; and
- Confirming residual effects after mitigation, compensation or enhancement are considered.

Determination of the level of sensitivity of an IEF is based on a combination of the feature's nature conservation value, defined on the basis of the geographic scale, and conservation status, based on its distribution and/or population trend.

The magnitude of potential effects will be identified by considering the degree of change to baseline conditions predicted as a result of the Development, how IEFs are likely to respond to the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation. Effects are judged in terms of magnitude in space and time, and effects can be positive, neutral or negative.

The significance of potential effects is determined by integrating the assessments of IEF sensitivity and magnitude of effect in a reasoned way, based on the available evidence and professional judgement.

A set of pre-defined significance criteria will be used in assessing the potential effects of the Development to establish whether there will be any effects which will be sufficient to adversely affect the IEF to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).

8.3.3 *Cumulative Effects*

An assessment of cumulative effects will be undertaken following published guidance (NatureScot, 2012)[142]. Cumulative effects on each feature relevant to the Development will be assessed in relation to other wind farm projects subject to the EIA process within a relevant search area, and their effects on a relevant reference population; for example, at a watercourse, watershed or NHZ level.

8.4 Baseline Conditions

This section provides information on the initial desk-based studies and field surveys undertaken to date; these will be supplemented with further desk-based data collation and review, and field surveys.

8.4.1 *Desk-Study*

8.4.1.1 Designated Sites

The Site does not overlap with any statutory ecologically designated sites. However, four statutory sites designated for terrestrial ecological qualifying interests are present within 5 km of the Site boundary (Figure 8.2), and therefore could have potential connectivity with the Site. These designated sites are detailed below in Table 8.1.

[142] SNH (2012) Assessing the Cumulative Impact of Onshore Wind Energy Developments [Online] Available at: https://www.nature.scot/guidance-assessing-cumulative-impact-onshore-wind-energy-developments (Accessed 03/03/2022)

Table 8.1: Ecological Designated Sites within 5 km of the Site Boundary

Site Name	Distance to Site Boundary (km)	Qualifying Interests	Status
Upper Nithsdale Woods SAC	2.6	Mixed woodland on base-rich soils associated with rocky slopes	Unfavourable Declining 09/11/2009
Back Wood SSSI	2.6	Upland oak woodland	Unfavourable Declining 08/10/2009
Mennock Water SSSI	2.9	Fen meadow	Favourable Maintained 27/06/2016
		Upland oak woodland	Favourable Maintained 02/06/2014
North Lowther Uplands SSSI	3.6	Upland assemblage	Unfavourable Recovering 31/05/2015

8.4.1.2 Ancient Woodland

One area of ancient woodland (as listed within the AWI) is partially within the Site, and there are numerous areas within 5 km, including some immediately adjacent to the Site boundary (Figure 8.2). The Ancient Woodland areas within 5 km of the Site are all located to the north. SPP identifies Ancient Woodland as an important national resource that should be protected and enhanced. However, no woodland removal resulting from the Development is expected in areas of Ancient Woodland. Furthermore, no impairment of woodland habitat connectivity is expected to result from the Development.

Connectivity between the Site and areas of Ancient Woodland cannot be ruled out, as several patches of woodland lie along Euchan Water which sits downstream of the portion of the Site which may include ancillary infrastructure.

8.4.1.3 NBN Atlas

A search on the NBN Atlas for species records within a 5 km buffer of the Site during the last 15 years (i.e., 2006 and onwards) contained records for the following protected species:

- Adder (*Vipera berus*);
- Atlantic salmon (*Salmo salar*);
- Brown hare (*Lepus europaeus*);
- Brown long-eared bat (*Plecotus auratus*);
- Common lizard (*Zootoca vivipara*);
- Eurasian otter (*Lutra lutra*);
- European eel (*Anguilla anguilla*);
- Mountain hare (*Lepus timidus*);
- Palmate newt (*Lissotriton helveticus*);
- Pipistrelle bat species;
- Red squirrel (*Sciurus vulgaris*); and
- Soprano pipistrelle (*Pipistrellus pygmaeus*).

The NBN Atlas also returned records of the invasive non-native species Himalayan balsam (*Impatiens glandulifera*).

8.4.1.4 Deer Distribution Survey

Every five years the British Deer Society undertakes a survey plotting the current distribution of all six species of deer wild in Great Britain and Northern Ireland and uses it to monitor and record changes from the previous survey to see if the range has changed or expanded.

The results of the 2016 Deer Distribution Survey indicate the following in the general area where the Site is located:

- Red deer (*Cervus elaphus*) were recorded in 2007 and/or 2011 and reconfirmed in 2016; and
- Roe deer (*Capreolus capreolus*) were recorded in 2007 and/or 2011 and reconfirmed in 2016.

No other species of deer have been recorded in the vicinity of the Site.

8.4.2 ***Field Survey***

8.4.2.1 NVC & Phase 1 Habitat Surveys

Habitat surveys were undertaken during August 2021, within the Site boundary as it was at the time. An updated Site boundary was provided in February 2022, and as such additional NVC and Phase 1 Habitat survey work will be required.

Results show that the Site is predominately a mosaic of the following Phase 1 habitat types with numerous transitional zones due to complex Site topography and aspect:

- Marsh/marshy grassland;
- Semi-improved acid grassland;
- Unimproved acid grassland;
- Wet dwarf shrub heath; and
- Wet modified bog.

Patches of blanket bog, acid neutral flush, broad-leaved semi-natural woodland and bracken were also encountered, although forming only a minor part of the habitat mosaic across the Site.

A number of the habitat types and NVC communities within the Site correspond to Habitats Directive (92/43/EEC) Annex I habitats, SBL priority habitats, and/or potential Ground Water Dependent Terrestrial Ecosystems (GWDTEs) as per guidance[143].

8.4.2.2 Protected Species Surveys

Protected species surveys were carried out in August 2021 within the Site boundary as it was at the time. An updated Site boundary was provided in February 2022, and as such additional protected species survey work will be required to provide a full understanding of how protected species use the Site.

Otter (Lutra lutra)

Otter signs were widespread along the watercourses surveyed, with a total of 39 spraints recorded. Several of the burns within the survey area were found to have good suitability for otter, including some features with suitability for use as holts or couches.

Water vole (Arvicola amphibious)

[143] SEPA (2017) Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Version 3. Issue [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf (Accessed 03/03/2022)

No evidence of water vole was recorded during the 2021 surveys. Some moderately suitable burns and foraging habitat were identified. Evidence of mink was recorded during surveys, and the presence of this species may have impacted on water vole numbers in the area.

Badger (Meles meles)

One sett was identified within the survey area, and other badger feeding signs and dung were also recorded. Suitable habitat for badger is restricted to the forested areas to the north-east of the survey area.

Pine marten (Martes martes)

An incidental record of potential pine marten scat was recorded during the NVC surveys in August 2021.

Red squirrel (Sciurus vulgaris)

Feeding signs were identified at Ulzieside plantation.

Reptiles

Five common lizard (*Zootoca vivipara*) sightings were recorded in the southern part of the survey area. 14 potential hibernacula were also recorded, mostly attributed to dry stone wall features in addition to stone circle remains and rock piles.

Bats

Potential roost features were identified during the 2021 protected species surveys. Two structures with potential roost features were identified, one deemed to have high potential, and one low. Seven groups of trees with potential for roosting bats were also identified, all of which were assessed as having low suitability. Three single trees containing features with high potential for roosting bats were identified.

Other species

One instance of mink scat was recorded during the 2021 surveys.

8.4.2.3 Static Bat Detector Surveys

Static bat detectors (anabats) were deployed between May and September 2020 at 12 locations on the Site. The species recorded were *Nyctalus* spp., common pipistrelle (*Pipiestrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Natterer's bat (*Myotis nattereri*) and *Myotis* spp. Bat passes overlapping with or earlier than known emergence times may suggest the presence of nearby roosts, with the results suggesting this possibility for *Nyctalus* spp., Common pipistrelle and soprano pipistrelle. Of the bat species recorded on-site, *Nyctalus* spp., common pipistrelle and soprano pipistrelle are considered to be high risk for collision with wind turbines[144].

8.4.2.4 Fisheries Surveys

Fisheries surveys were conducted by the Nith District Salmon Fishery Board (NDSFB) in September 2021. Atlantic salmon (*Salmo salar*) fry and parr were identified on Euchan Water and the River Nith. Trout (*Salmo trutta*) parr and fry were identified on Euchan Water and one sampling site on Glen Burn, with trout parr also identified on a second sampling site on Glen Burn. Stone loach (*Barbatula barbatula*), minnow (*Phoxinus*

[144] NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

phoxinus) and grayling (*Thymallus thymallus*) were also identified in the course of the surveys.

8.5 Key Sensitivities

The assessment will concentrate on the effects of construction, operation and decommissioning of the Development upon those IEFs identified during the baseline period. In general, key sensitivities and potential effects are likely to be:

- Sensitive terrestrial habitats such as Habitats Directive Annex I habitats– effects include direct (i.e., derived from land-take) and indirect (i.e., changes caused by impacts to supporting systems such as groundwater or overland flow), including habitats such as blanket bog;
- Aquatic habitats – effects are limited to the ecological impacts of changes in water conditions through potential pollution effects (hydrological effects and GWDTEs are considered in Section 10 - Hydrology and Hydrogeology of this Report);
- Protected species – impacts considered include direct (i.e., loss of life as a result of the Development; loss of key habitat; displacement from key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e., loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g. as a result of pollution); and
- Cumulative effects – ecological effects arising from the addition of the Development in combination with other relevant wind farm projects.

8.6 Potential Effects Assessment

8.6.1 *Scoped In Effects*

Notwithstanding the scoping out as detailed in Section 8.6.2 below, no other potential effects or potential IEFs have been scoped out until the ecological baseline surveys are complete and the presence and distribution of ecological features in relation to the planned infrastructure and activities associated with the Development is fully understood.

8.6.2 *Scoped Out Effects*

On the basis of the results of the desk-based and survey work undertaken to date, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, generally common and widely distributed habitats or species which do not fall within the following categories will be scoped out of the assessment:

- Habitats on Annex I to the Habitats Directive, and species on Annex II to the Habitats Directive; and
- Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.

In addition, it is considered there is no connectivity between the Site and any ecologically designated site. All sites listed in Table 8.1 are designated for habitat features. Given the distance from these designations to the Site, there is considered to be no connectivity, and it is proposed that potential effects on North Lowther Uplands SSSI, Upper Nithsdale Woods SAC, Back Wood SSSI and Mennock Water SSSI can be scoped out of the EIA.

8.6.3 *Approach to Mitigation*

Significant effects on ecological features will be avoided or minimised where possible within the design process. Good practice during construction and operation of the Development will be implemented as standard, including the provision of a suitable Species Protection Plan and CEMP or similar, as well as the presence of an ECoW during the construction

period. The assessment will be undertaken on the basis that these measures will be in place.

Where likely significant effects on IEFs are identified, measures to prevent, reduce and where possible offset these adverse effects will be proposed, for instance through the development of a HMP for peatland habitats which would be developed and agreed with relevant consultees.

Where unmitigated significant effects on IEFs are identified, additional measures to prevent, reduce and where possible offset these adverse effects will be proposed, in order to conclude a non-significant residual effect.

8.7 Questions for Consultees

- Q8.1 - Do consultees agree that the range of surveys that will be carried out is sufficient and appropriate?
- Q8.2 - Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ecology assessment?
- Q8.3 - Do consultees believe that there are any particular habitats or protected species which need to be considered in the assessment?
- Q8.4 - Do consultees agree that there is no potential for connectivity between the Development and the North Lowther Uplands SSSI, Upper Nithsdale Woods SAC, Back Wood SSSI and Mennock Water SSSI, and that consequently effects related to all designated sites can be scoped out of the assessment?
- Q8.5 - Are you aware of any relevant policies or guidance documents not specifically mentioned in this section of the Report?

9 ARCHAEOLOGY AND CULTURAL HERITAGE

9.1 Introduction

The assessment will consider direct, indirect, and cumulative effects upon archaeology and cultural heritage. This will include the consideration of the following:

- Nationally designated assets including World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventoried GDLs, Inventoried Battlefields, and Conservation Areas;
- Undesignated assets (including above and below ground assets) as recorded by the local Historic Environment Record (HER), cartographic record, photographic record, or identified through the walkover survey; and
- The potential for unknown (buried) archaeological remains to survive within the Development Site.

The assessment will be conducted with reference to the relevant statutory and planning frameworks for cultural heritage. Key heritage policy and guidance Heritage legislation of relevance includes:

- The Historic Environment Scotland Act 2014[145];
- The Ancient Monuments and Archaeological Areas Act 1979[146];
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[147];
- SPP (2014): Valuing the Historic Environment, Paragraphs 135-151[148];
- Scottish Natural Heritage (now known as NatureScot) and HES EIA Handbook[149];
- Historic Environment Policy for Scotland (HEPS)[150];
- Our Place in Time: The Historic Environment Strategy for Scotland[151];
- Dumfries and Galloway LDP2;
- PAN 2/2011: Planning and Archaeology;
- CIfA Standards and Guidance for Desk-Based Assessments[152]; and
- HES (2016) Managing Change in the Historic Environment Series, specifically 'Managing Change in the Historic Environment: Setting'[153].

[145] Scottish Government (2014) The Historic Environment Scotland Act [Online] Available at http://www.legislation.gov.uk/asp/2014/19/pdfs/asp_20140019_en.pdf (Accessed 01/02/2022)
[146] UK Government (1979) The Ancient Monuments and Archaeological Areas Act [Online] Available at: https://www.legislation.gov.uk/ukpga/1979/46 (Accessed 01/02/2022)
[147] Scottish Government (1997) The Planning (Listed Buildings and Conservation Areas) (Scotland) Act [Online] Available at: https://www.legislation.gov.uk/ukpga/1997/9/contents (Accessed 01/02/2022)
[148] Scottish Government (2020) Scottish Planning Policy [Online] Available at https://www.gov.scot/publications/scottish-planning-policy/pages/5/ (Accessed 01/02/2022)
[149] SNH and HES (2018) EIA Handbook [Online] Available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=6ed33b65-9df1-4a2f-acbb-a8e800a592c0 (Accessed 01/02/2022)
[150] HES (2019) Scottish Environment Policy for Scotland [Online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7 (Accessed 06/09/2021)
[151] Scottish Government (2014) Our Place in Time: The Historic Environment Strategy for Scotland [Online] Available at: https://www.gov.scot/publications/place-time-historic-environment-strategy-scotland/ (Accessed 01/02/2022)
[152] Chartered Institute for Archaeologists (2017) Standard and Guidance for Historic Environment Desk -Based Assessment, Published December 2014, Updated October 2020 [Online] Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf(Accessed 01/02/2022)
[153] HES (2016, updated February 2020) Managing Change in the Historic Environment: Setting [Online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549 (Accessed 01/02/2022)

9.2 Baseline Conditions

Initial information relating to archaeology and cultural heritage has been gathered through a preliminary desk top search using available online resources to indicate potential heritage features of interest, as listed below.

No designated assets fall within the Site.

There are four Scheduled Monuments, one Conservation Area and 45 Listed Buildings (one Category A, 23 Category B and 21 Category C) within 5 km of the Development, as detailed in Appendix B. No World Heritage Sites, Battlefield Sites or Inventoried GDLs are recorded within the 5 km Study Area.

Due to their proximity the Listed Buildings, Conservation Area and Scheduled Monuments within the 5 km Study Area have the potential to receive significant indirect effects as a result to changes in their setting caused by the Development. As such, a detailed assessment of these heritage assets will be undertaken in the EIA Report.

A review of Canmore data indicates that there are five recorded non-designated assets within the Site (Canmore ID 294202, 179295, 365153, 365154 and 358562), these assets all date to the post-medieval or modern period, and comprise standing buildings, field boundaries, quarries or monitoring stations.

It is anticipated that potential direct effects on surviving undesignated archaeological remains will be reduced by avoidance through design, resulting in no direct effects to archaeological assets.

Heritage assets between 5 and 10 km may be included in assessment where the assets lie in elevated positions or their setting incorporates long distance views towards the Development (i.e., Forts and duns). The final selection of heritage assets for inclusion in the assessment of indirect effects will be agreed through further consultation.

9.3 Assessment Methodology

9.3.1 *Study Areas*

To assess potential direct and indirect effects on the historic environment, four study areas have been defined:

- Core Study Area (CSA);
- 1 km Study Area;
- 5 km Study Area; and
- 10 km Study Area.

The CSA comprises the site boundary for the Development and will define the area for any direct impacts to heritage assets during construction, operation and decommissioning of the development. A 1 km Study Area will be used to identify known heritage assets within the wider landscape and to aid in the assessment of the potential for any unknown heritage assets within the Site.

The 5 km and 10 km Study Areas would also be used to identify any indirect effects which may arise as a result of the Development.

9.3.2 *Desk-based assessment*

A Desk-Based Assessment (DBA) of cultural heritage records will be compiled to establish the baseline against which the impact assessment will be carried out. Data will be gathered from the following sources:

- HES Datasets including:
    - Canmore Archaeological Records;

- Database of World Heritage Sites;
- Database of Scheduled Monuments;
- Database of Listed Buildings;
- Database of Inventoried GDLs;
- Database of Inventoried Battlefields;

- The Council's HER;
- Aerial photographs and other cartographic information detailing previous land uses;
- The Statistical Accounts of Scotland; and
- Local studies libraries and other archives, as appropriate.

The 1 km Study Area around the Site will be used to collect data to inform on the archaeological potential of the CSA.

The DBA will be augmented by a walkover survey in order to:

- Assess and validate documentary data collected;
- Identify the extent and condition of any visible archaeological remains; and Determine whether previously unrecorded historic features are visible.

9.3.3 ***Environmental Impact Assessment and Report Chapter***

9.3.3.1 The cultural heritage assessment will proceed from a consideration of the 'sensitivity' of a cultural heritage feature against the 'magnitude' of any potential change, to arrive at the 'significance' of the effect. The assessment of sensitivity of archaeological and historical assets reflects the relative weight which statute and policy attach to them. Direct Effects

9.3.3.2 Known archaeology, as identified during the DBA, will be avoided during design of the Development, where possible. The assessment of physical effects will consider direct effects where sites or potential sites / buried archaeology are in danger of being disturbed or destroyed during the construction phase of the Development. Indirect Effects

The assessment of indirect effects considers changes in setting which have the potential to affect the understanding, appreciation and experience of heritage assets. For the purposes of evaluating indirect effects upon heritage assets, designation status, proximity to the Development, and location within the ZTV will determine whether further assessment is required.

For the purposes of this document, designated heritage assets include Listed Buildings, Scheduled Monuments, Inventoried GDLs, Inventoried Battlefields and World Heritage Sites as well as regionally designated Conservation Areas.

All nationally designated heritage assets that are within the 5 km Study Area will be assessed as part of the EIA as well as designated assets between 5 km and 10 that fall within the ZTV. This may include assets which do not themselves lie within the ZTV but for which the views over/ across the asset are from within the ZTV. The final list of assets requiring assessment will be agreed during consultation with the Council and HES.

To aid the assessment of indirect effects, reference will be made to the extent of the potential visual changes in setting as determined through the LVIA assessment.

The archaeology and cultural heritage assessment will include proposals for mitigation of any identified impacts where necessary.

