



ARCUS

WILLOW WIND FARM SCOPING REPORT

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1 INTRODUCTION

1.1 Purpose of the Scoping Request

This report constitutes the request for a Scoping Opinion for a proposed wind farm on land approximately 3.5 kilometres (km) north-east of Tayinloan (hereafter referred to as the "Proposed Development") and 30km north-west of Campbeltown. The site comprises predominantly upland moorland and commercial forestry interspersed with patches of mixed woodland. The location is shown in Figure 1: *Site Location* in Appendix A. This Scoping Request has been prepared by Arcus Consultancy Services Ltd ("Arcus") on behalf of Good Energy Ltd ("the Applicant").

It is intended that an application for planning permission for the Proposed Development will be made under the Town and Country Planning (Scotland) Act 1997 (as amended) and it is anticipated that this application will require an Environmental Impact Assessment ("EIA") under Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 ("the EIA Regulations"). The Proposed Development will consist of up to 13 turbines and associated infrastructure including site access, on-site access tracks, underground cabling, electrical sub-station and control building, one permanent meteorological mast, temporary construction compound and potentially a temporary borrow pit for sourcing construction material. The findings of the EIA will be presented within an Environmental Statement ("ES") which will accompany the planning application.

The aim of the Scoping process is to identify key environmental issues at an early stage, to help determine which elements of the Proposed Development are likely to cause significant environmental effects and identify issues that can be 'scoped out' of the assessment. This Scoping Request has been prepared with a view to providing structure for consultation on the approach to EIA and the work required for preparation of the ES. Comments are invited from consultees listed and any other interested parties.

It is acknowledged that the site has previously been subject to applications for wind energy development under the name of Largie Wind Farm. This Scoping Report refers to some of the baseline data which were collected in relation to the EIA undertaken for Largie Wind Farm, which have been used to inform the understanding of the sensitivities associated with the Proposed Development.

1.2 The Applicant

Good Energy Ltd was founded in 2000 to lower UK carbon emissions by developing and distributing renewable energy within the UK. All Good Energy's electricity comes from certified renewable sources such as solar, wind and hydro. The Group sources electricity in three ways, either from its own renewable generation assets, from other UK renewable power producers or directly from the market. The Group sources a proportion of the electricity it supplies its customers through its wholly-owned Delabole and Hampole Wind Farms which are onshore wind assets of 9.2 megawatt (MW) in North Cornwall and 8.2MW in South Yorkshire respectively. The Group also operates a total of 11.8MW of solar energy projects with several more renewable energy projects in the planning and construction stages.

2 ENVIRONMENTAL IMPACT ASSESSMENT

EIA is an iterative process of assessment and design, during which prediction and assessment of potential effects will inform the evolving design of the Proposed Development. The Proposed Development can then be refined in order to avoid or reduce potential environmental effects where predicted. In assessing the EIA requirement for wind turbine developments, the decision on whether or not an EIA is required is delegated to Local Planning Authorities (LPAs). In the case of the Proposed Development, the Applicant has elected to undertake an EIA without formally screening the Proposed Development with the LPA given the nature of the proposal.

The ES, which reports the findings of the EIA as set out in the EIA Regulations, is required to “describe the likely significant effects” of a development; effects that are not considered significant do not need to be described to meet the requirements of the EIA Regulations.

During the EIA process, effects arising during the construction, operation and decommissioning phases will be assessed and mitigated accordingly. This includes all temporary construction facilities and other buildings or structures which will be on site for the operational phase of the wind farm, such as the control building. The duration, nature and reversibility of predicted effects will be described within the ES.

2.1 Cumulative Effects

At the time of writing it is known that there are other operational wind farms and a number of wind energy proposals in the region. The methodology adopted for assessing the cumulative effects of wind energy developments will be in accordance with advice from Scottish Natural Heritage (SNH)^{1,2,3} and the Scottish Government⁴. Cumulative effects, which are the combined effects of two or more developments acting on the same receptor, will be considered for each technical area assessed within the ES.

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 and other forms of development. The potential landscape and visual effects, for example, which relate to the intervisibility of an individual wind farm development scheme, will be much more wide ranging than noise effects which will be limited to receptors in the more immediate vicinity of the Proposed Development.

In relation to some of the technical assessments, specific guidance and policy exists advising that effects associated with existing wind farm developments should be considered cumulatively. Where such guidance exists, this will be considered within the relevant cumulative assessments.

2.2 Consultation

The process of identifying environmental effects is both iterative and cyclical, running in tandem with the iterative design process. Consultation forms an integral role throughout the EIA process. Following scoping, public exhibitions will be held in locations nearby the site providing the opportunity to learn more about the Proposed Development and give feedback and comments to the project team. Consultation on specific technical issues will also be undertaken where appropriate as part of the EIA process.