9.4 Potential Effects Assessment

9.4.1 *Scoped In Effects*

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

- Direct effects on undesignated archaeological features;
- Direct effects on designated heritage assets;
- Indirect effects on all designated assets within the 5 km Study Area;
- Indirect effects on designated heritage assets between 5 km and 10 km where the assets, or key views towards to asset, lie within the ZTV; and
- The cumulative effect of the Development in conjunction with other wind farm developments within 10 km.

9.4.2 *Scoped Out Effects*

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

- Indirect effects on undesignated heritage assets;
- Indirect effects on designated heritage assets beyond the 10 km Study Area;
- Indirect effects on designated heritage assets within the 10 km Study Area where the assets, or key views towards the asset, do not lie within the ZTV; and
- Cumulative effects from wind farm developments outwith the 10 km Study Area.

9.4.3 *Questions for Consultees*

- Q9.1 - Do the Council and consultees agree with the proposed methodology and scope of assessment?
- Q9.2 - Does the Council and consultees have any information regarding current or recent archaeological work or projects being undertaken within or in the vicinity of the Site, particularly those whose results may not yet be recorded in the National Monuments Record for Scotland?
- Q9.3 - Are the Council and consultees aware of any further sites with statutory protection within the wider landscape whose settings may be affected by the Development?
- Q9.4 - Does the Council and consultees have details of any cultural heritage sites in the vicinity of the Development site which it considers may raise significant issues within the EIA process for this Development?

10 HYDROLOGY AND HYDROGEOLOGY

10.1 Introduction

A hydrological assessment will establish the potential hydrological and hydrogeological constraints associated with the Development and determine the baseline hydrological conditions. The assessment will be informed by publicly available resources, our knowledge of the Site and of existing wind farm developments in the local area.

10.2 Study Area

The following study areas will be considered as part of the hydrological assessment:

- Core Study Area - outlined by the Site boundary;
- Wider Study Area - 10 km buffer zone around the Site. The Development is not expected to impact the hydrological environment outside of the Wider Study Area due to dilution and attenuation of potential pollutants; and
- Private Water Supply (PWS) Study Area - PWS will be identified within 2 km of the Site. Beyond 2 km it is considered that potential for hydrological connectivity with PWS is limited.

10.3 Assessment Methodology

10.3.1 *Desk Study*

The desk study will include the following, to inform the hydrological and hydrogeological assessment:

- Review of published data and maps;
- Identification of surface water features and drainage patterns;
- Delineation of surface water catchments;
- Identification of solid and surface (superficial) geology units;
- Identification of hydrogeological units and corresponding aquifer productivity classes for water supply;
- Collation of data on public and private water supply abstractions and supplies;
- Identification of wetland habitats with groundwater dependency, including assessment of peat depths and presence of GWDTEs;
- Identification of statutory designated sites related to the hydrological environment;
- Review of flood plain and flood extent maps;
- Identification of other similar developments within 10 km; and
- Review of relevant legislation, guidance and best practice.

10.3.2 *Consultation*

In addition to consultation with statutory consultees through the Scoping process, consultation with the Council's Environmental Health Officer (EHO) and Scottish Environmental Protection Agency (SEPA) will be sought to obtain information on PWS within the PWS Study Area and hydrologically connected to the Development.

Properties which are identified as being supplied by a PWS or have the potential to be supplied by a PWS will be consulted via letter / questionnaire and a site visit conducted, where necessary.

10.3.3 *Site-based Survey*

A hydrological walkover survey will be conducted within the Site to:

- Verify and ground-truth watercourse locations and waterbodies, as well as identify any springs;
- Assess the source of waterbodies;

- Identify the location and nature of GWDTEs (e.g., whether ombrotrophic or heavily modified by drainage); and
- Identify nature of watercourses considering watercourse crossing and access track routes.

In addition, if PWS are identified as at risk from works associated with the Development, the properties which are supplied by the PWS will be visited. The PWS infrastructure and source location surveyed where possible, to inform a PWS risk assessment.

10.3.4 *Assessment*

The EIA Report Chapter will describe the potential effects of the Development including:

- Details of consultation undertaken;
- Assessment methodologies for construction and decommissioning phases;
- Hydrological walkover survey details and results;
- Assessment of the operational and decommissioning phases of the project to establish the effect on the hydrological resource;
- Identify mitigation measures, where necessary;
- Identify any residual effects following mitigation;
- Cumulative assessment with other developments within 10 km of the Development; and
- Statement of significance in accordance with the EIA Regulations.

A CEMP will be provided as part of the submission to outline mitigation measures proposed. A concise section within the EIA Report will be provided to assess flood risk, a standalone Flood Risk Assessment (FRA) will not be provided with the EIA Report Chapter.

In addition, the following will be provided as a Technical Appendix to the EIA Report Chapter if required:

- GWDTE assessment; and
- PWS Risk Assessment (PWSRA).

10.4 Baseline Conditions

An initial desk-based review of the hydrological conditions of the Site has been undertaken to identify the potential hydrological and hydrogeological receptors within the Core and Wider Study Areas.

10.4.1 *Surface Hydrology*

The Site lies within an upland area south-west of Sanquhar, comprising grassland with isolated areas of woodland outside of the eastern and northern boundary of the Site. The Site generally slopes north with the topographic high of Cloud Hill, Whing Head and Corridow Hill to the south of the Site forming a catchment boundary between Euchan Water to the north and Scaur Water to the south. The Site lies nearly entirely within the catchment of Euchan Water, which has an overall SEPA waterbody classification of "Good"[154]. This watercourse continues to flow north-east before intersecting with the River Nith which has an over SEPA classification of "Moderate". A small area within the south-east of the Site lies within the wider Scaur Water catchment.

Across the Site, there are four main Watercourses which drain into Euchan Water. To the west of the Site, Glenlarie flows from south to north and has tributaries from both the east and west. West of Glenlarie Burn, Glen Burn flows parallel to Glenlarie from south to north

[154] SEPA (2018) Classification Hub [Online] Available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/ (Accessed 28/02/2022)

before discharging into Euchan Water. This watercourse has tributaries which flow from eastern, western and southern slopes.

Within the central area of the Site, Glenmaddie Burn flows north-east before discharging into Euchan water. This watercourse has two tributaries including Cow Burn and Cramley Burn. To the east of the Site, Whing Burn flows south to north across the Site before also discharging into Euchan Water. To the south of this watercourse, tributaries include Thorter Burn and McTurk's Gutter, and to the north, tributaries include Tongue Burn and Standard Gutter.

10.4.2 *Hydrogeology*

Based on SEPA mapping, the overall groundwater classification for the Upper Nithsdale groundwater body is "Poor"[155].

The British Geological Survey (BGS) 1:625,000 hydrogeology maps show the bedrock units are classified as 'low productivity aquifers' which is considered highly indurated greywackes with limited groundwater in near surface weathered zone and secondary fractures.

An assessment of the potential effects on the groundwater resource will be undertaken within the EIA.

10.4.3 *Private and Public Water Supplies*

Data requests will be sent to the Council requesting information on PWS within 2 km of the Development. Properties identified will be contacted via a questionnaire and site visits will verify the information provided. The assessment of PWS will follow a source-pathway-receptor model.

Scottish Water will be consulted to determine whether public water supply assets which could be affected by the Development are within the Core or Wider Study Areas.

10.4.4 *GWDTE*

As stated in Section 8.4.2.1, an Extended Phase 1 Habitat Survey and corresponding NVC Survey has been undertaken however, given a change in the Site boundary, an update is required. The location, type and extent of the GWDTEs will be determined through the NVC survey, which inform the assessment of the hydrological function of the GWDTEs, in accordance with SEPA Land Use Planning System Guidance Note 31[156].

An assessment of GWDTEs will be included within the EIA and will be informed by both NVC data and a separate hydrogeological assessment. The assessment will consider the condition of the GWDTE and if it is considered to be truly groundwater dependent or ombrotrophic (rainwater fed). Measures to safeguard groundwater fed communities will be compliant with SEPA guidance.

10.4.5 *Designated Hydrological Receptors*

Review of NatureScot GIS datasets available through the Scotland's Environment mapping service was used to identify statutory designated sites related to the water environment within the Wider Study Area.

[155] Scottish Government Scotland Environment Map. Available at: https://map.environment.gov.scot/sewebmap/ (Accessed 28/02/2022)
[156] SEPA (2017) Land Use Planning System SEPA Guidance Note 31, Version 3 [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf (Accessed 28/02/2022)

Statutory designations include those of international importance (e.g., Special Areas of Conservation (SACs), SPAs and Wetlands of International Importance (Ramsar)), national importance (e.g., SSSIs and NNRs) and of local importance (e.g., LNRs).

Statutory designated sites within the Wider Study Area and their hydrological connectivity to the Development are detailed in Table 10.1.

Table 10.1: Designated Hydrological Receptors within the Wider Study Area

Designated Receptor	Distance from the Site	Qualifying Interest	Hydrological Connection to Site
Upper Nithsdale Woods SAC[157]	2.68 km north	Mixed woodland on base-rich soils associated with rocky slopes	Hydrologically disconnected by the River Nith.
Back Wood SSSI[158]		Semi-natural broad-leaved woodland	
Mennock Water SSSI[159]	2.96 km east	Wet meadow and species rich grassland	
Upper Nithsdale Woods SAC[160]		Mixed woodland on base-rich soils associated with rocky slopes	
Muirkirk and North Lowther Uplands SPA[161]	3.6 km north	Hen harrier, Short-eared Owl, Merlin, Peregrine and Golden Plover	Hydrologically disconnected by the River Nith.
Polhote and Polneul Burns SSSI[162]	4.94 km north-west	Geological stratigraphy: Upper Carboniferous (Namurian (part)-Westphalian)	Hydrologically disconnected due to topography.
Chanlockfoot SSSI[163]	6.71 km south-east	Ash hazel woodland	Hydrologically disconnected due to topography.
Lagrae Burn SSSI[164]	7.6 km north-west	Upper Carboniferous sediments	Hydrologically disconnected due to topography.
Fountainhead SSSI[165]	8.07 km north-west	Granite, intrusive into Lower Palaeozoic strata.	Hydrologically disconnected due to topography.

[157] NatureScot (2021) Upper Nithsdale Woods SAC [Online] Available at: https://sitelink.nature.scot/site/8405 (Accessed 28/02/2022)
[158] NatureScot (2021) Back Wood SSSI [Online] Available at: https://sitelink.nature.scot/site/112 (Accessed 28/02/2022)
[159] NatureScot (2021) Mennock Water SSSI [Online] Available at: https://sitelink.nature.scot/site/1147 (Accessed 28/02/2022)
[160] NatureScot (2021) Upper Nithsdale Woods SAC [Online] Available at: https://sitelink.nature.scot/site/8405 (Accessed 28/02/2022)
[161] NatureScot (2021) Muirkirk and North Lowther Uplands SPA [Online] Available at: https://sitelink.nature.scot/site/8616 (Accessed 28/02/2022)
[162] NatureScot (2021) Polhote and Polneul Burns SSSI [Online] Available at: https://sitelink.nature.scot/site/1298 (Accessed 28/02/2022)
[163] NatureScot (2021) Chanlockfoot SSSI [Online] Available at: https://sitelink.nature.scot/site/355 (Accessed 28/02/2022)
[164] NatureScot (2021) Lagrae Burn SSSI [Online] Available at: https://sitelink.nature.scot/site/898 (Accessed 28/02/2022)
[165] NatureScot (2014) Fountainhead SSSI [Online] Available at: https://sitelink.nature.scot/site/658 (Accessed 28/02/2022)

Designated Receptor	Distance from the Site	Qualifying Interest	Hydrological Connection to Site
Coshogle Wood SSSI[166]	9.12 km east	Acidic-neutral, sessile oak dominated woodland	Hydrologically disconnected due to topography.
Leadhills - Wanlockhead SSSI[167]	9.73 km north-east	Lead zinc deposit	Hydrologically disconnected - upstream of Site.

The review presented in Table 10.1 suggests there is no hydrological connection between the Site and any designated sites.

10.4.6 *Flooding*

The Indicative River and Coastal Flood Map (Scotland)[168] produced by SEPA shows areas of Scotland with a 0.5 % (1:200) or greater chance of flooding. These areas are classified into areas of river, surface water and coastal flooding with a risk rating of 'low' to 'high' applied.

The preliminary review of SEPA's flood extent map shows areas along the banks of the Euchan Water as having a medium-high risk of annual flooding from river flooding. This extends to the northern aspect of the Whing Burn. There are a couple of very small, isolated areas where there is a medium-high risk of flooding from surface waters. Overall, there is very little risk to the Site from annual flooding.

During the design process, an initial 50 m buffer will be placed around watercourses and waterbodies on-site, therefore it is not anticipated that turbines or electrically sensitive equipment will be located within these areas of potential flood risk. As such, it is proposed that a stand-alone Flood Risk Assessment (FRA) is not required for the Development. A succinct assessment of flood risk will be included within the EIA.

10.5 Key Sensitivities

The EIA Chapter will assess effects likely during the construction, operation and decommissioning of the Development on hydrology and hydrogeology resources. Key sensitivities and potential effects are likely to be:

- Reduction in surface water quality or quantity of Euchan Water and River Nith and their tributaries as a result of chemical pollution, increase in erosion or sedimentation or impediments to flow due to, for example, on-site spills, excavation works or insufficient sediment mitigation;
- Changes to groundwater interflow patterns from temporary works such as physical cut-offs or dewatering for turbine foundations and crane hardstandings, affecting the Upper Nithsdale groundwater body and leading to reduced function of or severance of flow to GWDTEs;
- Reduced quality or quantity of supply for public or private water supplies due to changes in groundwater, near-surface or surface water flow;
- Acidification of watercourses as a result of construction works;
- Increase in run-off and flood risk due to increased impermeable hardstanding as part of the Development; and

[166] NatureScot (2021) Coshogle Wood SSSI [Online] Available at: https://sitelink.nature.scot/site/409 (Accessed 28/02/2022)
[167] NatureScot (2021) Leadhills - Wanlockhead SSSI [Online] Available at: https://sitelink.nature.scot/site/915 (Accessed 28/02/2022)
[168] SEPA (2021) SEPA Flood Maps [Online] Available at: https://map.sepa.org.uk/floodmaps (Accessed 28/02/2022)

- Cumulative effects if the potential effects arising from the Development are in combination with other relevant wind farm projects or activities.

10.6 Potential Effects Assessment

10.6.1 *Scoped In Effects*

Assessment of potential effects on the following receptors will be scoped in:

- Chemical pollution and sedimentation of watercourses of Euchan Water, River Nith and associated tributaries as a result of construction;
- Impediments to near-surface water and drainage to all watercourses as a result of construction, potential dewatering and presence of linear infrastructure (e.g., access tracks);
- Adverse effects on quality, quantity and continuity of public and private water supplies as a result of construction and operation;
- Impediments to flow and pollution of any identified GWDTEs as a result of construction;
- Acidification of watercourses as a result of construction works and related tree felling;
- Increased run-off and flood risk as a result of increased hardstanding and compaction of superficial deposits and soils; and
- Cumulative effects if the potential effects arising from the Development are in combination with other relevant wind farm projects or activities.

10.6.2 *Scoped Out Effects*

Assessment of potential effects on the following receptors will be scoped out:

- Migration of pollutants from contaminated land as the Site has not previously been developed and it is unlikely contaminated land will be encountered;
- Designated receptors not hydrologically connected to the Development, as detailed in Table 10.1, as there is no potential for effects on these receptors; and
- Pollution and sedimentation effects on the water environment at distances greater than 10 km and it is proposed that receptors beyond this distance are scoped out.

10.6.3 *Embedded Design Measures*

A 50 m buffer zone will be established for all turbine bases and ancillary structures / infrastructure around the watercourses on-site, where possible.

The requirement for access tracks crossing watercourses will be minimised, where possible, during the design stage.

A CEMP will accompany the EIA and form part of the embedded development design. The CEMP will comprise methods and works that are established and effective measures to which the Applicant will be committed through any subsequent consent. Accordingly, the assessment of significance of effects of the Development should be considered with the inclusion of the CEMP.

Mitigation measures in order to protect the water environment will be outlined in the CEMP and will be based on good construction practice outlined in the following documents:

- Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs) 1 to 21;
- Scottish Natural Heritage (SNH) (2015), Good Practice During Wind Farm Construction;
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741); and
- CIRIA (2001), Control of Water Pollution from Construction Sites (C532).

10.7 Questions for Consultees

- Q10.1 - Are consultees content with the proposed methodology and scope of the hydrology and hydrogeology assessment?
- Q10.2 - Do the Council, NatureScot, SEPA or other consultees have any information that would be useful in the preparation of the hydrology and hydrogeology assessment?

11 GEOLOGY AND PEAT

11.1 Introduction

An assessment of the impact of the Development on geology and peat will be undertaken. This will establish the baseline conditions, inform the assessments and designs whilst determining any suitable mitigation measures required.

11.2 Study Area

The Study Area for geology and peat assessment is the Site boundary.

11.3 Assessment Methodology

The purpose of the geology and peat assessment will be to:

- Define the peat extent, depth and properties across the Site;
- Identify any areas susceptible to peat slide, using peat thickness and Digital Terrain Model (DTM) data to analyse slopes;
- Advise on the micro-siting of turbines and tracks to areas of shallow or no peat;
- Assess potential effects on soils, peat and geology; and
- Develop an acceptable code for construction that will adopt best practice procedures, effective management and control of on-site activities to reduce or offset any detrimental effects on the geology and soils including peat.

11.3.1 *Peat Probing*

Peat Probing will consist of two phases, a preliminary phase (Phase 1) and a more detailed exercise once the proposed infrastructure has been defined (Phase 2). Phase 1 peat probing would comprise a 100 m x 100 m grid which will be supplemented by Phase 2 peat probe survey works which will focus on the layout of the Development following design freeze. Phase 2 peat probing survey will be undertaken at 50 m centres along tracks and at 25 m spacing either side to allow for micro-siting. Peat probing will also be undertaken at 10 m centres at each turbine location.

This approach is in accordance with Scottish Government guidance Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)[169]. If required, the information gathered will be utilised in preparation of a Peat Slide Risk Assessment (PSRA) and an outline Peat Management Plan (oPMP) which will accompany any subsequent application.

11.3.2 *Peat Slide Risk Assessment*

Should significant quantities of peat be present within the Site, a PSRA will be undertaken in accordance with the Scottish Government guidance 'Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)' along with full consultation with the relevant consultees.

The PSRA will comprise of detailed analysis and reporting on the design freeze. The PRSA will also include a hazard and slope stability assessment and preliminary peat management recommendations.

The hazards existing on the Site will be ranked based on factors that influence stability, namely peat depth and slope gradient. In addition, potential receptors exposure to risk will

[169] Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition) [Online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/04/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/documents/00517176-pdf/00517176-pdf/govscot%3Adocument/00517176.pdf (Accessed 03/03/2022)

be established and hazard rankings applied across the Site, with management and mitigation measures recommended for an acceptable construction.

11.3.3 *oPMP*

If required, an oPMP will accompany the EIA Report which will include high level estimation on peat excavation and re-use volumes. This will be based on the approximate infrastructure dimensions and anticipated re-use streams. The oPMP will:

- Define the materials that will be excavated as a result of the Development, focusing specifically on the excavation of peat;
- Determine volumes of excavated arisings, the cut/fill balance of the Development and proposals for re-use or reinstatement using excavated materials; and
- Detail management techniques for handling, storing and depositing peat for reinstatement.

11.4 Baseline Conditions

11.4.1 *Superficial Soils*

BGS survey mapping[170] indicated the superficial soils underlying the Site to be primarily areas of glacial till and areas of limited superficial cover. Peat was recorded as large pockets in the central and southern areas of the Site.