¹ Scottish Natural Heritage (SNH) (2003) *A Handbook for Environmental Impact Assessment*, Appendix 5: Guide to Outdoor Access Assessment

² Scottish Natural Heritage (SNH) (2005) *Cumulative effect of Windfarms*, SNH

³ Scottish Natural heritage (SNH) (2012) *Assessing the Cumulative Impact of Onshore Renewable Energy Developments*

⁴ Scottish Government (2010) *Scottish Planning Policy*, Scottish Executive

3 PROJECT DESCRIPTION

The Development will include:

- Wind turbines and turbine foundations;
- On site access tracks;
- New site entrance;
- Borrow pit;
- On site power collection system (transformers and underground cables);
- Substation building; and
- Permanent meteorological mast.

3.1 Turbines

The proposed details are as follows:

Number of turbines	up to 13
Maximum height to blade tip	130 metres (m)
Total generation capacity	up to 45MW

An indicative turbine layout is shown in Figure 2: *Preliminary Site Layout* of Appendix A.

For the purposes of the EIA, a precautionary approach will be taken and for each assessment, and a worst case scenario will be identified within the design parameters. This allows the assessments to be undertaken based on the worst case effects likely as a result of the Proposed Development.

3.2 Access Tracks

Access tracks will be required to provide access to the turbines, construction compound and substation. These will be constructed of graded stone and be approximately 5m running width, or as appropriate for the site ground conditions.

3.3 Grid Connection

Underground cabling, laid where possible alongside the access tracks, will link the turbine transformers to a single storey control building. Each turbine transformer will be located either within the turbine nacelle, within the base of the tower or in a small enclosure at the base of the turbine.

The connection to the grid falls under a separate consent process and will be subject to a separate environmental investigation and planning application if required. As such it will not be considered as part of this EIA.

3.4 Decommissioning

The Proposed Development will be designed to operate for a period of 25 years. Provision will be made for the Proposed Development to be decommissioned and the site restored at the expiry of planning permission. Typically all above ground infrastructure will be dismantled and removed from the site, cables and turbine foundations will be cut 1m below ground level and covered with topsoil. Alternatively, the Applicant may apply for planning permission to extend the operational life of the Proposed Development in accordance with the relevant environmental impact legislation at the time of any such application.

4 SITE SELECTION AND DESIGN EVOLUTION

The Applicant has identified the site through an iterative site selection process seeking to avoid areas of high environmental sensitivity whilst choosing a site which is technically and economically viable. In doing so the following criteria have been achieved for the Proposed Development:

- No international or national landscape designations within the site;
- No European Protected Species listed on Annex 1 of European Council Directive 2009/147/EC on the conservation of wild birds or species listed in Schedule 1 to the Wildlife and Countryside Act 1981, as amended, located within the turbine envelope area;
- Located more than 2km from densely populated settlements;
- Exposed location with good wind speeds;
- Land area available to accommodate sufficient viable generating capacity;
- Availability of a good access route options to the site involving minimal environmental disruption; and
- No, or potentially resolvable, civil and military radar issues.

The optimum layout of a wind farm depends on a range of criteria. These vary depending on the type and size of turbines as well as the local topography and the turbulence created by the ground conditions within and around the site. Turbine manufacturers recommend that the turbines are to be spaced between three to seven rotor diameters apart depending on the prevailing wind direction, turbine type and site characteristics.

Through-out the EIA process, the layout will evolve to take into consideration the results of surveys and data gathered through the baseline assessment process. This iterative design process ensures that the final layout of the wind farm submitted to planning responds to the constraints identified onsite. The iterative design process and the reasoning behind these key changes will be reported in the ES.

5 PLANNING POLICY CONTEXT

5.1 Introduction

This section of the ES will set the policy and energy target context for renewable energy projects from a European, UK and Scottish perspective. A review of more specific and existing national planning policy will then be undertaken, before outlining the framework of relevant regional and local policy that relates to the Willow Wind Farm. Emerging policy will also be considered in the context of the proposed Local Development Plan. Finally, supplementary guidance will be given consideration.

Policies related to individual disciplines will be examined within the relevant technical chapters of the ES. A separate Planning Statement will also be prepared in addition to the ES, which will consider the compatibility of the Development with planning policy.

5.2 Energy policy context

5.2.1 European Context

In January 2008 the European Commission (EC) published a '20% by 2020' package. This included proposals for reducing the European Union's (EU) greenhouse gas emissions by 20% and increasing the proportion of final energy consumption from renewable sources to 20%. Both targets are to be achieved by 2020, as set out in the EC Renewable Energy Directive (2009)⁵.

The EU aims to see 20% of all energy consumed within the EU to be from renewable sources. This 20% is split between Member States. For the UK, the EC's proposals include a 16% reduction in UK greenhouse gas emissions by 2020 and a requirement for 15% of all energy consumed in the UK to come from renewable sources by 2020.

The EU revised its targets in January 2014 under the 2030 Framework for Climate and Energy Policies Framework⁶ and will cut greenhouse gas emissions by 40% by 2030 compared with 1990 levels, and will produce 27% of all energy from renewable sources by 2030. This 27% is split between Member States. This target is binding on the EU but will not include national targets through EU legislation.

In addition to the targets outlined above, an ambitious target of reducing Europe's greenhouse gas emissions by 80-95% compared to 1990 levels is outlined in the Roadmap for Building the Low-Carbon European Economy⁷.

5.2.2 UK Context

Climatic research and apparent changes in world weather systems have brought the issue of climate change to the forefront of the political agenda. Through the Climate Change Act 2008⁸, the UK Government has set a binding commitment to cut the UK's carbon emissions by 80% by 2050. The UK Government further requires through Act that limits be set on the total amount of emissions in successive five year periods (carbon budgets), with a minimum 34% reduction by 2020, against 1990 levels. This makes the UK the first country in the world to introduce such a long-term and significant carbon reduction target into law.

⁵ The European Parliament and Council, (April, 2009), 'Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of Energy from Renewable Sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC' [online]. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0028&from=EN>, [Accessed on 14/11/2014]

⁶ European Commission, (2014), '2030 Framework for Climate and Energy Policies' [online]. Available at: http://ec.europa.eu/clima/policies/2030/index_en.htm [Accessed on 14/11/2014]

⁷ European Commission, (2014), 'Roadmap for Moving to a Low-Carbon Economy in 2050' [online]. Available at: http://ec.europa.eu/clima/policies/roadmap/index_en.htm [Accessed on 14/11/2014]

⁸ Her Majesty's Stationary Office (HMSO), (2008), 'Climate Change Act 2008'

In 2011, the UK Renewable Energy Roadmap⁹ was published which reaffirms the UK Government's commitment to increasing the use of renewable energy, and outlines that the UK has the potential to meet its 2020 target of 15% of UK energy consumption from renewable resources, and deliver an operational capacity of 29 gigawatts (GW) of renewable energy by this same year. In December 2013, a second update to the UK Renewable Energy Roadmap¹⁰ was issued which reiterates the commitment to achieve the renewable energy target for 2020 which was set within the 2009 EU Renewable Energy Directive. In relation to onshore wind development, the 2013 Update states that:

"Onshore wind, as one of the most cost effective and proven renewable energy technologies, has an important part to play in a responsible and balanced UK energy policy...it remains committed to ensuring that projects are built in the right places".

Estimates show that in 2008, the net UK Carbon Dioxide (CO²) emissions were 10.5% below 1990 levels which was 2% lower than 2007¹¹. Further action is needed to curb CO² emissions over the next few years if the Government's targets are to be met. The UK Government has set a target of 20% of the UK's electricity supply to come from renewable sources by 2020. The published Renewable Energy Strategy 2009 (which is a part of the Government's Overall UK Low Carbon Transition Plan) states that renewable sources could provide 30% of electricity by 2020, of which two-thirds are expected to come from onshore and offshore wind¹².

Wind energy is seen as the most significant renewable energy source for achieving these targets in the short and medium term. Wind power does not create CO² emissions during its operational life and displaces other fuel sources generating greenhouse gas emissions. In 2012, electricity supplied from renewable sources stood at 41.3 Terra Watt hours (TWh)¹³, an increase from 34.4 TWh in 2011¹⁴.

5.2.3 Scottish Context

Renewable energy policy aims to reduce carbon emissions and counter climate change. UK wide energy policy sets the context and may form a material consideration in assessing Willow Wind Farm; otherwise, energy policy has been devolved to the Scottish Government¹⁵.

The Climate Change (Scotland) Act 2009¹⁶ creates a long-term framework for the reduction of greenhouse gas emissions of 80% by 2050. This underlines the Scottish Government's commitment to reducing greenhouse gases.

Securing low carbon energy supplies is a key element in achieving this target and, in recognition of this, the Scottish Government has committed to producing 100% of the country's demand for electricity from renewable sources by 2020 through its publication, the 2020 Routemap for Renewable Energy in Scotland (2011)¹⁷. According to the most up to date information, provided

⁹ DECC, (2011), 'UK Renewable Energy Roadmap', DECC [online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48128/2167-uk-renewable-energy-roadmap.pdf [Accessed on 14/11/2014]

¹⁰ DECC, (2013), 'UK Renewable Energy Roadmap Update 2013' [online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255182/UK_Renewable_Energy_Roadmap_-_5_November_-_FINAL_DOCUMENT_FOR_PUBLICATION_.pdf, [Accessed on 14/11/2014].