11.4.2 *Bedrock Geology*

BGS survey mapping indicated the bedrock geology to comprise mainly of Portpatrick formation with Kirkcolm formation in the extreme north of the Site. Some localised Devonian intrusions are present in the central area and faulting orientated north-east to south-west.

11.4.3 *National Soils Mapping*

Scotland's Soils mapping[171] indicated the Site to be underlain by a mix of soils, largely mineral soils in the north, with localised areas of Class 1, 2, 3, 4 and 5 through the central and southern areas.

11.4.4 *Carbon & Peatland Map 2016*

The Carbon and Peatland Map 2016[172] was consulted to determine likely peatland classes present at the Site. The map is a predictive tool that provides an indication of the likely presence of peat at a coarse scale. The Carbon and Peatland map has been developed as a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities. It identifies areas of "nationally important carbon-rich soils, deep peat and priority peatland habitat' [173] as Class 1 and Class 2 peatlands. Class 1 peatlands are also "likely to be of high conservation value" and Class 2 "of potentially high conservation value and restoration potential".

[170] BGS (2022) GeoIndex [Online] Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 23/02/2022)
[171] Scotland's Soils (2022) Mapping [Online] Available at: https://map.environment.gov.scot/Soil_maps/?layer=10 (Accessed 23/02/2022)
[172] SNH (2016) Carbon and Peatland 2016 Map [Online] Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map (Accessed 23/02/2022)
[173] Priority peatland habitat is land covered by peat-forming vegetation or vegetation associated with peat formation.

According to the predictive tool and map, the Site contains predominantly Class 3[174] and Class 5[175] soils, with a small area of Class 2 peatland at the south-east corner of the Site.

As the Carbon and Peatland Map is a high-level tool, detailed habitat and peat depth surveys will be carried out across the Site and respective relevant Study Areas to inform siting, design and mitigation and the detailed Site assessment on peatland and associated habitats.

11.5 Key Sensitivities

At this stage, the main key sensitivities are considered to be:

- Soil type and associated land use are highly sensitive (e.g., peat/blanket bog); and
- Class 1 or 2 priority peatland, carbon-rich and peaty soils (although the Site appears to contains predominantly Class 3 and Class 5 soils, with a small area of Class 2 peatland).

11.6 Potential Effects Assessment

11.6.1 *Peat Slide Risk*

Development of wind farms on peatlands can lead to potential peat slide risk. An assessment of the likely impact on peatlands and the potential for peat slide risk will be undertaken as part of the EIA.

11.6.2 *Peatland Disturbance*

Disturbance of organic rich peat soils leading to carbon loss, therefore an assessment on the impacts to deep peat, nationally important peatlands (Class 1 and Class 2 peatlands). Carbon effects are discussed in more detail under the Section 15 - Climate Change of this Report.

11.6.3 *Geology*

Assessment of effects on underlying geology will be undertaken, determining the potential for impacts to any nationally or regionally protected mineral deposit.

11.6.4 *Scoped In Effects*

The potential effects that are to be considered during the assessment are:

- Potential peat slide risk;
- Assessment of effects on peatlands;
- Outline management measures for excavation and re-use of peat and peaty soils; and
- Details of embedded mitigation and restoration relative to geology and soils.

11.6.5 *Scoped Out Effects*

Contaminated land has been scoped out.

11.7 Questions for Consultees

- Q11.1 - Do the consultees agree with the proposed methodology and scope of the geology and peat assessment?

[174] Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.
[175] Soil information takes precedence over vegetation data. No peatland habitat recorded. May also show bare soil. All soils are carbon-rick soil and deep peat.

- Q11.2 - Do the consultees have any information that would be useful in the preparation of the geology and peat assessment, including details of local quarrying activity?

12 NOISE

12.1 Introduction

This section of the Report defines the proposed methodology and approach to undertaken for the noise assessment that will be included within the EIA Report.

Sources of noise during operation of a wind turbine are both mechanical (from machinery housed within the turbine nacelle) and aerodynamic (from the movement of the blades through the air). Modern turbines are designed to minimise mechanical noise emissions from the nacelle through isolation of mechanical components and acoustic insulation of the nacelle. Aerodynamic noise is controlled through the design of the blade tips and edges. In most modern wind turbines, aerodynamic noise is also restricted by control systems which actively regulate the pitch of the blades.

Whilst noise from the wind turbines increases with wind speed, at the same time ambient background noise (e.g., wind in trees) usually increases at a greater rate. Planning conditions are used to enforce compliance with specified noise level limits.

The effects of noise from the Development will be assessed in consultation with the Council's EHO.

12.2 Study Area

The Study Area for the assessment of operational noise from the Development will be the area within which noise levels are predicted to be at least 35 dB, LA90,10min, in accordance with ETSU-R-97[176]. This typically comprises a radius of up to 2 km from the proposed turbine locations.

The Cumulative Noise Study Area will be defined as described in the IOA Good Practice Guide[177]. This states that cumulative noise should be considered for all receptors in areas where the predicted cumulative noise levels from the Development together with any other wind energy developments that are operational, under construction, consented or the subject of a current valid planning application is at least 35 dB, LA90,10min and the difference between the predicted noise level for the Development and those for the other turbines is less than 10 dB. This typically comprises an area within approximately 5 km of the proposed turbine locations. Potential cumulative developments will be identified within a distance of 10 km of the proposed turbine locations to inform this definition.

Indicative study areas and search areas based on the above are shown in Figure 12.1.

12.3 Assessment Methodology

12.3.1 *Legislation, Policy and Guidance*

The following guidance and information sources are pertinent to the assessment of wind turbine noise:

- The Scottish Government's planning information on onshore wind turbines[178];
- PAN 1/2011: Planning and Noise;
- ETSU-R-97: The Assessment and Rating of Noise from Wind Farms; and

[176] ETSU. (1996). *ETSU-R-97 The Assessment and Rating of Noise from Wind Farms*

[177] IOA (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise [Online] Available at: https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf (Accessed 23/02/2022)

[178] Scottish Government (2014) Onshore Wind Turbines [Online] Available at: https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/ (Accessed 03/03/2022)

- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

12.3.1.1 Scottish Government Planning Information on Onshore Wind

The Scottish Government's Online Renewables Planning Advice states that ETSU-R-97 should be used to assess and rate noise from wind energy developments, together with the Institute of Acoustics' Good Practice Guide.

12.3.1.2 PAN 1/2011: Planning and Noise

PAN 1/2011 provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It promotes the principles of good acoustic design and the appropriate location of new potentially noisy development. An associated Technical Advice Note offers advice on the assessment of noise impact and includes details of the legislation, technical standards and codes of practice appropriate to specific noise issues.

Appendix 1 of the Technical Advice Note: Assessment of Noise describes the use of ETSU-R-97 in the assessment of wind turbine noise.

12.3.1.3 ETSU-R-97

ETSU-R-97 provides a framework for the assessment and rating of noise from wind turbine installations. It is the accepted standard for wind farm developments in the UK as supported by national guidance.

The aim of ETSU R 97 is to provide *"indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities"*.

ETSU-R-97 makes it clear from the outset that any noise restrictions placed on a development must balance the environmental impacts of the development against the national and global benefits which would arise through the development of renewable energy sources.

Both background noise and noise from wind turbines typically vary with wind speed. According to ETSU-R-97, wind farm noise assessments should therefore consider the site-specific relationship between wind speed and background noise, along with the particular noise emission characteristics of the proposed wind turbines.

ETSU-R-97 specifies the use of the LA90,10min descriptor for both background and wind turbine noise. Therefore, unless otherwise specified, all references to noise levels within this Section relate to this descriptor. Similarly, all wind speeds referred to relate to a height of 10 m Above Ground Level (AGL) at the location of the Development, standardised in accordance with current good practice guidance or BS EN (IEC) 61400-11:2003 as appropriate, unless otherwise stated.

The document recommends the application of external noise limits at the nearest noise sensitive properties, to protect outside amenity and prevent sleep disturbance inside dwellings. These limits take the form of a 5 dB margin above the prevailing background noise level, except where background noise levels are lower than certain thresholds, where fixed lower limits apply. Separate limits apply for quiet daytime and night-time periods, as outlined below.

During daytime, the guidance specifies limits designed to protect the amenity of residents whilst enjoying the external garden areas of their properties. The limits are based on the prevailing background noise level for 'quiet daytime' periods, defined in ETSU-R-97 as:

- 18:00 – 23:00 every day;
- 13:00 – 18:00 on Saturday; and

- 07:00 – 18:00 on Sundays.

ETSU-R-97 recommends that the fixed lower noise limit for quiet daytime should be set within the range 35 to 40 dB, LA90,10min, with choice of value dependent on the following factors:

- The number of dwellings in the neighbourhood of the Development;
- The effect of the noise limits on the number of kWh (kilowatt hours) generated; and
- The duration and level of exposure.

Different limits apply at night, where potential sleep disturbance is the primary concern rather than the requirement to protect outdoor amenity. Night-time is considered to be all periods between 23:00 and 07:00. A limit of 43 LA90,10min is recommended for night time at wind speeds or locations where the prevailing wind speed-related night-time background noise level is lower than 38 LA90,10min. At other times, the limit of 5 dB above the prevailing wind speed-related background noise level applies. The value of night time fixed lower limit was selected in order to ensure that internal noise levels remained below those considered to have the potential to cause sleep disturbance, taking account of the attenuation of noise when passing from outdoors to indoors, and making allowance for the presence of open windows. The Council typically require a reduced night-time fixed lower noise limit of 38 dB, LA90,10min.

Where the occupier of the property has a financial interest in a development, ETSU R 97 states that the fixed lower noise limit for both daytime and night-time can be increased to 45 dB(A) and that *"consideration should be given to increasing the permissible margin above background"*.

12.3.1.4 The Good Practice Guide

The Good Practice Guide (GPG) was published by the Institute of Acoustics (IOA) in May 2013 and has been endorsed by the Scottish Government as current industry good practice (IOA, 2013)[179]. The GPG presents current good practice in the application of ETSU-R-97 assessment methodology for wind turbine developments at the various stages of the assessment, and will be followed throughout the assessment

12.3.2 ***Methodology for Assessing Noise***

The specific methodologies involved in applying ETSU-R-97 will be detailed in full in the EIA Report but, in summary, these provide recommendations for noise limits relating to the existing levels of background noise for quiet day-time and night-time periods.

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

- Specify the number and locations of the wind turbines;
- Identify the locations of the nearest, or most noise sensitive, neighbours;
- If necessary, determine the background noise levels as a function of site wind speed at the nearest neighbours, or a representative sample of the nearest neighbours, and derive noise limits;
- Specify the type and noise emission characteristics of the wind turbines proposed for the Site;
- Calculate the noise emission levels due to the operation of the wind turbines as a function of site wind speed at the closest and/or most noise sensitive properties; and

[179] IOA (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise [Online] Available at: https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf (Accessed 03/03/2022)

- Compare the calculated noise emission levels with the noise limits and assess accordingly.

12.3.3 *Cumulative Effects*

ETSU-R-97 and the GPG state that the noise limits that ETSU-R-97 recommends apply to the cumulative effect of noise from all wind turbines that may affect a particular location. A search will be undertaken in consultation with the Council to identify any wind energy developments either operational, consented or in planning which may also require consideration in the assessment process. Known cumulative wind farms are shown on Figure 12.1:

- Whiteside Hill Wind Farm;
- Twentyshilling Hill Wind Farm;
- Euchanhead;
- Sanquhar Community Wind Farm;
- Sanquhar 2 Community Wind Farm;
- Sandy Knowe;
- Hare Hill; and
- Hare Hill Extension.

Cumulative noise levels will be established in line with the requirements of the GPG, and assessed against the ETSU-R-97 noise limits to determine the level of headroom present (i.e., the level of noise which may be generated by the Development, after taking all relevant cumulative developments into account).

Noise due to the Development will then be assessed against the remaining headroom to determine compliance with ETSU-R-97.

12.4 Baseline Conditions

The assessment is limited to the effects on human receptors at noise-sensitive locations, namely residential properties, schools, hospitals and places of worship. Each of these receptor types are considered to be of equal value.

The following potential noise-sensitive receptors have been identified within a distance of 2 km from the Site shown in Figure 12.1:

- Glenmaddie (0.8 km north);
- Euchan Filter Station House (1.2 km north);
- Dunploddin (1.3 km south-west); and
- Shiel (1.3 km south).

12.5 Key Sensitivities

Cumulative operational noise is likely to be a key consideration within the EIA. In addition to the requirement to assess cumulative effects set out in ETSU-R-97 and the GPG, ETSU-R-97 also states that noise from any existing wind turbines should not be considered as background noise. Due to the presence of a number of operational wind farms in the cumulative study area (in particular, Whiteside Hill Wind Farm immediately to the west of the Development), it will be necessary to ensure that noise from these turbines does not affect any measured background noise. The GPG provides a number of options for measures that can be taken to ensure this, including using previous measured background noise levels, directional filtering or correcting the measured levels for the influence of the existing turbines. These measures will be considered during the assessment and agreement sought with the EHO as to the most appropriate.

12.6 Potential Effects Assessment

Operational noise impacts are associated primarily with the aerodynamic noise generated by the movement of the turbine blades through the air, and to a lesser extent by the operation of mechanical components housed within the turbine itself. Operational noise impacts are assessed on the basis of the level of noise produced by the Development relative to ETSU-R-97 noise limits (or an apportionment thereof).

12.6.1 *Scoped In Effects*

The following could potentially result in significant effects and are therefore scoped in:

- Development operational noise; and
- Cumulative operational noise.

12.6.2 *Scoped Out Effects*

12.6.2.1 Low Frequency Noise and Infrasound

A study[180], published in 2006 by acoustic consultants Hayes McKenzie, 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, but that complaints attributed to low frequency noise were in fact, most likely due to a phenomenon known as Amplitude Modulation (AM).

In February 2013, the Environmental Protection Authority of South Australia published the results of a study into in infrasound levels near wind farms[181]. This study measured infrasound levels at urban locations, 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 wind farms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

Bowdler et al. (2009)[182] concludes 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".

12.6.2.2 Amplitude Modulation

In its simplest form, 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.

There is a distinction between 'normal' AM of wind turbine noise, characterised as blade swish and Enhanced AM (EAM) or Other AM (OAM), sometimes characterised onomatopoeically as 'thump'. It should be noted that ETSU-R-97 describes and makes allowance for normal AM or blade swish.

[180] Hayes McKenzie on behalf of the Department for Trade and Industry (2006) The measurement of low frequency noise at three UK wind farms [Online] Available at: https://windfarmrealities.org/wp-content/uploads/wfr-docs/hayes-measurement-low-freq-3-farms.pdf (Accessed 03/03/2022)

[181] Environment Protection Authority (2013) Infrasound levels near wind farms and in other environments [Online] Available at: http://www.epa.sa.gov.au/xstd_files/Noise/Report/infrasound.pdf (Accessed 03/03/2022)

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

A study[183] 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. This report 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 increased AM (OAM) 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.

The study concluded that OAM 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 OAM were not well understood and that prediction of the effect was not then currently possible.

This research has recently been supported by an in-depth study undertaken by RenewableUK[184], which has identified that many of the previously suggested causes of OAM have little or no association to the occurrence of OAM in practice. The generation of OAM is based upon the interaction of a number of factors, the combination and contributions of which are unique to each site. With the current state of knowledge, the research concludes that is not possible to predict whether any particular site is more or less likely to give rise to OAM, and the incidence of OAM occurring at any particular site 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 or the IOA.

In 2016, the IOA proposed a measurement technique[185] to quantify the level of AM present in any particular sample of wind farm noise. This technique is supported by BEIS who have published guidance[186], which follows on from 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. Notwithstanding this, the suggested outline planning condition is as yet unvalidated, remains in a draft form and would require site-specific legal advice on its appropriateness to a specific development.

Section 7.2.1 of the GPG therefore remains current, stating: "the evidence in relation to 'Excess' or 'Other' Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM".

12.6.2.3 Ground-Borne Vibration

Research undertaken by Snow[187] in 1996 found that levels of ground-borne vibration 100 m from the nearest wind turbine were significantly below criteria for 'critical working areas' given by British Standard BS6472:1992 Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz), and were lower than limits specified for residential premises by an even greater margin.

Ground-borne vibration from wind turbines can be detected using sophisticated instruments several kilometres from a wind farm site as reported by Keele University[188]. This report

[183] University of Salford, The Department for Business, Enterprise and Regulatory Reform, URN 07/1235. (2007) Research into aerodynamic modulation of wind turbine noise [Online] Available at: http://usir.salford.ac.uk/id/eprint/1554/ (Accessed 03/03/2022)

[184] Wind Turbine Amplitude Modulation: Research to improve understanding as to its Cause and effects, Renewable UK, 2013

[185] IOA (2016) *A Method for Rating Amplitude Modulation in Wind Turbine Noise.*

[186] BEIS (2016) Review of the evidence on the response to amplitude modulation from wind turbines. Available at: https://www.gov.uk/government/publications/review-of-the-evidence-on-the-response-to-amplitude-modulation-from-wind-turbines (Accessed 03/03/2022)

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

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

clearly shows that, although detectable using highly sensitive instruments, the magnitude of the vibration is orders of magnitude below the human level of perception and does not pose any risk to human health.

12.6.2.4 Construction and Decommissioning Noise

Noise during the Development's construction phase will consist of that generated by on-site activities and noise due to construction traffic on public roads. Whilst the precise location of construction works has yet to be established, the closest noise-sensitive receptor is likely to be located to the north of the Development, situated approximately 800 m from the closest turbine location, based upon the layout presented in this Report.

By virtue of the large separation distances and low number of residential receptors in the locality, construction noise impacts are anticipated to be minimal, and will therefore be scoped out of the assessment. Notwithstanding this, the assessment will include a discussion of construction noise guidance, and detail best practice methods for minimising construction noise impact in line with the requirements of BS5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open sites.

The effects of noise during decommissioning of the Development are likely to be similar to those during construction. However, both the magnitude and duration of such effects are likely to be less than those during construction.

12.6.3 ***Questions for Consultees***

- Q11.1 - Do the Council and consultees agree with the proposed methodology and scope of assessment?
- Q11.2 - Do the Council and Consultees have details of any further cumulative developments in the locality which they consider may raise significant issues within the EIA process for the Development?
- Q11.3 - Are you aware of any relevant policies or guidance documents not specifically mentioned in this section of the Report?

13 TRAFFIC AND TRANSPORT

13.1 Introduction

This section of the Report defines the proposed methodology and approach to be undertaken for the traffic and transport assessment that will be included within the EIA Report.

The traffic and transport chapter of the EIA Report will evaluate the effect of the Development on traffic and transportation resources within the study area. Vehicle movements to the Development will consist of Abnormal Load Vehicles (ALVs), HGVs, Light Goods Vehicles (LGVs) and cars.

The EIA Report will identify potential effects from increased road traffic arising from the construction, operation and decommissioning of the Development. The significance of these effects will be assessed against recognised guidelines. Where required, appropriate mitigation measures will be proposed to reduce these effects.

It is assumed that the proposed route to the Site for turbine components will be from the King George V Dock in Glasgow, then via the M8, M74, A75 and A76 to Sanquhar. From Sanquhar, a number of access points to the Site are being considered, including an access via Blackaddie Road or via Eliock Bridge and then the C125N.