¹¹ DECC, (2009), Special Feature – Carbon Dioxide Emissions [online]. Available at: <http://www.berr.gov.uk/files/file50671.pdf> [Accessed on 14/11/2014]

¹² HM Government, (2009), 'The UK Renewable Energy Strategy 2009' HMSO

¹³ DECC (2013) 'Digest of UK Energy Statistics 2013' (DUKES), DECC [online]. Available at: <https://www.gov.uk/government/publications/digest-of-united-kingdom-energy-statistics-dukes-2013-printed-version-excluding-cover-pages> [Accessed 27/08/2014]

¹⁴ DECC, (2012), 'Digest of UK Energy Statistics 2012 (DUKES)' [online]. Available at: <http://www.decc.gov.uk/assets/decc/11/stats/publications/dukes/5949-dukes-2012-exc-cover.pdf> [Accessed on 14/11/2014]

¹⁵ HM Government, 'The UK Low Carbon Transition Plan, National Strategy for Climate and Energy' [online]. Available at: <https://www.gov.uk/government/publications/the-uk-low-carbon-transition-plan-national-strategy-for-climate-and-energy>, [Accessed on 14/11/2014]

¹⁶ Office of Public Sector Information (OPSI), (2009), 'Climate Change (Scotland) Act 2009'. OPSI

¹⁷ The Scottish Government, (2011), '2020 Routemap for Renewable Energy in Scotland', Scottish Government [online]. Available at: <http://www.scotland.gov.uk/Publications/2009/07/06095830/2020Routemap> [Accessed on 14/11/2014]

by the DECC in June 2014¹⁸, Scotland currently has approximately 40.3% of installed renewable energy capacity to date, with a target of 50% required by 2015, and 100% by 2020.

5.3 National policy

5.3.1 Scottish Planning Policy (SPP)

SPP¹⁹ sets out national planning policies which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land. The SPP promotes consistency in the application of policy across Scotland whilst allowing sufficient flexibility to reflect local circumstances. The SPP is a material consideration in the determination process for planning applications.

On the 23rd June 2014, the Scottish Government published SPP 2014. This document replaces the previous SPP (2010) as a non-statutory document which sets out the Scottish Government's stance on how land use planning matters of national importance should be addressed throughout the country. SPP 2014 outlines the Scottish Ministers priorities for land use planning and therefore should be afforded significant weight in the determination process for planning applications; however paragraph (iii) of SPP 2014 acknowledges that "it is for the decision-maker to determine the appropriate weight in each case".

Paragraphs 24 to 35 reaffirm the Scottish Government's commitment to "Sustainability", stating that there should be a "presumption in favour of development that contributes to sustainable development."

Paragraphs 152 to 192, under the heading "A Low Carbon Place", detail how the Scottish planning system will contribute towards delivering a low carbon economy, specifically through the development of electricity generation technologies which will help contribute to reducing greenhouse gas emissions. Paragraphs 161 to 166 deal solely with onshore wind development.

The SPP 2014 sits alongside other key Scottish Government documents including the National Planning Framework and Circulars.

5.3.2 National Planning Framework 3 (NPF)

On the 23rd June 2014, the NPF3²⁰ was laid before the Scottish Parliament as required by statute alongside the associated documentation. It is the Scottish Government's third NPF and a spatial expression of the Government's Economic Strategy.

NPF3 sets the context for development and spatial planning in Scotland. It outlines the Scottish Government's development priorities over the next 20-30 years and identifies fourteen national developments to facilitate wider economic development. It focuses on supporting sustainable economic growth and the transition to a low carbon economy.

Strategic and local development plans are required to take account of NPF3.

The Scottish Government's ambitions "aims to ensure that all parts of Scotland make best use of their assets to build a sustainable future", as stated in paragraph 2.6, while paragraph 2.7 supports "emerging technologies for renewable energy". Page 5 refers to "adaptation to climate change", and lower greenhouse gas emissions.

Page 34 identifies that rural communities will benefit from well-planned renewable energy development.

¹⁸ DECC, (2014), 'Energy Trends – June 2014' [online]. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326368/ET_June_2014.pdf [Accessed on 14/11/2014]

¹⁹ Scottish Government (2014) Scottish Planning Policy [online]. Available at: <http://www.scotland.gov.uk/Resource/0045/00453827.pdf> [Accessed on 14/11/2014]

²⁰ Scottish Government (2014) National Planning Framework 3 [online]. Available at: <http://www.scotland.gov.uk/Resource/0045/00453683.pdf> [Accessed on 14/11/2014]

5.3.3 Planning Advice Notes (PANs) and Specific Advice Sheets

PANs and Specific Advice Sheets²¹ set out detailed advice from the Scottish Government in relation to a number of planning issues, and include:

- PAN 60 Planning for Natural Heritage;
- PAN 65 Planning and Open Space;
- PAN 68 Design Statements;
- PAN 75 Planning for Transport;
- PAN 79 Water and Drainage (Currently being consolidated);
- PAN 3/ 2010 Community Engagement;
- PAN 1/2011 Planning and Noise;
- PAN 2/2011 Planning and Archaeology;
- Specific Advice Sheet: Onshore Wind Turbines (Updated December 2013);
- EIA Regulations 2011: Easy Read Guide; and
- Scottish Forestry Implementation Plan 2013-2016²².

5.3.4 Scottish Forestry Strategy

The Scottish Forestry Strategy (2006)²³ is a framework for forestry up to 2050 and beyond. The framework aims to protect and expand the woodlands and forests of Scotland and increase their value to society and the environment by providing services and benefits into the future. The Strategy is supported by the Scottish Forestry Implementation Plan 2013 – 2016 which outlines directions for realising the Strategy's vision at this time.

5.4 Regional and local development planning policy

In the case of the Proposed Development, the LPA is Argyll and Bute Council ('the Council'). The planning application will be made to the Council under the provision of the Town and Country Planning (Scotland) Act 1997.

Relevant policies contained within the statutory Development Plan relevant to the Willow Wind Farm will be described within the ES. The statutory Development Plan consists of:

- Argyll and Bute Structure Plan (November, 2002); and
- Argyll and Bute Local Plan (August, 2009).

5.4.1 Argyll and Bute Structure Plan

The Argyll and Bute Structure Plan (November, 2002)²⁴ sets out the strategic planning policy framework for Argyll and Bute. The Structure Plan contains general land use locational strategies and covers a range of topics including renewable energy which will be relevant in the consideration of the Willow Wind Farm. The document also frames more detailed Local Plans.

5.4.2 Argyll and Bute Local Plan

The Argyll and Bute Local Plan (August, 2009)²⁵ provides a local framework (excluding Loch Lomond and the Trossachs National Parks) consisting of a written statement and local plan maps. The Local Plan encourages the accommodation of new ways to produce renewable

²¹ All the above referenced PANs and Advice sheets are available online at the Scottish Government website: <http://www.scotland.gov.uk/Topics/Built-environment/planning/publications/pans> [Accessed on 14/11/2014]

²² Forestry Commission Scotland, *Scottish Forestry Implementation Plan 2013-2016* [online]. Available at: [http://www.forestry.gov.uk/pdf/SFSImplementationPlan2013-2014final.pdf/\\$FILE/SFSImplementationPlan2013-2014final.pdf](http://www.forestry.gov.uk/pdf/SFSImplementationPlan2013-2014final.pdf/$FILE/SFSImplementationPlan2013-2014final.pdf) [Accessed on 14/11/2014]

²³ Scottish Executive, (2006), *The Scottish Forestry Strategy* [online]. Available at: [http://www.forestry.gov.uk/PDF/fcfc101.pdf/\\$FILE/fcfc101.pdf](http://www.forestry.gov.uk/PDF/fcfc101.pdf/$FILE/fcfc101.pdf) [Accessed on 14/11/2014]

²⁴ Argyll and Bute Council (2002) *Argyll and Bute Structure Plan (2002)* [online]. Available at: <http://www.argyll-bute.gov.uk/sites/default/files/planning-and-environment/Argyll%20and%20Bute%20Structure%20Plan%202002.pdf>, [Accessed on 14/11/2014]

²⁵ Argyll and Bute Council (2009), *Argyll and Bute Local Plan* [online]. Available at: <http://www.argyll-bute.gov.uk/planning-and-environment/local-plan> [Accessed on 14/11/2014]

energy, and there is a specific policy for commercial wind farms and wind turbines, Policy LP REN 1 – Wind Farms and Wind Turbines, which supports wind farm development.

5.5 Emerging policy

5.5.1 Argyll and Bute Local Development Plan

The Argyll and Bute Local Development Plan (LDP) is at the proposed plan stage and will replace the existing Local Plan and Structure Plan to form an overall planning policy for the area. The LDP will set out planning policy on how land will be used across the whole of Argyll and Bute. The first formal stage of the LDP, The Main Issues Report²⁶, was subjected to a consultation process in 2011, and an additional consultation document was produced in 2012. A draft LDP was published in February 2013 and this too was subjected to a consultation period which ended in April 2013. All unresolved objections to the proposed LDP were submitted to the Scottish Government, who have appointed reporters to examine these issues. The reporters began their examination of these issues on 23rd May 2014.

Arcus will continue to monitor the progress of the emerging LDP and the EIA process for the Proposed Development will be written in line with the appropriate up-to-date policy.

5.5.2 Argyll and Bute Landscape Wind Energy Capacity Study (March, 2012)

This study provides technical information to help develop wind energy policy and provide a spatial framework in the proposed LDP. The study has built on the 1996 Argyll and the Firth of Clyde Landscape Assessment but has revised some of the landscape character types. The study provides new guidance for the siting of smaller scale (up to 50m) turbines.

5.6 Supplementary planning guidance

5.6.1 Argyll and Bute Renewable Energy Action Plan 2010-2013 (REAP) and Interactive Renewables Map²⁷

The REAP has been developed to enable Argyll and Bute to take full advantage of the opportunities presented by the renewable energy sector by providing a framework to deliver renewable energy projects and enabling Argyll and Bute to take its place at the heart of the Scottish energy industry. The REAP is supplemented by an Interactive Renewables Map.

5.6.2 Argyll and Bute Council Woodland and Forestry Strategy (April 2011)

The Argyll and Bute Council Woodland and Forestry Strategy²⁸ provides supplementary planning guidance to the LDP and integrates with other supplementary planning guidance. The strategy requires that woodland loss as a result of development should be avoided or offset by compensatory planting to maintain the extent of the woodland and its carbon sequestration potential.