Following detailed traffic and transport assessments, there is the possibility turbine components will be transported from the south. This will be discussed with relevant consultees and detailed in the EIA Report.

13.2 Study Area

The Study Area has been defined by the public road network in the vicinity of the Site and potential delivery corridors to be used during construction. These take into account the local strategic / trunk road network, sources of labour and the potential sources of construction materials, specifically stone and concrete from local quarries. The A76(T), Blackaddie Road and sections of the C125N is anticipated to be included in the Study Area. The nearest trunk road is the A76(T) between Dumfries and Cumnock passing through Sanquhar. Transport Scotland manage the A76(T) and the road is operated by Amey (as maintenance contractor for Scotland South West Area).

Within the Site, the Applicant would endeavour to follow existing on-site tracks as far as possible. All new access junctions would have appropriate sight lines and, where necessary for the abnormal load route, would meet abnormal load geometric requirements. The final access track route from the public road will be determined as the design of the Development progresses. The final Study Area will also be confirmed once the initial access assessment has been completed and may include additional roads from the local authorities adopted road network.

13.3 Assessment Methodology

13.3.1 *Legislation, Policy and Guidance*

The assessment will follow guidance contained in the following planning policy documents:

- Guidelines for the Environmental Assessment of Road Traffic[189]; and
- The Transport Assessment Guidance[190].

[189] IEMA (1993) Guidelines for the Environmental Assessment of Road Traffic [Online] Available at: https://www.thenbs.com/PublicationIndex/documents/details?Pub=IEA&DocID=257892 (Accessed 10/03/2022)
[190] Transport Scotland (2012) *Transport Assessment Guidance* [Online] Available at: https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management_dpmtag_ref_17_-_transport_assessment_guidance_final_-_june_2012.pdf (Accessed 10/03/2022)

13.3.2 ***Methodology for Assessing Traffic and Transport***

The assessment methodology will be based on 'Guidelines for the Environmental Impact of Road Traffic.' A screening process, using two broad rules from these guidelines, will be employed to identify roads on which potential significant effects may occur. These are:

- Roads where traffic is predicted to increase by more than 30% a result of the Development, or where the number of HGVs is predicted to increase by more than 30% must be assessed; and
- Roads in specifically sensitive areas where overall traffic flow or HGVs are predicted to increase by more than 10% must be assessed.

Where the predicted increase is lower than threshold, the guidelines suggest the significance of effects can be stated to be 'low' or 'not significant' and further detailed assessment is not warranted.

It is worth noting that on roads where existing traffic levels are generally low (e.g., rural roads and some unclassified roads), any increase in traffic flow may result in a predicted increase that would be higher than the guideline thresholds. In these situations, it is important to consider any increase in terms of overall traffic flow in relation to the capacity of the road before making a conclusion in EIA terms.

Any change in traffic flow which is greater than the thresholds set out in the guidelines would be subject to further analysis to establish if the increased traffic flow is within the capacity of the road. In instances where traffic flow is higher than the Guidelines for the Environmental Impact of Road Traffic (1993) thresholds, but within the capacity limits of the road, and the potential magnitude on receptors is 'minor' or 'negligible', this increase would generally be considered to be 'not significant'. It is acknowledged that capacities can be reduced by local conditions that cannot be accounted for within the relevant guidance such as temporary road works or road failure.

It is not proposed to submit a formal Transport Assessment to accompany any subsequent application for the Development, as a Transport Assessment principally relate to developments that generate a significant permanent increase in traffic as a direct consequence of function (e.g., retail parks). The traffic impacts associated with a wind farm development is temporary during the construction phase, and the function does not result in a permanent increase.

13.3.2.1 Sensitivity of Receptor

The sensitivity of receptors will be determined based on the value of the affected resource and the extent of the area that might be affected by the Development. The receptor sensitivity is summarised as follows:

- High sensitivity refers to receptors of greatest sensitivity to traffic flow - schools, colleges, playgrounds, retirement homes, residential roads without pedestrian or cyclist facilities, and accident black spots;
- Medium sensitivity refers to traffic flow sensitive receptors - congested junctions, community centres, parks, businesses with roadside frontage, recreation facilities;
- Low sensitivity refers to receptors with some sensitivity to traffic flows: public open spaces, nature conservation areas, listed buildings, tourist attractions, and residential roads with adequate footway provision, places of worship; and
- Negligible sensitivity refers to receptors with very low sensitivity to traffic flows; receptors that are sufficiently distant from the affected roads and junctions.

13.3.2.2 Magnitude of Change

The magnitude of change related to the increase in traffic is a function of the existing traffic volumes on the surrounding highway network, the percentage increase associated with the Development and the changes in the type of traffic.

This approach is intended for the assessment of environmental effects of road traffic associated with major new developments giving rise to traffic generation, as opposed to short-term construction. In the absence of alternative guidance and, as the traffic generation during the operational phase is very low, these guidelines will be applied to assess the short-term construction phase of the Development.

Table 13.1 shows the criteria to be employed to determine the magnitude of change related to the increase in traffic. The absolute increase refers to the change in number of vehicles per hour while the percentage increase refers to the change in number of vehicles per hour expressed as a percentage of the base traffic flows.

Table 13.1: Magnitude of the Change Thresholds

Percentage increase (%) (Vehicles per hour of base traffic flows)	**Absolute increase (Vehicles per hour)**			
	< 30	30 - 60	60 - 90	> 90
< 5	Negligible	Negligible	Negligible	Negligible
5 – 10	Negligible	Low	Low	Low
10 – 20	Low	Low	Medium	Medium
20 – 30	Medium	Medium	High	High
> 30	High	High	High	High

13.3.2.3 Significance of Effect

The significance of effect will be determined by considering both the sensitivity of the receptors and magnitude of change as shown in Table 3.3. The receptors will be identified as the physical resource or user group that would potentially be affected by the Development (e.g., human being(s) and the transport network). Where the predicted increase in traffic flows is lower than the thresholds, the guidelines suggest the significance of effects can be stated to be low or not significant and further detailed assessments are not warranted. Peak traffic flows will be identified to assess a worst-case scenario.

On routes where traffic is predicted to increase above the thresholds identified in the screening process further assessment may be warranted. This further assessment will consider the potential for receptors to receive impacts relating to the effects.

13.3.3 *Cumulative Effects*

In accordance with guidance, the assessment will consider the potential for any significant cumulative effects that may occur in combination with other consented, and/or in planning, traffic-generating developments that exist within the Study Area. Consultation will be undertaken with relevant authorities to establish where significant cumulative effects may occur, and with which developments.

13.3.4 *Abnormal Load Study*

An Abnormal Load Route Assessment (ALRA) will be undertaken to confirm that the proposed route can accommodate the turbine blades and that their transportation will not have any detrimental effect on the haulage route. The ALRA will identify any additional off-site improvement works which are required in order to make the route viable.

13.4 Baseline Conditions

Baseline traffic flow conditions on routes within the Study Area will be established and detailed in the EIA. This geographic scope of the baseline assessment will be confirmed in consultation with the relevant local authorities as appropriate. As construction vehicles may approach the Development from a distributed set of origins then all routes within the Study Area will be assessed.

Where publicly available traffic flow information is available, (e.g., from the Department for Transport (DfT)), then this will be used as a basis for baseline assessment. Where such information is not available, traffic surveys will be undertaken. Baseline traffic data will be factored to take into account traffic growth between the date of recording and the anticipated date of construction.

13.5 Key Sensitivities

The main sensitives relating to the Development are considered to be:

- Increase in HGV traffic;
- Delay related to the movement of abnormal loads;
- Abnormal road wear and tear; and
- Road widening/improvements to accommodate abnormal loads.

13.6 Potential Effects Assessment

13.6.1 *Scoped In Effects*

The following aspects will be assessed when considering the effects of the Development on traffic and transportation:

- Traffic generation;
- Hazardous Loads;
- Accidents and Safety;
- Driver Delay;
- Pedestrian Amenity;
- Severance;
- Air Quality; and
- Noise and Vibration.

13.6.2 *Scoped Out Effects*

Traffic experienced during operation of the Development is likely to be minimal, and in the region of one or two LGVs per day. This traffic is likely to be negligible in terms of existing traffic flow on routes within the vicinity of the Site. Therefore, assessment of operational traffic is scoped out of the assessment.

During decommissioning of the Development, all below ground infrastructure is likely to be left in-situ. For this reason, the volume of traffic associated with decommissioning is likely to be less than experienced during construction. It is not possible to accurately estimate baseline traffic flow levels at the time of decommission (e.g., 30 years into the future). Prior to decommissioning of the Development, an assessment of the proposed decommissioning methodology in relation to traffic and transport effects will be undertaken. For the above reasons, it is not considered necessary to assess

decommissioning effects in the EIA and they have therefore been scoped out of the assessment.

13.6.3 *Questions for Consultees*

- Q13.1 - Are Consultees content with the proposed methodology of the assessment and scope of the traffic and transport assessment?
- Q13.2 - Are the Consultees aware of any specific access restrictions or limitations on the proposed abnormal loads route?

14 SOCIO-ECONOMICS, RECREATION AND TOURISM

14.1 Introduction

Wind farms are known to be a controversial topic, with views widely ranging between individuals. This assessment will look specifically at how the Development could affect people. This will include the local population, those who use the area for recreational purposes and those who visit the area for tourism.

The Development will result in economic benefits and employment opportunities, both directly and indirectly. Investment in a community fund by the Developers will result in a significant amount of money being made available for use in the local community.

Socio-economic effects will be considered based on the guidance from Guidelines for Environmental Impact Assessment[191] and a Handbook for EIA[192] and considered against:

- An economic profile of the area; and
- Tourism and recreation.

The socio-economics assessment will detail the direct and indirect beneficial effects resulting from the Development; demonstrating the potential benefits which the Development can bring to the surrounding area.

Given the use of the surrounding area for recreational pursuits and the attraction it provides for tourists within the area, consideration will be given to the potential effects that may result from the Development. This assessment will consider the overall experience felt by those who visit the area and use it for recreation.

The results of these assessments will be present in an EIA Report chapter.

14.2 Assessment Methodology

There is no specific legislation or guidance available on the methods that should be used to assess the socio-economic impacts of a proposed onshore wind farm development. The proposed method has however, been based on established best practice, including that used in the UK Government and industry reports on the sector. In particular, this assessment will draw from two studies by BiGGAR Economics on the UK onshore wind energy sector, a report published RenewableUK and DECC in 2012 on the direct and wider economic benefits of the onshore wind sector to the UK Economy[193] and a subsequent update to this report published by RenewableUK in 2015[194]. These reports will provide the input assumptions if the data for the Development is not available.

There is also no formal legislation or guidance on the methods that should be used to assess the effects that wind farm developments may have on tourism and leisure interests. The proposed method would consider individual attractions and tourism facilities to assess if there could be any effects from the Development.

It is also important that the socio-economic and tourism chapter takes account of the relevant local and national policy objectives. The most relevant objectives for this are

[191] Institute of Environmental Management and Assessment (IEMA) (2004) Guidelines for Environmental Impact Assessment (IEMA)
[192] SNH (2003) A Handbook for Environmental Impact Assessment, Appendix 5: Guide to Outdoor Access Assessment, SNH
[193] RenewableUK (2012) Onshore Wind Direct and Wider Economic Impacts [Online] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48359/5229-onshore-wind-direct--wider-economic-impacts.pdf (Accessed 03/03/2022)
[194] RenewableUK (2015) Onshore Wind: Economic Impacts in 2014 [Online] https://c.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/publications/reports/onshore_economic_benefits_re.pdf (Accessed 03/03/2022)

expected to be included in the following strategies (or relevant updates at the time of writing the EIA Report):

- Scotland's Economic Strategy;
- Tourism Scotland 2020; and
- Dumfries and Galloway Regional Economic Strategy 2016 - 2020[195].

14.3 Baseline Conditions

The assessment will include a description of the current socio-economic baseline within the local area. This will include a summary of economic performance data for each study area and a description of the relevant tourism assets that will be considered in the assessment.

The baseline environment will cover and compare three study areas, namely:

- Local Area, comprising of electoral wards that cover the location of the Development and nearest settlements;
- Dumfries and Galloway Council Area; and
- Scotland.

The economic impacts will be quantified for the Dumfries and Galloway Council Area and Scotland.

The socio-economic baseline will cover:

- The demographic profile of the local area within the context of the regional and national demographic trends;
- Employment and economic activity in the local area, within the context of the regional and national economic trends;
- The industrial structure of the local area within the context of the regional and national economies;
- The role of the tourism sector in the local and regional economy; and
- Wage levels within the local economy compared to regional and national levels.

A key consideration for the Development will be the SUW which intersects the Site. The SUW is designated as a Core Path (504) within the Dumfries and Galloway Core Paths Map and stretches approximately 344 km from Portpatrick on the south-west coast to Cocksburn path in the east of Scotland. It is proposed that no recreational route shall be obstructed, closed or diverted during the operation of the Development and if a temporary closure is necessary during construction, the Council and relevant consultees shall be consulted beforehand, with every effort made to ensure the routes remain accessible throughout the duration of construction.

14.4 Assessment of Effects

It is suggested that a study area of 5 km will be appropriate for this assessment, however confirmation of this acceptability is sought.

As no standard criteria exist for the assessment of socio-economic, tourism and recreational effects, professional judgement will be used in relation to policy context and baseline conditions to define the significance of the effects.

This will be a desk-based study and therefore there will be no stakeholder consultations undertaken as part of this study.

[195] Dumfries and Galloway Council (2016) Dumfries and Galloway Regional Economic Strategy 2016 - 2022 [Online] Available at: https://dumgal.gov.uk/media/18717/Regional-Economic-Strategy-2016-20/pdf/%20Regional_Economic_Strategy_2016_-_2020.pdf?m=636592257429570000 (Accessed 03/03/2022)

14.4.1 *Socio-Economics*

Cognisance will be taken of the Green Book: Appraisal and Evaluation in Central Government when conducting the assessment.

The socio-economic assessment will consider the effects on population, employment, occupation, and economy. The wider economic value of UK renewables industry will also be examined.

In addition to covering the potential effects resulting from each phase of the Development (construction, operation, decommissioning), the effects resulting from the planning phase will also be considered. Experience has shown that a significant level of expenditure can be released in to the local economy during this phase. Details of these amounts will be included in the assessment.

The following significance categories have been suggested for the assessment:

- Major effect (i.e. significant) – effects are greater than local scale or which exceed recognised standards;
- Moderate effect (i.e. significant) – noticeable effects that may be judged to be important at a local scale;
- Minor effect (i.e. not significant) – slight or highly localised effects that may be raised as local issues; and
- Negligible effect (i.e. not significant) – effects are indiscernible.

It is considered unlikely that any significant socio-economic effects will occur as a result of the Development.

14.4.2 *Tourism and Recreation*

This assessment will take cognisance of the noise, traffic and transport, landscape and visual, archaeology and cultural heritage assessments to provide an assessment of the expected effects on tourism and recreation.

It is expected that the assessment will consider tourist facilities and attractions; accommodation; paths and walking route; cycle routes; and other recreational activities including fishing, shooting/stalking, golf, water sports, and paragliding.

The assessment on tourism will consider whether the public would cease, or decrease, their visits to the tourist attractions in the surrounding local area, taking into account the effect the Development could have on the public's access to the attraction and their experience whilst visiting the attraction.

Access to the attraction will take cognisance of the transport assessment, whilst the experience whilst visiting the attraction will be based on the public's perception of noise levels, safety and the view from the tourist site. As experience is subjective it is assessed using professional judgement as well as the following qualitative criteria:

- Major effect – a highly noticeable difference in accessibility and/or experience;
- Moderate effect – a noticeable difference in accessibility and/or experience;
- Minor effect – a slightly noticeable difference in accessibility and/or experience; and
- Negligible effect – a barely noticeable difference in accessibility and/or experience.

Recreation will be assessed through consideration of identified paths in terms of both the journey length of those using the path and the amenity which would be experienced. The assessment of amenity considers the experience of those using the path in terms of noise levels, personal safety and the view experienced. The effect on paths will be assessed using the following criteria:

- Major adverse effect – closure of path or a diversion of more than 200 m and/or a highly noticeable difference in amenity;

- Moderate adverse effect – a diversion of 100 - 199 m and/or a noticeable difference in amenity;
- Minor adverse effect – a diversion of 50 - 99 m and/or a slightly noticeable difference in amenity; and
- Negligible adverse effect – a diversion of 1 - 49 m and/or a barely noticeable difference in amenity.

The assessment of other activities, will take into consideration the Development's impact on accessing the activity and amenity of undertaking the activity. Based on professional judgement this will be assessed using the following criteria:

- Major effect – a highly noticeable difference in accessibility and/or amenity;
- Moderate effect – a noticeable difference in accessibility and/or amenity;
- Minor effect – a slightly noticeable difference in accessibility and/or amenity; and
- Negligible effect – a barely noticeable difference in accessibility and/or amenity.

14.5 Questions for Consultees

- Q14.1 - Are Consultees aware of any key sensitive receptors that should be taken into account?
- Q14. 2 - Are Consultees aware of any additional relevant consultees it would be valuable to consult with regard to socio-economics, tourism and recreation?

15 CLIMATE CHANGE

15.1 Introduction

The aim of the Climate Change Impact Assessment (CCIA) section is to determine how the Development is likely to interact with a changing climate and whether any significant effects could arise. CCIA is a new form of environmental assessment required by the amended EC Directive 2014/52/EU as transposed into the EIA Regulations.

15.2 Relevant Guidance and Legislation

The following legislation, policy and guidance have been considered in carrying out this assessment:

- The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019[196] and the legally binding net zero target for 2045 and interim targets for 2020, 2030 and 2040;
- The Scottish Government's Climate Change Plan (CCP)197; and
- The Institute of Environmental Management and Assessment (IEMA) guidance documents 'Environmental Impact Assessment Guide to Climate Change Resilience and Adaption' (2015)198 and Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017)199;
- Achieving Net Zero (2020)[200];
- The Committee on Climate Change (CCC) Reducing UK emissions: 2020 Progress Report (2020)[201];
- Energy White Paper: Powering our net zero future (2020)[202]; and
- Scottish Government: Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update (2020)[203].

15.3 Baseline Conditions

The State of the UK Climate 2019[204] provides the latest report on observed climate data for UK. Key findings are as follows:

- The decade 2010-2019 was on average 0.3ºC warmer than the 1981-2010 average and 0.9ºC warmer than 1961-1990. The ten warmest years on record have occurred since 2002;

[196] Scottish Government (2019) Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 [Online] Available at: http://www.legislation.gov.uk/asp/2019/15/enacted (Accessed 03/03/2022)
[197] Scottish Government (2018) Climate Change Plan: third report on proposals and policies 2018-2032 (RPP3). https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/ (Accessed 03/03/2022)
[198] IEMA (2015) IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation [Online] Available at: https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_and_adaptation%20(1).pdf (Accessed 03/03/2022)
[199] IEMA (2017) IEMA Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' [Online] Available at: https://www.iema.net/policy/ghg-in-eia-2017 (Accessed 03/03/2022)
[200] National Audit Office (2020) Achieving Net Zero [Online] Available at: https://www.nao.org.uk/wp-content/uploads/2020/12/Achieving-net-zero.pdf (Accessed 03/03/2022)
[201] The CCC (2020) Reducing UK emissions: 2020 Progress Report to Parliament [Online] Available at: https://www.theccc.org.uk/publication/reducing-uk-emissions-2020-progress-report-to-parliament/#key-findings (Accessed 03/03/2022)
[202] HM Government (2020) The Energy White Paper - Powering our Net Zero Future [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf (Accessed 03/03/2022)
[203] Scottish Government (2020) Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update [Online] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/pages/0/ (Accessed 03/03/2022)
[204] International Journal of Climatology, volume 39, Issue S1 (July 2020) ed. Radan Huth. Wiley

- The decade 2010–2019 has been on average 1% wetter than 1981–2010 and 5% wetter than 1961–1990 for the UK overall. Six of the ten wettest years for the UK in a series from 1862 have occurred since 1998;
- In the context of seasonal changes, for the most recent decade (2010-2019):
  - UK summers have been on average 11% wetter than 1981–2010 and 13% wetter than 1961–1990;
  - UK winters have been on average 4% wetter than 1981–2010 and 12% wetter than 1961–1990; and
- In the UK, there is no strong evidence for trends in storminess as determined by maximum gust speeds over the last five decades.