²⁶ Argyll and Bute Council (2011) *Local Development Plan Main Issues Report* [online]. Available at: <http://www.argyll-bute.gov.uk/planning-and-environment/local-development-plan-main-issues-report>, [Accessed on 14/11/2014]

²⁷ Argyll and Bute Council (2010) *Renewable Energy Action Plan* [online]. Available at: <http://www.argyll-bute.gov.uk/planning-and-environment/renewable-energy-action-plan> [Accessed on 14/11/2014]

²⁸ Argyll and Bute Council (2011) *Argyll and Bute Council Woodland and Forestry Strategy April 2011* [online]. Available at: <http://www.argyll-bute.gov.uk/sites/default/files/planning-and-environment/woodland%20and%20forestry%20strategy%20april%202011.pdf>, [Accessed on 14/11/2014]

5.6.3 Argyll and Bute Landscape Capacity Study (March, 2010)²⁹

The rural areas of Argyll and Bute have been studied to assess the capacity for development within the local authority area. The Willow Wind Farm would lie within the South Kintyre area and be classified as Upland Type 6 – Upland Forest Moor Mosaic.

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. In the context of the findings of the ES, a Planning Statement would accompany the Willow Wind Farm planning application to undertake an in-depth appraisal of the Proposed Development to assess its compliance with relevant planning policies.

²⁹ Argyll and Bute Council (2010) *Argyll and Bute Landscape Capacity Study* [online]. Available at: http://www.argyll-bute.gov.uk/sites/default/files/planning-and-environment/North%20and%20South%20Kintyre%20Landscape%20Capacity%20Study_Part%201.pdf [Accessed on 14/11/2014]

6 LANDSCAPE AND VISUAL ASSESSMENT

6.1 Introduction

This section of the ES will assess the potential effects of the Proposed Development on the landscape and visual resource.

6.2 Methodology

The following guidance will be considered:

- The Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, 2013;
- Visual Representation of Wind Farms, SNH, Version 2, July 2014;
- Landscape Institute Advice Note 01/11 - Photography and photomontage in landscape and visual impact assessment;
- Visual Assessment of Windfarms: Best Practice', Commissioned Report F01AA303A; University of Newcastle for Scottish Natural Heritage, 2002;
- SNH (March 2012), Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- Siting and Designing Windfarms in the Landscape, SNH, 2009; and
- Landscape Character Assessment Guidance for England and Scotland, Scottish Natural Heritage and The Countryside Agency, 2002.

6.3 Baseline

Initial studies have been undertaken to identify key receptors and potential viewpoints. These have been selected based on initial ZTV studies shown on Figure 3 and knowledge of the area surrounding the site. The set of viewpoints used for the previous application (known as Largie) has also been considered.

Within the proposed 30km study area there are three National Scenic Areas to consider – North Arran, Knapdale and Jura. Locally designated landscapes will be assessed where they lie within 10km of the site, which will include Areas of Panoramic Quality. Nearby statutory landscape designations are shown in Figure 4: *Landscape Designations* in Appendix A.

Effects on local landscape character areas within 10km will also be assessed. These are identified in:

- Argyll and Bute Landscape Wind Energy Capacity Study (2012); and
- Landscape Assessment of Argyll and the Firth of Clyde (Review No 78), SNH (1996).

Effects on wild land (Wild Land Areas, 2014); following the current SNH guidance in relation to this aspect of the landscape would also be assessed. The nearest Area of Wild Land is 14km to the south-east of the site (North Arran).

6.4 Scheme Design and Mitigation

The scheme design is not yet fixed. The final layout will be informed by consideration in terms of landscape and visual effects and potential effects on residential visual amenity, in line with policy and informed by relevant guidance, in particular the Argyll and Bute Landscape Wind Energy Capacity Study (2012). Considerations of scheme design in conjunction with the other wind farms will also be considered in light of the advice within 'SNH (March 2012), Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments'.

6.5 Assessment of Effects

The assessment will consider effects upon landscape character areas, settlements, roads, promoted walking and ferry routes, cycle routes, designated landscapes and wild land. A 30km study area has been proposed as suitable to cover all potentially significant landscape and visual effects – as indicated by the ZTV study which shows an overall limited visibility on land.

13 viewpoints are proposed (subject to identifying precise locations), including short, medium and long distance views from representative locations and key receptors. The final list will be agreed with the Council. Wirelines would be produced from each viewpoint and a photomontage produced for views within 20km (as advised within SNH guidance). The visualisations will be

produced in accordance with the recently published (July 2014) 'Visual Representation of Wind Farms' guidance – Version 2.

Effects on residential visual amenity will be considered in detail for dwellings within 2km of the turbines.

6.6 Proposed Viewpoint Locations

The same set of viewpoints as agreed for the previously submitted Largie application are proposed, also illustrated on the ZTV, with several alterations as detailed in **Table 6.1**.

Table 6.1: Proposed LVIA Viewpoint List

Old VP Ref.	VP	Name	Distance/ Direction	Approx. Location (X,Y)	Receptors	Notes
B	1	Rhunahaorine	2.5km, W	169757, 648175	Kintyre Way users, residents	Included
C	2	Tayinloan	3km, SW	169424, 646202	Local road users, residents, ferry users, Kintyre Way users	Included
E	3	Gigha Hotel, Gigha	7.3km, W	164911, 648668	Visitors, residents, local road users	Included
D	4	East Tarbert Bay, Gigha	8.5km, NW	165607, 652418	Residents, visitors, local road users	Included
F	5	Loch Ciaran	4.8km, NE	177556, 654540	Kintyre Way users, residents, visitors	Included
A	6	A83 near Clachan	8km, NE	178318, 657944	A-road users, residents	Included
G	7	Loch Stornaway	10.5km, N	172357, 661615	Local road users, Sustrans Route 78, residents	Included
I	8	Jura House, Jura	27km, NW	149600, 663100	Visitors/ walkers, residents	Included
J	9	Claggain Bay, Islay	26.5km, W	146350, 653825	Residents, visitors, local road users	Included
-	10	A83 near Glenacardoch Point	10km, SW	167202, 638706	A-road users, residents	New viewpoint
N	11	Machrie Bay, Arran	20km, SE	189000, 635800	A-road users, residents	Included
O	12	Beinn Bharrain, Arran	16.3km, SE	189200, 643800	Walkers	Included
-	13	Newton Point, Arran	18.9km, E	193125, 651547	Walkers, residents	New viewpoint – Specific viewpoint as marked on OS map
H		Kilmory	25km, N	170485, 675838	Local road users, residents	Excluded –distant with very limited visibility of the scheme

Old VP Ref.	VP	Name	Distance/ Direction	Approx. Location (X,Y)	Receptors	Notes
L		Machrihanish	29.5km, SW	163027, 619248	Kintyre Way, Local road users, residents	Excluded –distant with very limited visibility of the scheme
M		Beinn Guilean	29.3km, S	172570, 617929	Walkers	Excluded –distant with very limited visibility of the scheme
K		Islay Ferry	17.8km, NW	157000, 657000	Visitors, residents	Excluded – moving receptor which would cause difficulties with full SNH standard visualisations. However, an assessment of this route would be included in the LVIA, supported by wireframes and photographs at a range of distances

Figure 3 shows a zone of theoretical visibility (ZTV), which has been prepared for the layout shown in Figure 2 with a height to blade tip of 130m. This also shows the viewpoints listed in Table 6.1.

6.7 Cumulative Assessment

Operational and consented wind farms within 30km will be considered to form part of the baseline. Combined effects with proposed wind farms (submitted applications) within 30km will also be considered. Schemes in scoping will not be considered unless there is reason to believe to application is imminent, and adequate information about turbine sizing and layout is available to undertake an assessment.

GLVIA 3 (2013) and SNH's latest cumulative guidance (March 2012), both emphasises the need within LVIA to maintain proportionality and to focus on potentially significant cumulative effects. In line with this guidance, the following approach has been proposed:

- All wind developments within 3km of the scheme to be included;
- All wind developments with blade tip heights between 25 - 50m within 5km of the scheme to be included;
- All wind developments with blade tip heights between 50 - 90m up to 10km of the scheme to be included; and
- All wind developments with blade tip heights above 90m within 30km of the scheme to be included.

A list of schemes and viewpoints will be agreed with the Council during the scoping process. At this stage it would be helpful if the Council could agree the criteria above and provide a list of schemes meeting the above criteria. Known cumulative wind farms are shown in Figure 5: *Cumulative Windfarms* in Appendix A.

6.8 Questions for Consultees

- Do consultees agree that the proposed viewpoint list is sufficient to assess the visual effects of the Proposed Development?

- Do consultees agree that the proposed guidance documents which will inform the LVIA are appropriate and up to date?
- Do consultees agree that the scope of the cumulative assessment is sufficient to assess the cumulative effects of the Proposed Development, and provide details of developments which they are aware of within the study area?

7 ECOLOGY

7.1 Introduction

This section details the methodologies that will be employed to assess the potential effects of the Proposed Development on local habitats and mammal species, and summarises the results of these surveys collected to date.

The assessment will focus on the potential for direct and indirect effects upon protected species and habitats, particularly during the construction phase, as well as the operational and decommissioning phases of the development. Where practical, alternative solutions and mitigation will be identified where the assessment indicates there is a potential significant effect upon important habitats and species as a consequence of the Proposed Development. Potential effects on ornithology are covered in section 8 of this report.

7.2 Relevant Legislation and Policies

The assessment methodology used in the EIA will follow the IEEM Guidelines for Ecological Impact Assessment in the UK³⁰, incorporating other best practice guidance as appropriate.