Climate Projections show that the trends over the 21st century in the UK are towards warmer and wetter winters and hotter, drier summers, with an increase in frequency and intensity of extremes.

The climate parameters considered most relevant to the assessments referenced within this section are wind speed, temperature and precipitation.

15.3.1 *Wind Speed*

The global projections over the UK show an increase in near surface (10 metre height) wind speeds over the UK in the second half of the 21st century, in the winter season when higher wind speeds are generally experienced. The increase is modest when compared to inter-annual variability. This would be accompanied by an increase in frequency of winter storms over the UK[205]. There are no significant changes forecast in the wind speeds over the first part of the century.

These projections are in line with earlier findings by Pryor and Barthelmie (2010)[206] who concluded that in the near-term (i.e. until the 2050's) there will be no detectable significant change in the wind resource of northern Europe.

15.3.2 *Temperature*

For period 2041-2060 projected changes to UK annual mean temperature (compared to 1981-2000) is projected at +1.5ºC (50% probability) for RCP8.5 (unmitigated scenario). Results for the 10th to 90th percentile range are between +0.7ºC to +2.5oC[207]. Key observations are that:

- Both winters and summers will be warmer, with more warming in the summer; and
- In summer, there is a pronounced north/south divide with greater increases in maximum summer temperatures over the southern UK compared to Northern Scotland.

15.3.3 *Precipitation*

Rainfall patterns over the UK are not uniform and vary on regional and seasonal scales, which will continue in the future. Future changes are uncertain but point to wetter winters and drier summers in general. Northern Scotland is associated with greatest increased precipitation in winters[208].

Over the UK, the changes to precipitation projected for 2041-2060 (compared to 1981-2000) for RCP8.5 (unmitigated scenario) are:

[205] UKCP18 (2018) Factsheet: Wind.

[206] Pryor, S.C. and Barthelmie, R. J. (2010) Climate Change Impact on Wind Energy: A Review. Renewable and Sustainable Energy Review, 14(1): 430-437

[207] Lowe et al (2018) UKCP18 Science Overview Report (Table 2.2, Page 16)

[208] Lowe et al (2018) UKCP18 Science Overview Report

- Winter precipitation – increase of 7%. Results for the 10th to 90th percentile range are between -5% and +21%;
- Summer precipitation – decrease of 15%. Results for the 10th to 90th percentile range are between -31% and +0%.

15.4 Key Sensitives

Possible sensitivities associated with the Development, which may be potentially significant include:

- Effects of the Development on climate change;
- Effects of climate change on the Development; and
- Effects of climate change on assessments made in other topics of the Development's EIA Report.

15.5 Scoped In Effects

The following effects have been scoped in:

- Carbon Balance Calculator would be undertaken using the most recent version of the spreadsheet available on the Scottish Government website.

15.6 Scoped Out Effects

15.7 Questions for Consultees

- Q15.1 - Do the consultees agree with the proposed methodology and scope of assessment?

16 OTHER ISSUES

16.1 Aviation

16.1.1 *Introduction*

The development of wind turbines has the potential to cause a variety of adverse effects on aviation during turbine operation. These include but are not limited to:

- Physical obstructions;
- Generation of unwanted returns on Primary Surveillance Radar (PSR); and
- Adverse effects on overall performance of Communications, Navigation and Surveillance (CNS) equipment.

Since many issues must be considered when assessing the potential effect of the Development, the local Air Navigation and Air Traffic Services Providers are best placed to provide expert interpretation of what those effects might be and how they might affect safety, efficiency and flexibility of their operations. A well-established regulatory and policy framework that has been in force for a number of years, and subject to constant amendments and updating; this, in addition to guidance documents, has been taken into account when preparing the assessment methodology to ensure compliance.

Where line of sight exists between turbines and air traffic control radars it is possible that the turbines may be detected by the radar, dependant on atmospheric conditions, and appear as clutter on the controllers' screens; such clutter can have a direct operational impact on air traffic control operations.

It is known that neighbouring wind farms (e.g., Twentyshilling Hill Wind Farm) were visible on the Lowther Hill PSR and mitigation was required. Furthermore, the Site is located just beyond the extent of the 50 km consultation zone for the Eskdalemuir Seismic Station and therefore, should not be a consideration for the Development. Confirmation with National Air Traffic Services (NATS) En-Route Plc and the Ministry of Defence (MOD) in the context of the likelihood of identified aviation operators using the airspace in the vicinity of the Development will be sought.

It is therefore expected that an aviation assessment will be required to identify and assess the likely aviation issues associated with the Development.

16.1.2 *Assessment Methodology*

There is no requirement to assess the effects of developments on aviation receptors as part of the EIA process, however it is included to prevent effects on aviation infrastructure. The general approach to wind farm development is to avoid adverse effects on aviation infrastructure, where possible, and to find appropriate technical mitigation solutions where this cannot be achieved.

Consultation with relevant aviation providers is a routine part of wind farm development and the consultation process that is required to be undertaken is also laid down in Civil Aviation Publication (CAP) 764 (for civil aviation issues)[209] and the Wind Energy and Aviation Interests Interim Guidelines (for both civil and military consultation)[210]. In relation to the Development the following consultees have been identified:

- MOD (Defence Infrastructure Organisations);
- NATS; and
- CAA.

[209] CAA (2016) CAA Policy and Guidelines on Wind Turbines CAP 764 [Online] Available at: https://publicapps.caa.co.uk/docs/33/CAP764%20Issue6%20FINAL%20Feb.pdf (Accessed 03/03/2022)
[210] Department of Trade and Industry (2002) Wind Energy and Aviation Interests – Interim Guidelines [Online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48101/file17828.pdf (Accessed 03/03/2022)

A search for private airfields will be conducted in parallel with the consultation process, and any identified airfields will also be consulted on the Development.

16.1.3 *Summary*

The assessment methodology will be confirmed, and the assessment undertaken in conjunction with the aforementioned consultees to ensure there are no significant effects on the operation of aviation and radar equipment. The results of this assessment will be presented in an EIA Report Chapter.

16.2 Telecommunications

Wind farms have the potential to interfere with electro-magnetic signals and utilities passing above ground and physically with existing infrastructure below ground. This can therefore potentially affect television reception, fixed telecommunication links and other utilities. To identify any existing infrastructure constraints, both consultation and a desk based study will be conducted. Consultation with relevant telecommunication and utilities providers is a routine part of wind farm development and consultees will include:

- Spectrum Licensing (OFCOM);
- Television and telecommunications providers as appropriate; and
- Water, gas and electricity utilities providers.

Other additional information obtained from consultation will be used to inform the future layout iterations.

The Development will be designed to ensure that there are no effects on telecommunication links and therefore, it is proposed to be scoped-out of the EIA Report. Ongoing consultation with relevant consultees will ensure any potential effects are identified.

16.3 Shadow Flicker

Reflectivity is the potential for the sun to 'glint' off structures which, in the case of wind turbines, can be an intermittent glint when the turbines are rotating. This effect can be minimised by selecting a matt coating for the wind turbines, designed to reduce the potential for reflection.

Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wine turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as a window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects can only occur inside buildings when the blade casts a shadow across an entire window opening.

Due to the lack of explicit guidance in Scotland, guidance within England is considered to be material for assessing shadow flicker effects. Guidance produced by the UK Government, 'Planning Practice Guidance for Renewable and Low Carbon Energy' 2013 states that:

"only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK- turbines do not cast long shadows on their southern side."

In addition, the Online Planning Guidance note[211] on onshore wind provides information on Shadow Flicker. It states:

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

[211] The Scottish Government (2008) Planning Advice Note 45: Spatial Frameworks and Supplementary Planning Guidance for Wind Farms [Online] Available at: http://www.gov.scot/resource/doc/244403/0068333.pdf (Accessed 03/03/2022)

Since the final layout and candidate turbine have yet to be selected, it is difficult to determine whether or not the Development will have a significant effect on the surrounding properties from shadow flicker. However, given the closest residential receptor is considered to be Glenmaddie (0.8 km north of the Site), it is deemed unlikely that any property will be within 10 rotor diameters of a turbine.

An assessment will be undertaken to determine whether or not there will be any impacts on surrounding properties. This will examine all properties which lie within 10 rotor diameters and 130 degrees either side of north from each turbine. Resoft WindFarm, a computer modelling programme, will be used to model the potential effects at surrounding properties to quantify the potential effects.

It is proposed that the industry recognised limits are applied for the purposes of the assessment:

- Worst case scenario - 30 hours per year or 30 minutes per day; and
- Realistic scenario - 8 hours per year.

Should these limits be exceeded, the Applicant would implement mitigation measures to minimise or prevent effects where appropriate.

16.3.1 *Scoped Out Effects*

Well designed and maintained wind turbines are a safe technology. The Site design and inbuilt buffers from sensitive receptors will minimise the risk to humans from the operation of the turbines. Risks associated with ice build-up and lightning strike are removed or reduced through inbuilt turbine mechanisms in modern machines, and as such can be scoped out at this stage.

All other potential interactions with Human Health including Health and Safety best practice, ice, lightning strike and structural failures are unlikely to occur and therefore, unlikely to give rise to potentially significant effects. As such, Health and Safety best practice, ice, lightning strike and structural failures have been scoped out of further assessment at this stage.

16.4 Human Health, Major Accidents and Disasters

The EIA Regulations state that an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Development to risks, so far as relevant to the Development, of major accidents and natural disasters.

A series of elements will be covered as part of the review of human health effects, this will summarise the findings of relevant assessments already assessed as part of the EIA where interactions with Human Health are possible, including the following:

- Traffic and Transportation;
- Noise;
- Socio-economics, Recreation and Tourism; and
- Shadow Flicker.

Relevant information available and obtained through risk assessments pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament[212] on the control of major accident hazards involve dangerous substances. The Directive lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. Directive 2012/18/EU requires the preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the

[212] European Union (2012) Directive 2012/18/EU [Online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0018 (Accessed 03/03/2022)

nature of the Development. Throughout all phases of the Development, cognisance should be made through the following guidance documents produced by Renewable UK:

- Wind Turbine Safety Rules Third Edition[213];
- Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition[214]; and
- Onshore Wind Health & Safety Guidelines[215].

Health and Safety during the construction and decommissioning phases of the Development will be subject to relevant legislation and best practice. This will involve site inductions, risk assessment and method statements as implements by the CEMP. Therefore, there is no further requirement for Health and Safety to be assessed within the EIA and is scoped out of further assessment.

The risk of a major accident could be increased by the probability of natural disasters associated with the location of the Development. This should be considered during the preparation of major accident scenarios.

The Development is not located within an area known for natural disasters such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis. As the most probable of natural disasters to effect the Development, flood risk will be assessed within the hydrological assessment in the EIA Report. It is noted that the Development is not located in an area of flood risk.

None of the identified climate change trends listed will affect the Development with the exception of increased windstorms. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and should severe windstorms be experienced then the turbines would be shut down. Although an unlikely event in the area, the brake mechanisms could also apply to a hurricane scenario.

The Development is not located within an area prone to such disasters and the likelihood of such an event is extremely rare. Therefore, it is concluded that no significant effects will arise due to major accidents and natural disasters as a result of the Development, and this topic can be scoped out of the EIA.

16.4.1 *Scoped Out Effects*

It is proposed that the Development's vulnerabilities and resilience to climate change can be scoped out of the EIA. None of the identified climate change trends could affect the Development with the exception of increased windstorms. Breaking mechanisms installed on turbines allow them to be operated only under specific wind speeds and should severe windstorms be experienced then the turbines would be shut down. In addition, given the elevated location of the Development, flooding will not pose a significant risk to the operation of the windfarm nor will the construction of a windfarm contribute to flooding elsewhere. Therefore, it is concluded that no significant effects will arise, as a result of the Development, and this topic can be scoped out.

In addition, the Development is not located within an area prone to such disasters and the likelihood of such an event is extremely rare. Therefore, it is concluded that no significant

[213] Renewable UK (2015) Wind Turbine Safety Rules. Third Edition [Online] Available at: https://c.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/Docs/Health_&_Safety/WindTurbineSafetyRulesIssue3.pdf (Accessed 03/03/2022)

[214] Renewable UK (2015) Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules. Third Edition [Online] Available at: https://c.ymcdn.com/sites/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/Wind-turbine-safety-rules-guidance.pdf (Accessed 03/03/2022)

[215] Renewable UK (2015) Onshore Wind Health and Safety Guidelines [Online] Available at: https://c.ymcdn.com/sites/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/OnshoreWind_HealthSafety_Guidelines.pdf (Accessed 03/03/2022)

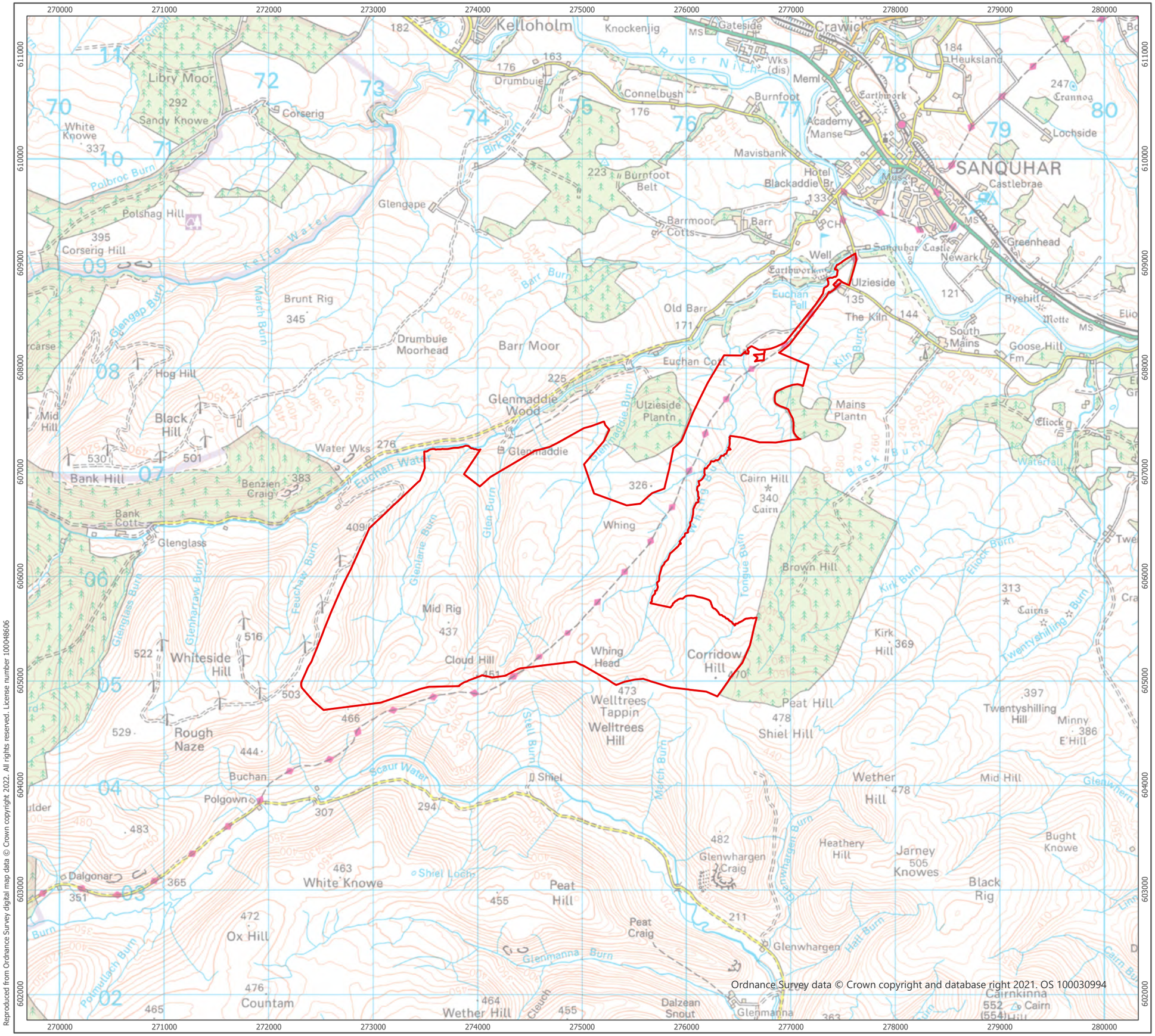
effects will arise due to major accidents and natural disasters as a result of the Development, and this topic can be scoped out of the EIA.

16.5 Questions for Consultees

- Q16.1 - In the event that all consultees return a 'not significant' response, are consultees content to scope out aviation out of the EIA Report?
- Q16.2 - Are any consultees aware of any additional stakeholders that should be taken into account?
- Q16.3 - Are consultees content that telecommunications can be scoped out following detailed consultation with telecoms providers, should no telecommunications links be found in the immediate vicinity of the Development?
- Q16.4 - Are consultees content to scope out effects on Health and Safety best practice, ice, lightning strike and structural failures?
- Q16.5 - Should no properties fall within ten rotor diameters and 130 degrees of north of the Development, are consultees content that shadow flicker effects can be scoped out of the EIA?
- Q16.6 - Are consultees content to scope out the Development's vulnerabilities and resilience to climate change?
- Q16.7 - Are consultees content to scope out Major Accidents and Disasters from further assessment?

APPENDIX A: FIGURE LIST

- Figure 2.1 - Site Location;
- Figure 2.2 - Site Layout;
- Figure 6.1 - Study Area;
- Figure 6.2 - Landscape Character and Blade Tip ZTV;
- Figure 6.3 - Landscape Designations and Blade Tip ZTV;
- Figure 6.4 - Viewpoint Locations and Blade Tip ZTV;
- Figure 6.5 - Visual Receptors and Blade Tip ZTV;
- Figure 6.6 - Cumulative Wind Farms;
- Figure 7.1 - Vantage Points and Viewsheds;
- Figure 7.2 - Ornithological Designated Sites within 20 km;
- Figure 8.1 - Ecological Survey Area;
- Figure 8.2 - Ecological Designated Sites and Ancient Woodland within 5 km; and
- Figure 12.1 - Noise.



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\\Uksprdgisapp01\gis-cad\GIS\Environment\4254 Cloud Hill EIA\4254 Cloud Hill EIA.aprx\4254-REP-003 Fig 2.1 Site Location

ARCUS
An ERM Group Company

Site Boundary

1:35,000 Scale @ A3

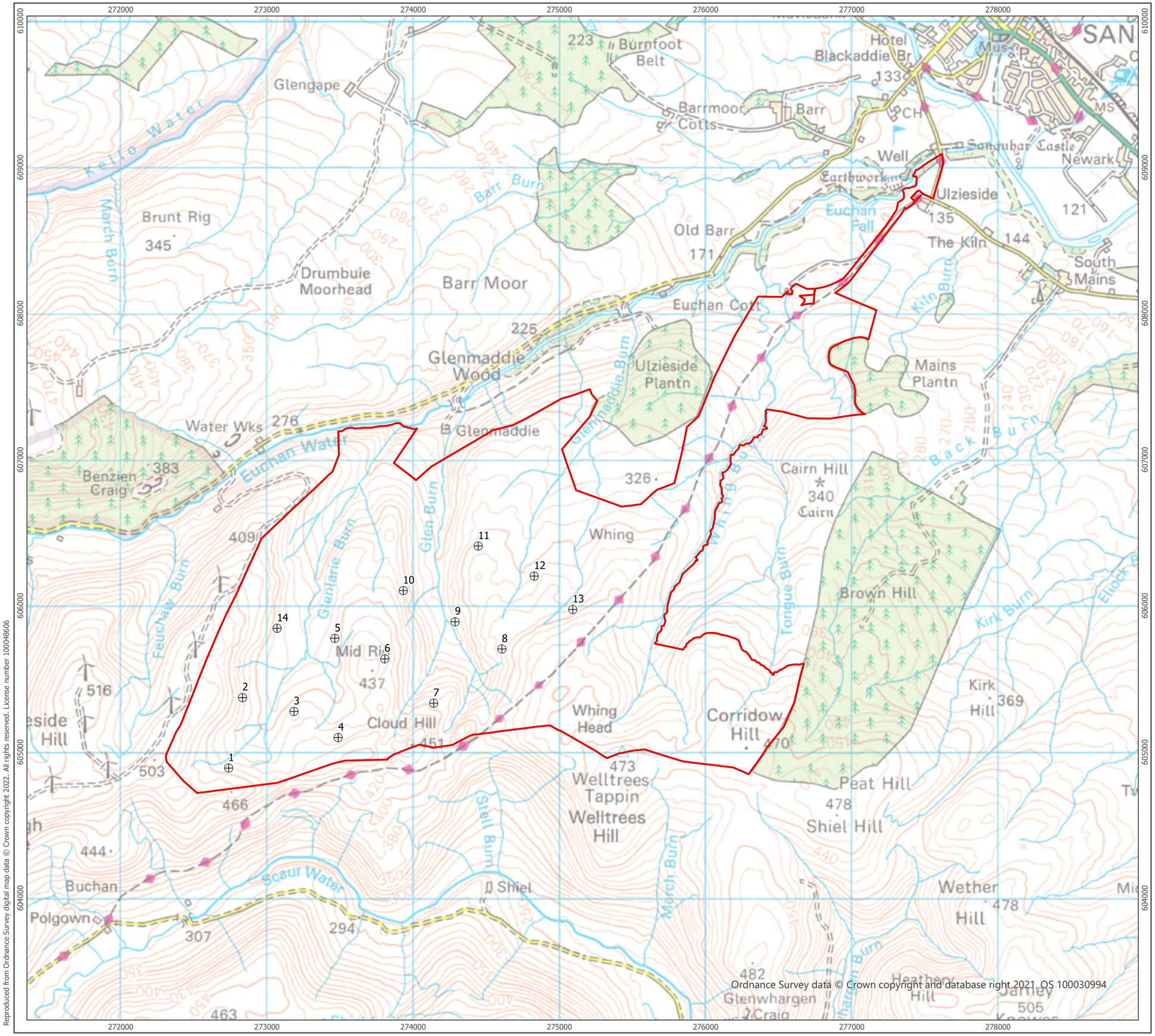
0 0.5 1 km

NORTH

Produced By: AD	Ref: 4254-REP-003
Checked By: SC	Date: 29/03/2022

Site Location
Figure 2.1

Cloud Hill Wind Farm
Scoping Report



ARCUS
An ERM Group Company

Site Boundary

Proposed Turbine Location

1:25,000 Scale @ A3

0 0.5 1 km

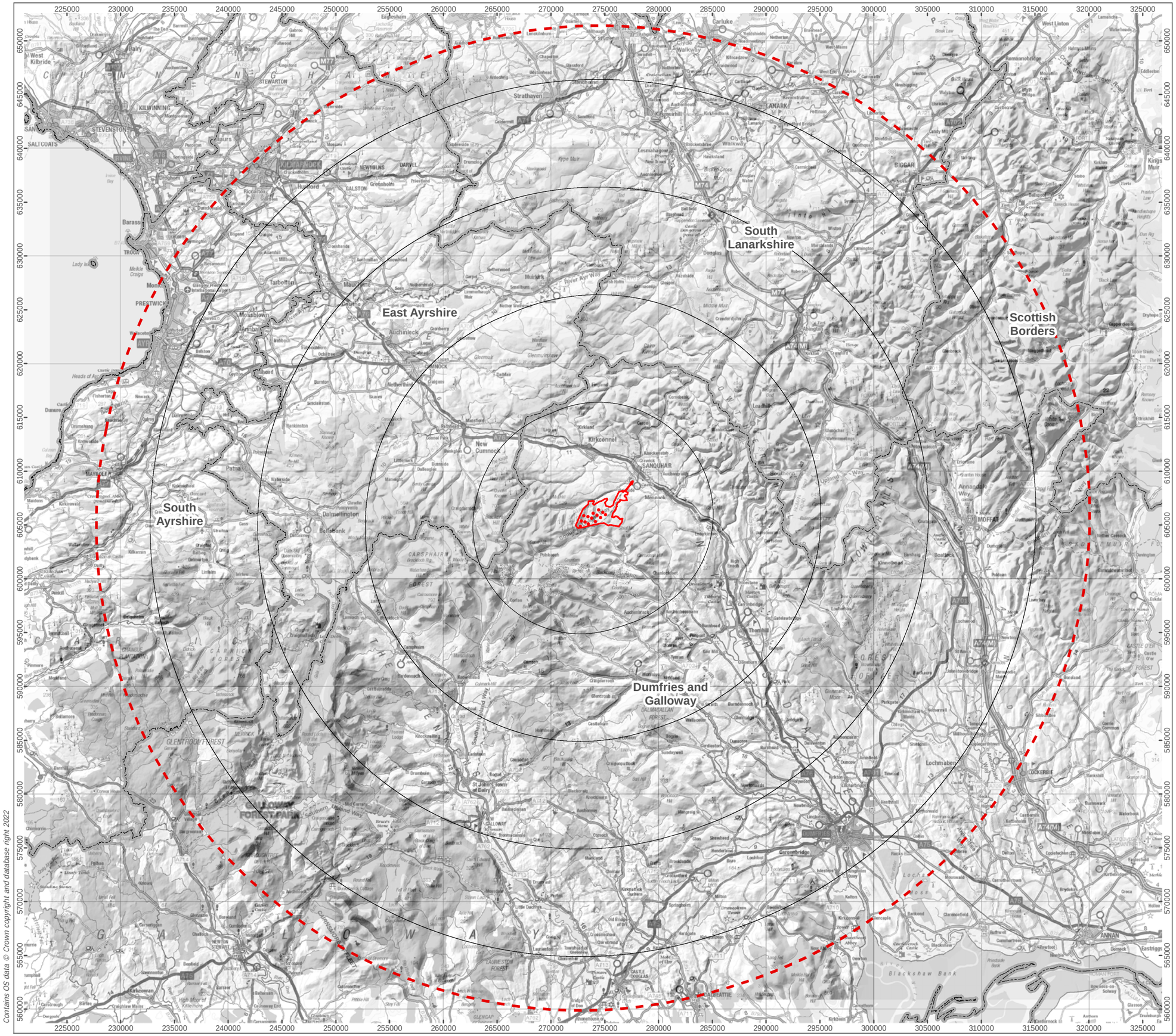
NORTH

Produced By: AD	Ref: 4254-REP-004
Checked By: SC	Date: 29/03/2022

Site Layout
Figure 2.2

Cloud Hill Wind Farm
Scoping Report

\\Uksprdgisapp01\gis-cad\GIS\Environment\4254 Cloud Hill EIA\4254 Cloud Hill EIA.aprx\4254-REP-004 Fig 2.2 Site Layout



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open optimised environments

PART OF SLR

ARCUS An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 10km Radii
- 45km Study Area
- Local Authority Boundary

1:340,000 Scale @ A3

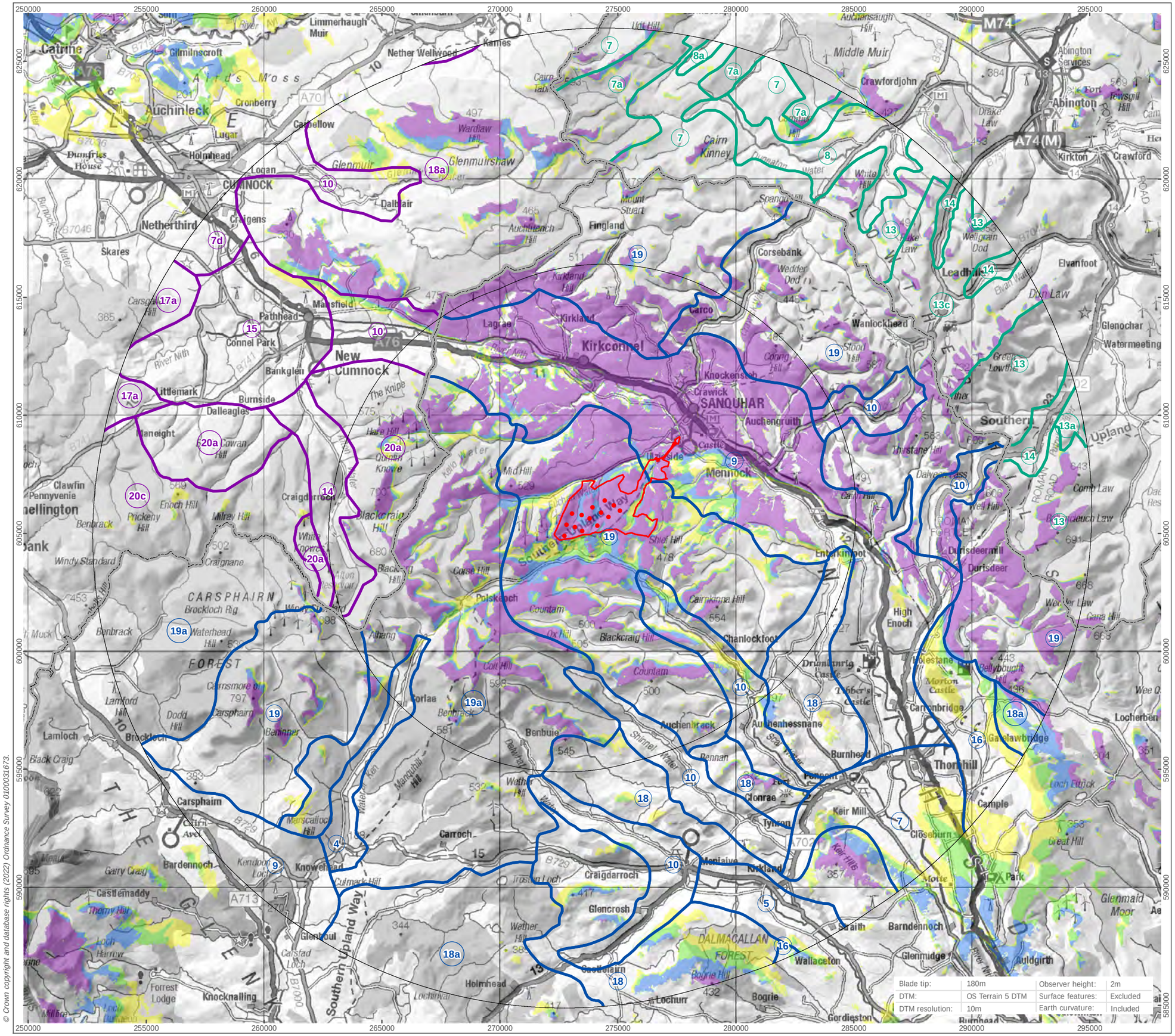
0 6.5 13 km

NORTH

Produced By: TH	Ref: 4254-REP-6.1
Checked By: JP	Date: 18/03/2022

Study Area
Figure 6.1

Cloud Hill Wind Farm
Scoping Report



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open optimised environments
PART OF SLR
ARCUS An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 10km Radii
- Local Authority Boundary

Blade Tip ZTV
No. of Blade Tips Theoretically Visible

- 1 - 3
- 7 - 10
- 4 - 6
- 11 - 14
- Dumfries & Galloway LCT

Source: Dumfries & Galloway LDP SPG Wind Energy Development Landscape Capacity Study June 2017

4. Narrow Wooded River Valleys
5. Intimate Pastoral Valley
7. Middle Dale (Valley)
9. Upper Dale (Valley)
10. Upland Glens
16. Upland Fringe
18. Foothills
18a. Foothills with Forest
19. Southern Uplands
19a. Southern Uplands with Forest

- East Ayrshire LCT

Source: East Ayrshire Wind Capacity Study 2018

7d. East Ayrshire Lowlands
10. Upland River Valley
14. Upland Glen
15. Upland Basin
17a. Foothills with Forest & Opencast Mining
18a. East Ayrshire Plateau Moorlands
20a. East Ayrshire Southern Uplands
20c. Southern Uplands & Forestry

- South Lanarkshire LCT

Source: South Lanarkshire Landscape Capacity Study for Wind Turbines Feb 2016

7. Rolling Moorland Foothills
7a. Rolling Moorland Forestry
8. Upland River Valley
8a. Upland River Valley Incised
13. Southern Uplands
13a. Southern Upland Forestry
13c. Southern Uplands Leadhills
14. Upland Glen

1:155,000 Scale @ A3

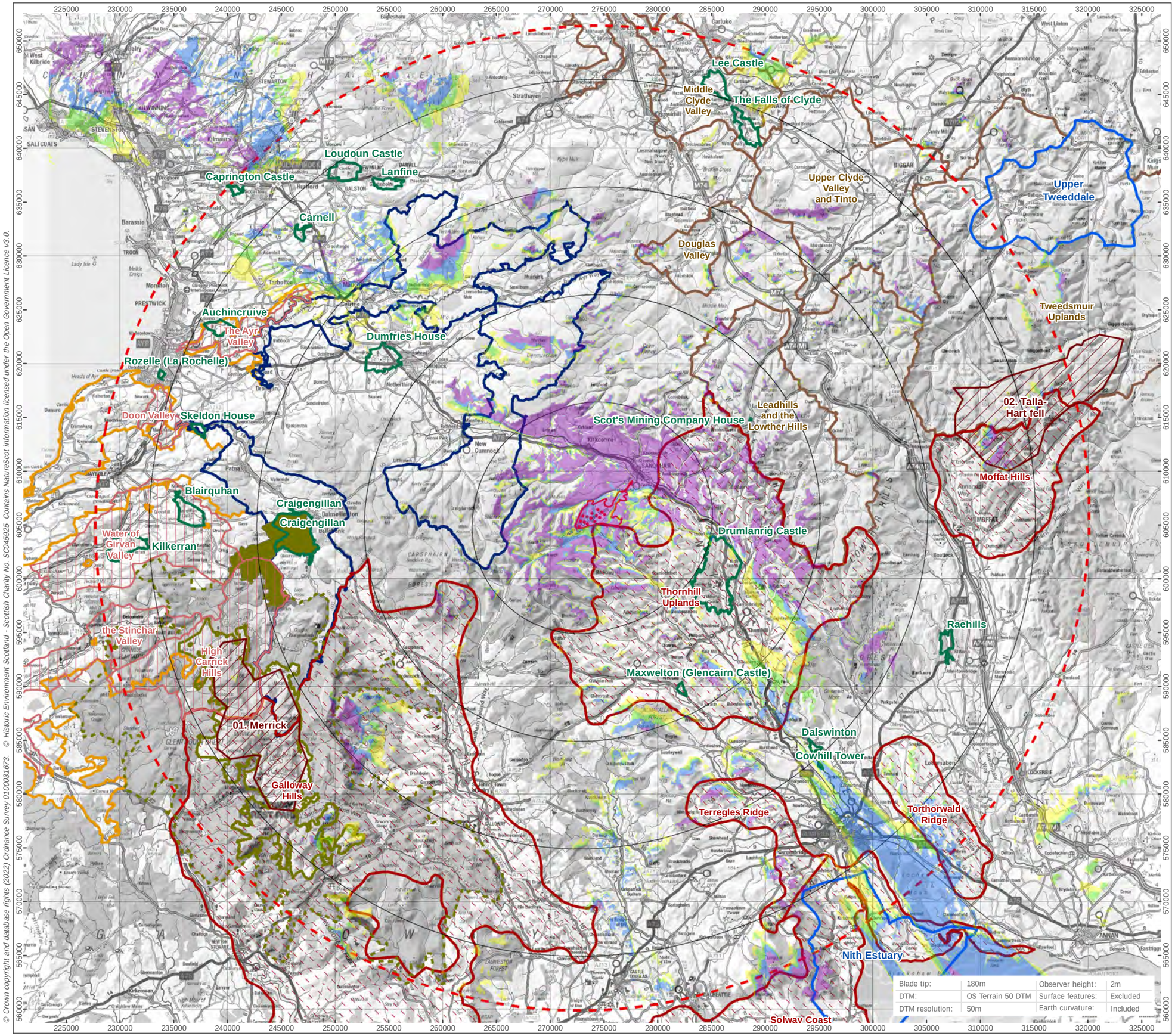
0 3 6 km

NORTH

Produced By: TH	Ref: 4254-REP-6.2
Checked By: JP	Date: 18/03/2022

Landscape Character and Blade Tip ZTV Figure 6.2

Cloud Hill Wind Farm Scoping Report



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open optimised environments
PART OF SLR
ARCUS An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 10km Radii
- 45km Study Area

Blade Tip ZTV
No. of Blade Tips Theoretically Visible

- 1 - 3
- 4 - 6
- 7 - 10
- 11 - 14

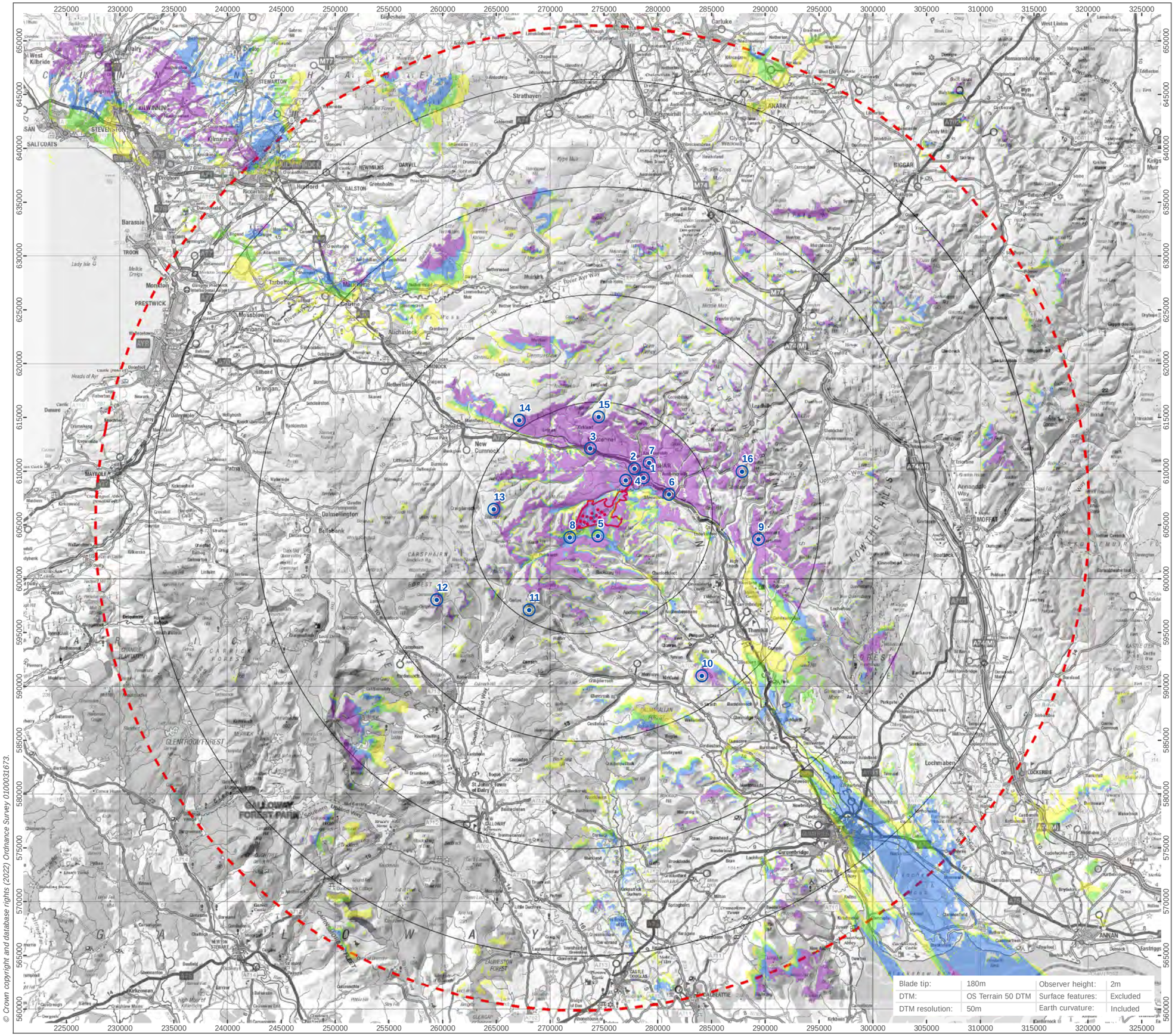
- Garden & Designed Landscape
- National Scenic Area
- Wild Land Area
- Dark Sky Park - Buffer
- Dark Sky Park - Core
- Dark Sky Park - Craigengillan Estate
- Proposed Local Landscape Area
- Regional Scenic Area
- Scenic Area
- Sensitive Landscape Area
- Special Landscape Area

1:340,000 Scale @ A3
0 6.5 13 km
NORTH

Produced By: TH	Ref: 4254-REP-6.3
Checked By: JP	Date: 18/03/2022

Landscape Designations and Blade Tip ZTV
Figure 6.3

Cloud Hill Wind Farm
Scoping Report



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open
optimised environments
PART OF SLR
ARCUS
An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 10km Radii
- 45km Study Area

Blade Tip ZTV
No. of Blade Tips Theoretically Visible

- 1 - 3
- 4 - 6
- 7 - 10
- 11 - 14

Viewpoint Location

1 - A76 Sanquhar Castle
2 - Sanquhar Church Road
3 - Kirkconnel
4 - Euchan Water minor road
5 - Shiel, Scar Water minor road
6 - Mennock
7 - Southern Upland Way east of Sanquhar
8 - Polgown, Scar Water minor road
9 - Durisdeer
10 - Wauk Hill
11 - Benbrack
12 - Cairnsmore of Carsphairn
13 - Blackcraig
14 - Corsencon Hill
15 - Todholes Hill
16 - Lowther East Mount

1:340,000 Scale @ A3

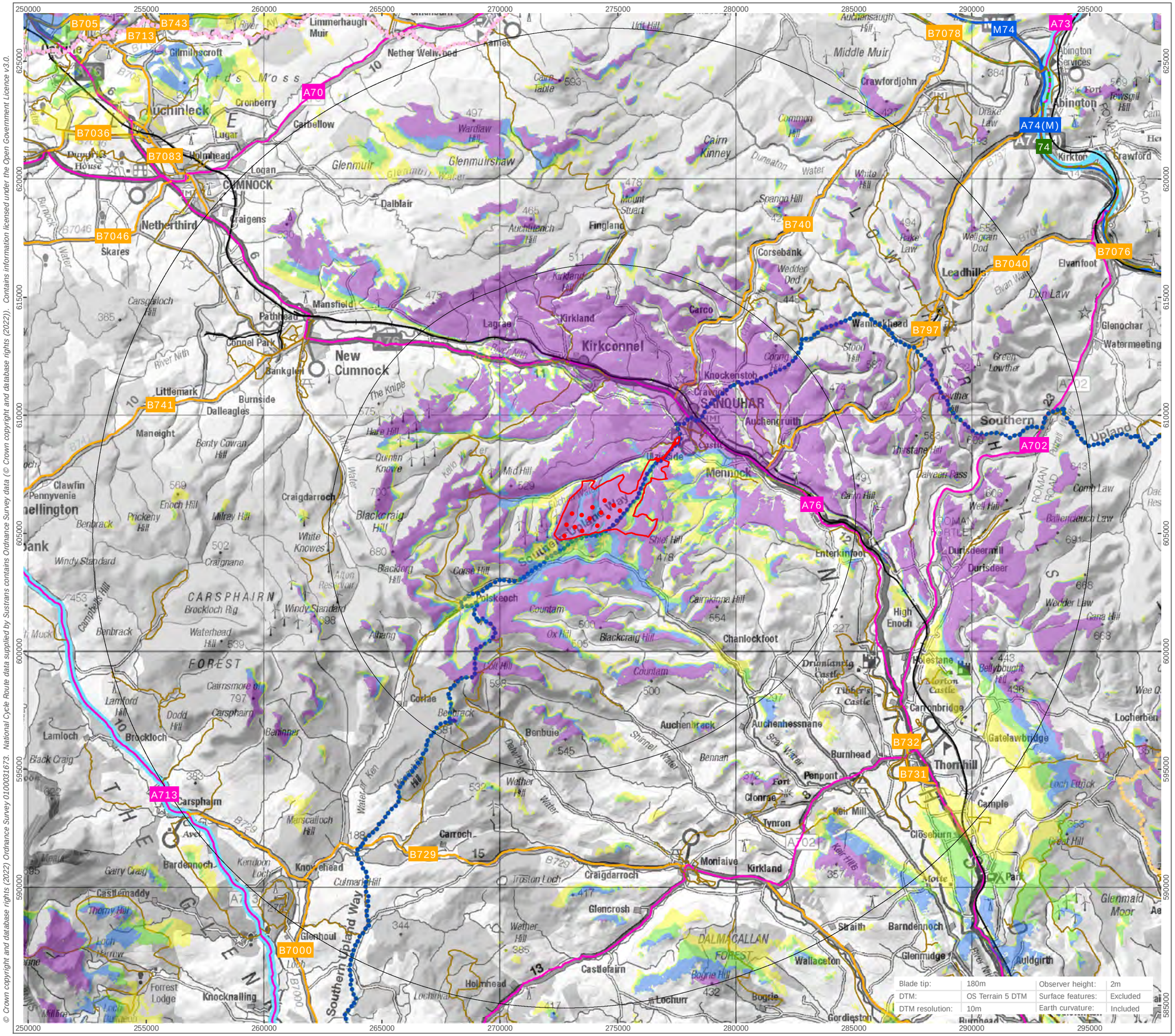
0 6.5 13 km

NORTH

Produced By: TH	Ref: 4254-REP-6.4
Checked By: JP	Date: 18/03/2022

Viewpoint Locations and Blade Tip ZTV
Figure 6.4

Cloud Hill Wind Farm
Scoping Report



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open optimised environments
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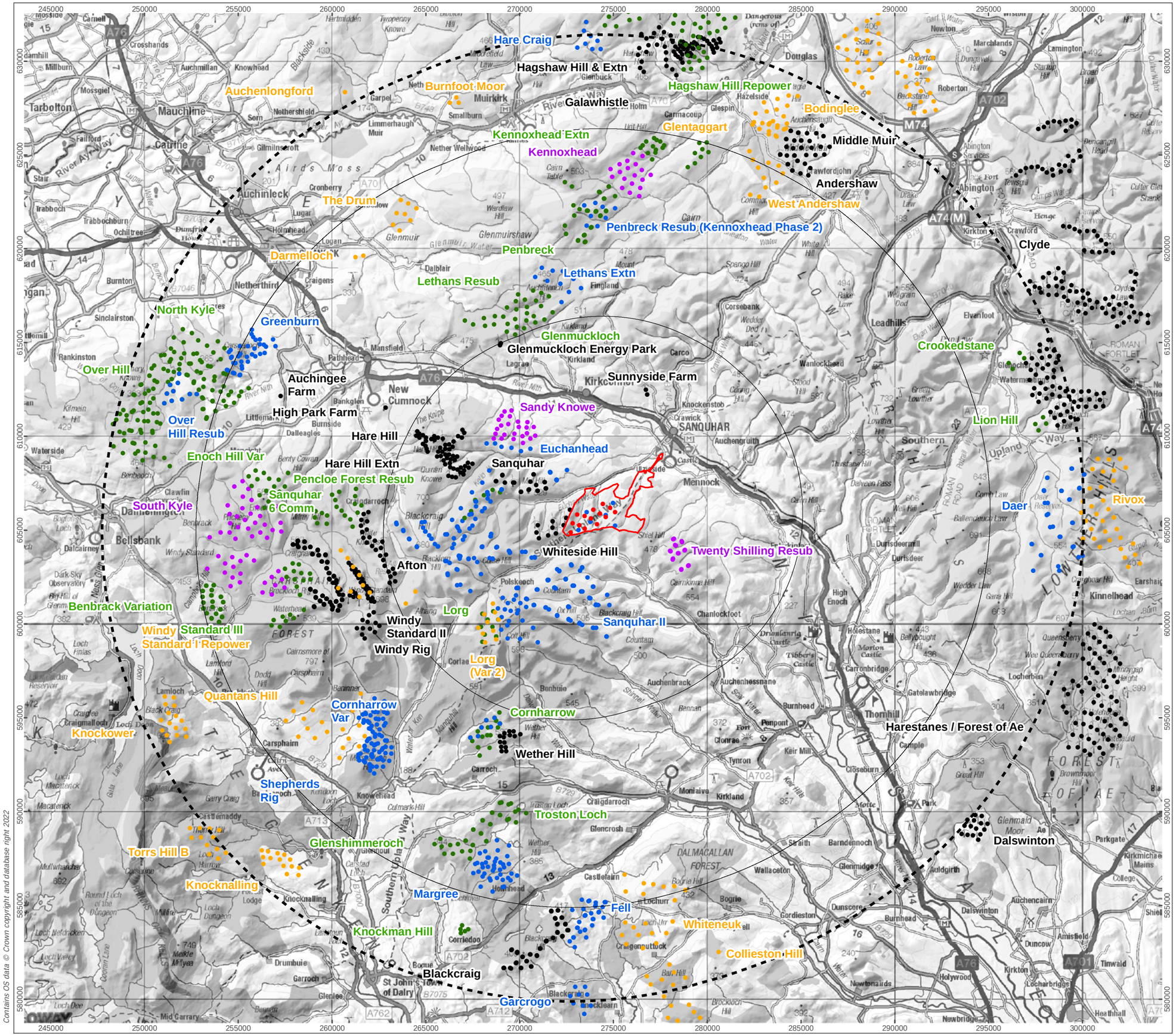
ARCUS An ERM Group Company

Produced By: TH	Ref: 4254-REP-6.5
Checked By: JP	Date: 18/03/2022

Visual Receptors and Blade Tip ZTV
Figure 6.5

Cloud Hill Wind Farm
Scoping Report



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optimised environments
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An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 10km Radii
- 25km Radius

Cumulative Wind Farms

- Operational
- Under Construction
- Consented
- Appeal; Application
- Scoping

1:195,000 Scale @ A3

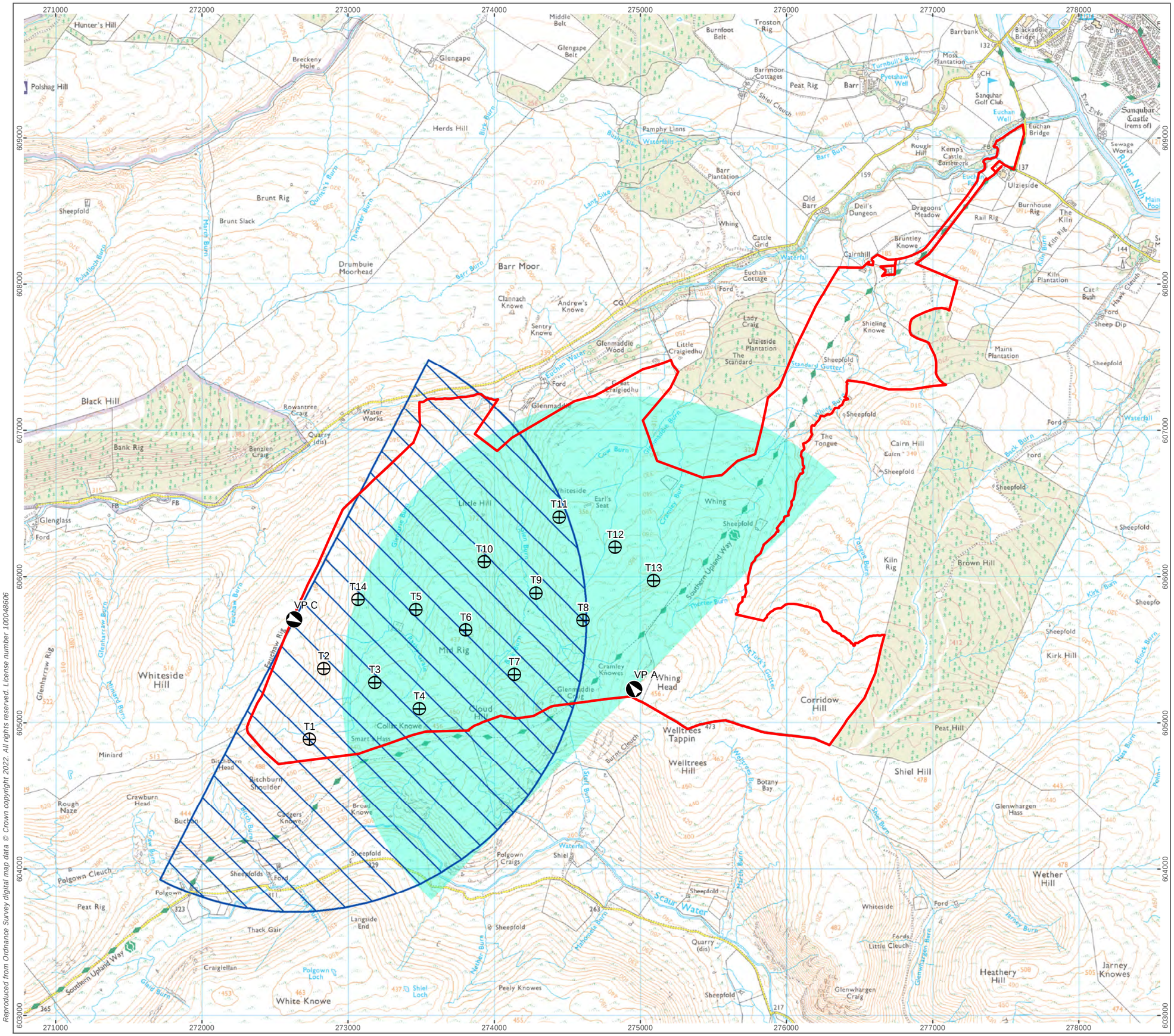
0 3.5 7 km

NORTH

Produced By: TH	Ref: 4254-REP-6.6
Checked By: JP	Date: 18/03/2022

Cumulative Wind Farms
Figure 6.6

Cloud Hill Wind Farm
Scoping Report



MacArthur Green

ARCUS
An ERM Group Company

⊕ Proposed Turbine Location

Site Boundary

Vantage Points and Viewsheds

Vantage Point (VP)

Visible Area from VP A

Visible Area from VP C

Produced By: LM	Ref: Scoping_R_O_Fig7.1_CLD
Checked By: ES	Date: 18/03/2022

Vantage Points and Viewsheds
Figure 7.1

Cloud Hill Wind Farm
Scoping Report

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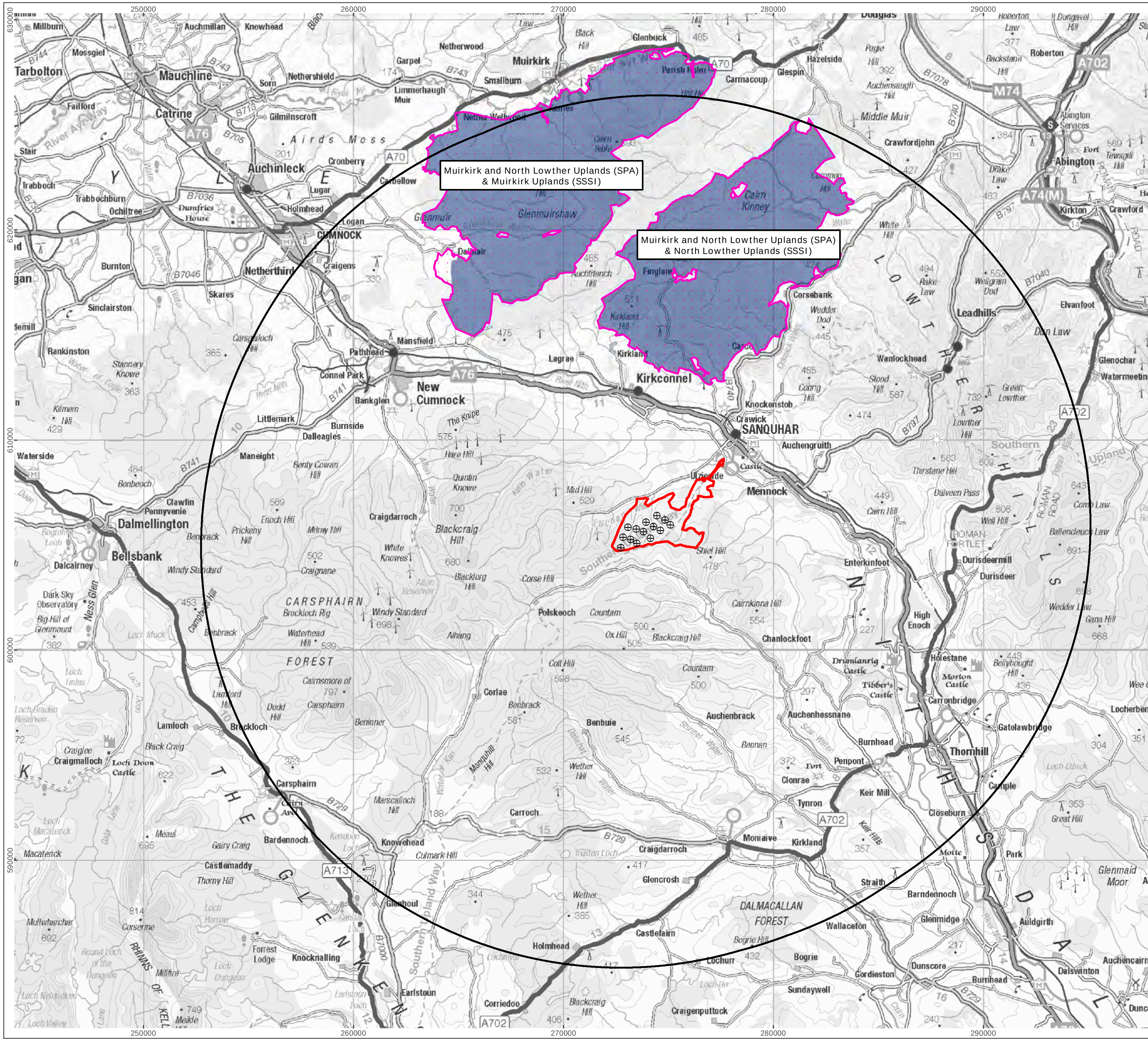

MacArthur Green

ARCUS An ERM Group Company

⊕ Proposed Turbine Location

Site Boundary

20 km Distance Band

Ornithological Designated Sites

Source: NatureScot (SNH)

Special Protection Area (SPA)

Site of Special Scientific Interest (SSSI)

1:175,000 Scale @ A3

0 2.5 5 km

NORTH

Produced By: LM	Ref: Scoping_R_O_Fig7.2_CLD
Checked By: ES	Date: 18/03/2022

Ornithological Designated Sites within 20 km
Figure 7.2

Cloud Hill Wind Farm
Scoping Report

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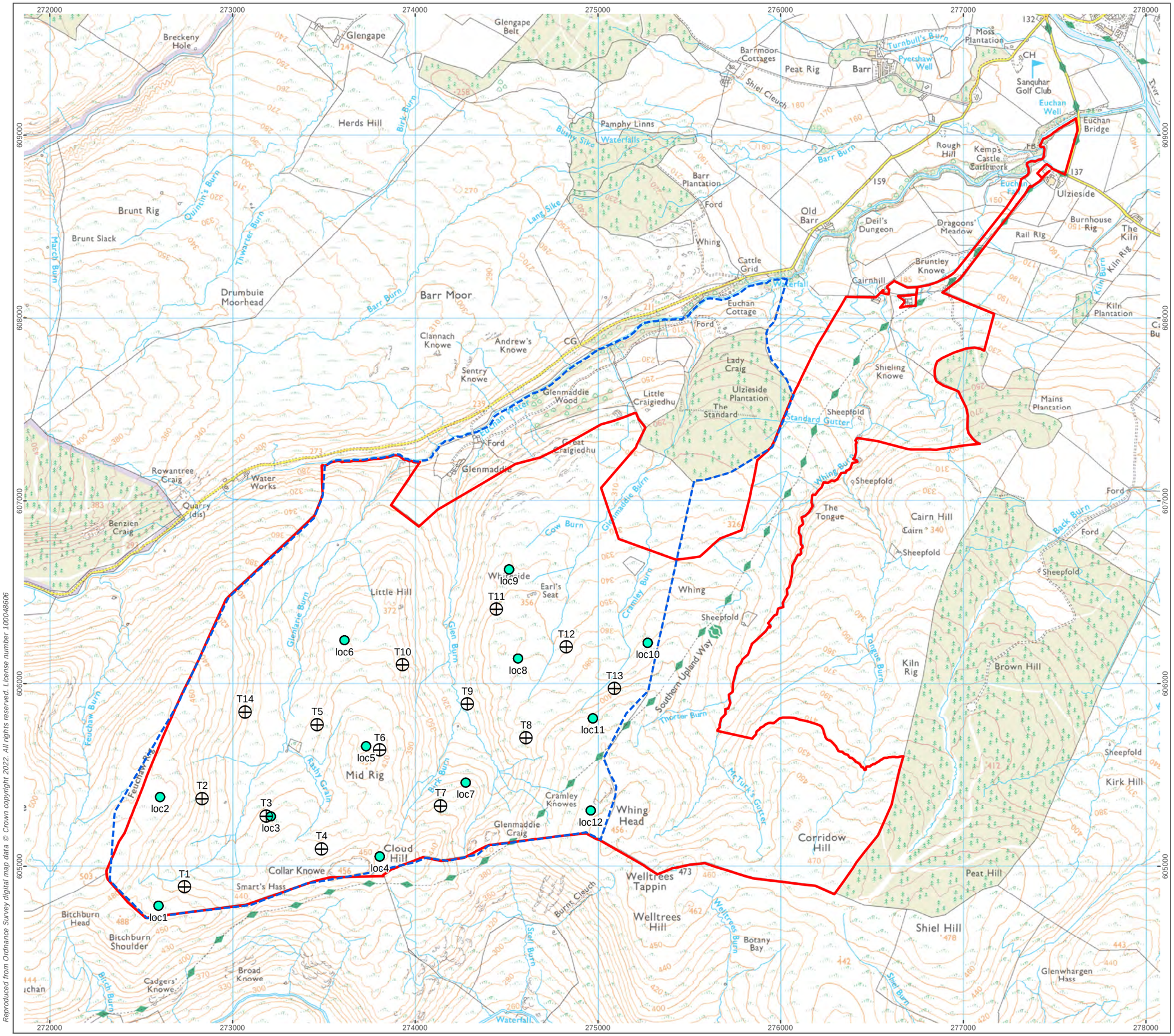

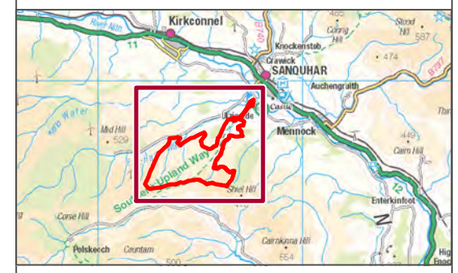

MacArthur Green

ARCUS
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- Proposed Turbine Location
- Site Boundary
- Protected Species and NVC Survey Area
- Anabat Location

1:20,000 Scale @ A3

0 0.5 1 km

NORTH

Produced By: LM	Ref: Scoping_R_E_Fig8.1_CLD
Checked By: ES	Date: 18/03/2022

Ecological Survey Areas
Figure 8.1

Cloud Hill Wind Farm
Scoping Report

S:\Projects\Baywa-Re\Cloud Hill_CLD\03_Data\Scoping_R_E_Fig8.1_CLD.mxd

North Lowther Uplands (SSSI)

Upper Nithsdale Woods (SPA) & Back Wood (SSSI)

Upper Nithsdale Woods (SPA) & Mennock Water (SSSI)

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13 T14

MacArthur Green

ARCUS
An ERM Group Company

- Proposed Turbine Location
- Site Boundary
- 5 km Distance Band

Ecological Designated Sites

Source: NatureScot (SNH)

- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland

1:60,000 Scale @ A3

0 1 2 km

NORTH

Produced By: LM	Ref: Scoping_R_E_Fig8.2_CLD
Checked By: ES	Date: 18/03/2022

Ecological Designated Sites and Ancient Woodland within 5 km
Figure 8.2

Cloud Hill Wind Farm
Scoping Report

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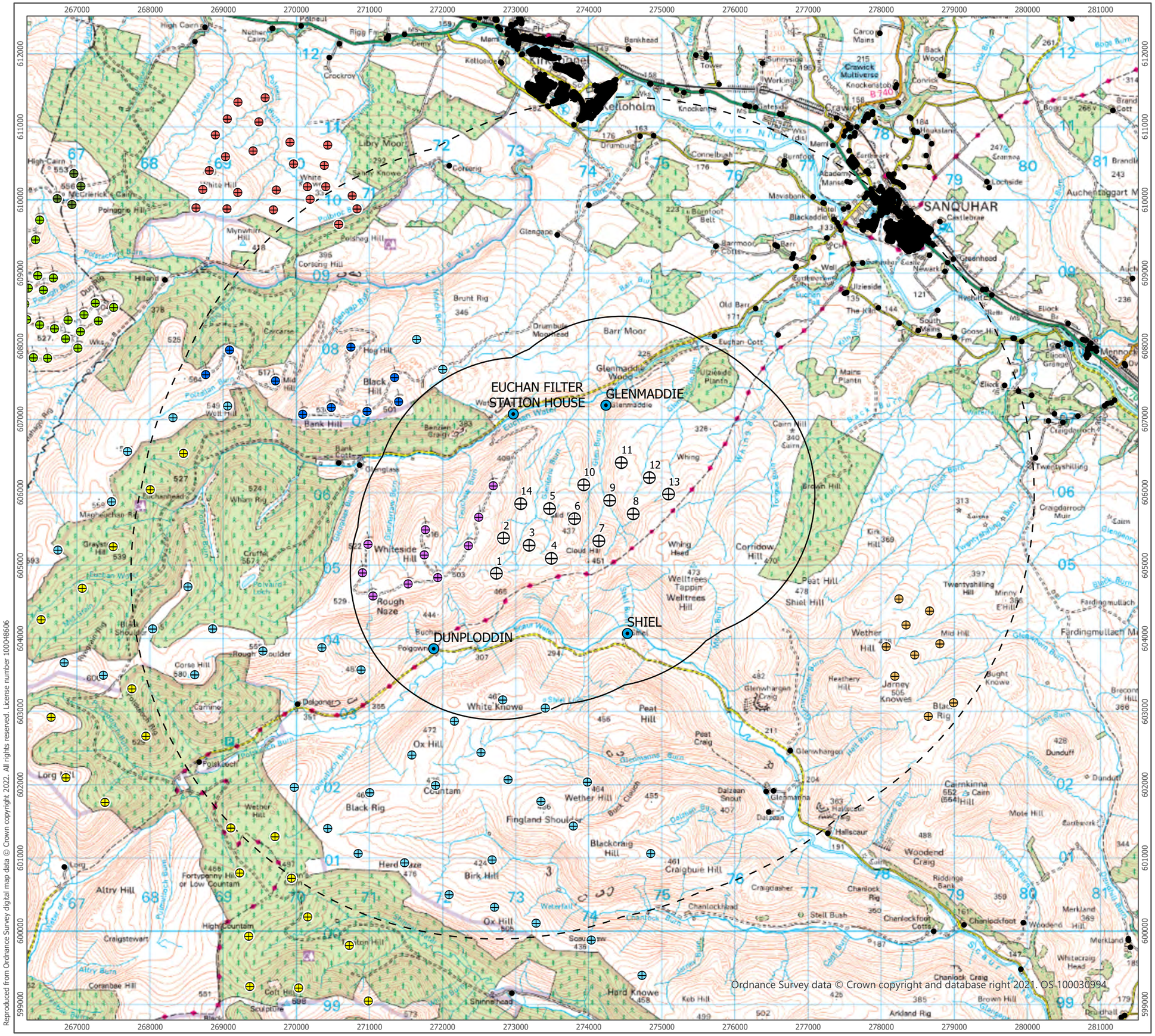

ARCUS
An ERM Group Company

1:50,000 Scale @ A3

0 1 2 km

NORTH

Produced By: MT	Ref: 4254-REP-005
Checked By: SC	Date: 18/03/2022

Noise Study Area
Figure 12.1

Cloud Hill Wind Farm Scoping Report

\\Uksprdgisapp01\gis-cad\GIS\Noise\4254 Cloud Hill\4254 Cloud Hill Noise\4254 Cloud Hill Noise.aprx\4254-REP-005 Fig12.1 Noise

APPENDIX B: TABLE OF DESIGNATED HERITAGE ASSETS WITHIN THE 5 KM STUDY AREA

Designation	Category	Designation ID	Name	Description	Distance and Direction from Site
Scheduled Monument	-	SM656	Kemps Castle, fort 320 m SW of Euchan Bridge	Prehistoric domestic and defensive: fort (includes hill and promontory fort)	16 m north
Scheduled Monument	-	SM687	Crichton Peel & Sanquhar Castle	Secular: castle	850 m north-east
Scheduled Monument		SM679	Orchard, cross socket	Crosses and carved stones: cross (free-standing)	3.8 km north-north-east
Scheduled Monument		SM687	Crichton Peel & Sanquhar Castle	Secular: castle	1 km east
Conservation Area	-	CA326	Sanquhar	Conservation Area for the settlement of Sanquhar	870 m north-east
Listed Building	C	17258	Euchan Bridge (Over Euchan Water)	Euchan Bridge	20 m north-east
Listed Building	B	40536	Blackaddie Bridge (Over River Nith)	Blackaddie Bridge	400 m north
Listed Building	B	40537	2 Church Road	Sanquhar, 2 Church Road	870 m north-east
Listed Building	A	40540	High Street, Tolbooth/Town House	Sanquhar, High Street, Tolbooth	870 m north-east
Listed Building	C	40541	1, 3 High Street, Nithsdale Hotel	Sanquhar, 1, 3 High Street, Nithsdale Hotel	870 m north-east
Listed Building	C	40542	5, 7 High Street, Including Mary Millar's Shop	Sanquhar, 5 High Street	870 m north-east
Listed Building	C	40543	11, 13 High Street	Sanquhar, 11, 13 High Street	870 m north-east
Listed Building	C	40544	27, 29 High Street	Sanquhar, 27, 29 High Street	870 m north-east

Designation	Category	Designation ID	Name	Description	Distance and Direction from Site
Listed Building	C	40545	31,33 High Street	Sanquhar, 31, 33 High Street	870 m north-east
Listed Building	C	40546	35, 37 High Street	Sanquhar, 35, 37 High Street	870 m north-east
Listed Building	B	40547	39, 41 High Street, Post Office And House	Sanquhar, 41 High Street, Post Office	870 m north-east
Listed Building	B	40548	63 High Street, Bank Of Scotland	Sanquhar, 63 High Street, Bank Of Scotland	870 m north-east
Listed Building	B	40549	71, 73 High Street.	Sanquhar, 73 High Street	870 m north-east
Listed Building	C	40550	High Street, Monument	Sanquhar, High Street, Monument	870 m north-east
Listed Building	C	40553	14-24 High Street (Even Nos)	Sanquhar, 20 High Street	870 m north-east
Listed Building	B	40554	26 High Street, Royal Bank Of Scotland	Sanquhar, 26 High Street, Royal Bank Of Scotland	870 m north-east
Listed Building	C	40555	28-34 High Street	Sanquhar, 28-36 High Street	870 m north-east
Listed Building	C	40556	36 And 40 High Street	Sanquhar, 38, 40 High Street	870 m north-east
Listed Building	B	40557	74, 76 High Street	Sanquhar, 76 High Street	870 m north-east
Listed Building	B	40558	78-86 High Street (Even Numbers)	Sanquhar, 84, 86 High Street	870 m north-east
Listed Building	C	40559	100-102 High Street, Council Offices	Sanquhar, 100 High Street, Council Offices	870 m north-east
Listed Building	C	40560	104-106 High Street, Library And House	Sanquhar, 104 High Street	870 m north-east

Designation	Category	Designation ID	Name	Description	Distance and Direction from Site
Listed Building	B	40561	Laurie's Wynd, Former Crichton School	Sanquhar, Laurie's Wynd, Crichton School and Schoolhouse	1.05 km north-east
Listed Building	B	40562	Laurie's Wynd, Crichton Schoolhouse	Sanquhar, Laurie's Wynd, Crichton School and Schoolhouse	1.05 km north-east
Listed Building	B	40563	Queensberry Square, School (Range To North East)	Sanquhar, Queensberry Square, School	1.1 km north-east
Listed Building	C	40564	Saint Mary Street, Evangelical Union Church	Sanquhar, St Mary's Street, E.U. Congregational Church	1.05 km north-east
Listed Building	B	40565	Sanquhar House (Parish Manse) And Walled Garden	Sanquhar, Sanquhar House, Walled Garden	1.05 km north-east
Listed Building	C	40566	Former Station, Stationmaster's House	Sanquhar, Leven Road, Sanquhar Station And Stationmaster's House	1.2 km north-east
Listed Building	B	10241	Tower	Tower Farmhouse	3.4 km north
Listed Building	B	10276	Holm	The Holm	2.2 km north-east
Listed Building	C	10278	Kirkconnel, Kelloside	Kelloside	4.8 km north
Listed Building	C	10290	Carco	Carco Farmhouse And Steading	5 km north-east
Listed Building	B	10291	Crawick New Bridge	Crawick Bridge (A76 Over Crawick Water)	1.5 km north-east
Listed Building	C	17251	Back Burn Road Bridge	Back Burn Road Bridge (Over Back Burn)	2.4 km east
Listed Building	C	17253	Craigdarroch Farmhouse	Craigdarroch Farmhouse	3.4 km east
Listed Building	B	17254	Crawick, Viaduct	Crawick Viaduct	1.9 km north-east
Listed Building	B	17255	Mennock, Eliock Bridge	Eliock Bridge	2.8 km east
Listed Building	B	17256	Eliock House	Eliock House	2.5 km east

Designation	Category	Designation ID	Name	Description	Distance and Direction from Site
Listed Building	C	17257	Eliock House Bridge	Eliock House Bridge (Main Driveway Over Garral Burn)	2.6 km east
Listed Building	B	17259	Kello Bridge (Over Kello Water At Old Kelloside)	Kello Bridge	3.5 km north
Listed Building	B	17260	Mennock Viaduct	Sanquhar, Mennock, Viaduct	3.7 km east
Listed Building	B	40538	Church Road, Sanquhar Parish Church, (St Bride`S) and Churchyard Including Hamilton Monument	Sanquhar, Church Road, St Bride's Church	1.1 km north-east
Listed Building	B	40539	Crawick Bridge, (A76 Over Crawick Water)	Crawick New Bridge	1.6 km north-east
Listed Building	B	40551	High Street, St Ninians Church, Hall, Gatepiers and Screen Wall	Sanquhar, St Ninian's Church	1.05 km north
Listed Building	C	40552	High Street, St Ninian's Manse	Sanquhar, High Street, St Ninian's Manse	1.05 km north

APPENDIX C: LIST OF SUGGESTED CONSULTEES

It is advised that the organisations shown below should be consulted with the relevant information as part of the scoping process, although not all consultees will receive a complete copy of the Scoping Report.

Statutory Consultees

- Dumfries and Galloway Council;
- SEPA;
- NatureScot; and
- HES.

Non-Statutory Consultees

- CAA;
- MOD;
- NATS Safeguarding;
- Crown Estate Scotland;
- Defence Infrastructure Organisation;
- Fisheries Management Scotland;
- Forestry Commission;
- Glasgow International Airport;
- Glasgow Prestwick Airport;
- John Muir Trust;
- Marine Scotland;
- Mountaineering Scotland;
- OFCOM;
- RSPB Scotland;
- Scottish Rights of Way and Access Society (ScotWays);
- Scottish Water;
- Scottish Wild Land Group (SWLG);
- Scottish Wildlife Trust;
- Telecommunication Providers as identified by OFCOM;
- Transport Scotland; and
- Visit Scotland.

Community Councils

- Royal Burgh of Sanquhar and District Community Council;
- Kirkconnel and Kelloholm Community Council;
- Penpont Community Council; and
- Durisdeer Community Council.

All responses should be addressed to:

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Email: energyconsentsadmin@scotland.gsi.gov.uk

Responses should also be copied to Arcus at:

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G2 2HG
Email: info@arcusconsulting.co.uk
Telephone: 0141 221 9997

If you would like any more information prior to responding to the Scoping Report, please contact Arcus at the address above.

In addition to the specific comments at the end of each section, general comments from consultees are invited on:

- The proposed content of the EIA Report;
- Assessment methods;
- Additional data sources; and
- Additional consultees.