The assessment will take into account the following guidance and legislation:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna ("Habitats Directive");
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- Nature Conservation (Scotland) Act 2004;
- The Protection of Badgers Act 1992;
- Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ("Water Framework Directive");
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- SERAD (Scottish Executive Rural Affairs Department) 2000. Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('The Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995³¹;
- Nature Conservancy Council. (1989). Guidelines for selection of biological SSSIs;
- Highland Local Biodiversity Action Plan 2010;
- Bat Conservation Trust. (2010). Bat Surveys – Good Practice Guidelines 2nd Edition: Surveying for Onshore Windfarms. BCT;
- Natural England (2012) Technical Information Note TIN051 – Bats and Onshore Wind Turbines Interim Guidance. Natural England Publications, Peterborough;
- Natural England (2009) Natural England Technical Information Note TIN 051. Bats and Onshore Wind turbines – Interim Guidance;
- SEPA. (2011). Guidance Note 4 - Planning Advice on Windfarm Developments;
- Scottish Renewables, SNH, SEPA, FC (Scotland) (2010, Version 1) Good Practice During Windfarm Construction; and
- Scottish Government (August 26 2011) Guidance: Development on Peatlands: Site Surveys.

7.3 Habitats

Habitat surveys were carried out in 2014 at appropriate times or periods of the year by appropriately qualified and experienced personnel. The ES will provide a comprehensive account of the survey methods and timings habitats present on the Proposed Development site through NVC mapping. It will identify rare and threatened habitats, those protected by European or UK

³⁰ Institute of Ecology and Environmental Management, 2006. Guidelines for Ecological Impact Assessment in the UK.

³¹ SERAD (Scottish Executive Rural Affairs Department) 2000. Habitats and Birds Directives, Nature Conservation: Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('The Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995.

legislation, or identified in national or local Biodiversity Action Plans. Habitat enhancement and mitigation measures will be detailed, particularly in respect to blanket bog, in the contexts of both biodiversity conservation and the inherent risk of peat slide

Overall the upland habitats identified at the site are typical of those found in Kintyre with areas of blanket mire, wet and dry heath and acid & marshy grasslands.

Surveys to date have identified that ground water dependent terrestrial ecosystems under SEPA's definitions are present. These will be mapped in detail through the EIA, and will be used to inform the design of the Proposed Development, seeking to avoid effects on these receptors.

Within the site design and assessment, particular attention will be paid to the potential effects on any priority habitats listed in Annex 1 of the EU Habitats Directive on the site. The findings of the habitat surveys will be used to inform the design of the Proposed Development in relation to both turbine and associated infrastructure to avoid significant effects in the first instance.

7.4 Mammals

A baseline survey of the species and number of mammals present on the site has been undertaken in 2014. Particular attention was paid to specially protected and/or vulnerable species, especially European Protected Mammals.

There are no otter holts identified in the wind farm envelope, but otters use the watercourses that drain the moorland summits at Largie. There was no evidence of water vole, or pine marten dens within the site.

During the summer of 2014 walkover surveys were undertaken to identify bat roosts or suitable roosting sites within the zone of influence (a 200m buffer from all turbine bases). Transect surveys over two separate routes were repeated over the three periods (i.e. spring, summer and autumn) between May and September 2014. Bat activity levels were sampled by seven automated detectors over nine consecutive 24h periods during the three periods above.

There was no evidence of bat roosts or suitable roosting sites within the zone of influence and the transect surveys recorded low levels of activity from only three species of bat recorded: common pipistrelle, soprano pipistrelle and an unidentified *Myotis* bat. Overall, the static detectors recorded for a total of 171 nights (combined) and in total 9,172 bat passes were recorded (across the seven locations). Only 1,666 (18%) were recorded within the core turbine area. Daubenton's bat, Natterer's bat, brown long eared bat and Leisler's bat as well as those listed above were present and the latter accounted for 98% of passes.

7.5 Reptiles and Amphibians

A baseline survey of the species and number of reptiles and amphibians present on the site was undertaken as incidental records during other ecology surveys. Due to the relatively small footprint of the Proposed Development relative to the Largie moorlands, the relatively low potential for the relevant species, and experience from ECoW safeguards during construction no dedicated reptile surveys have been undertaken and are not proposed as part of the ecology assessment. Similarly dedicated amphibian surveys were not considered necessary based on the experience of surveyors in Kintyre moorlands. Great crested newts are unlikely to be present on site or in adjacent areas, e.g. moderate altitude, dystrophic, isolated, small pools (x3) present on site, outside of known NBN Gateway distribution (low habitat suitability index ARG UK Advice Note 5 2010). As a precaution a standard set back design buffer of 50m from standing or flowing water bodies has been employed.

7.6 Ecological Assessment

Full details of all survey methods, including timing and detailed methodologies will be presented within the ES. All survey results will be clearly presented in tables and figures, to allow an independent review of the assessment.

Information from the above survey work will be analysed and collated into a technical report detailing the baseline conditions at the site. This will include data appendices, figures and a confidential annex where appropriate. An assessment of potential effects will be presented in

the ES accompanying the planning application. The assessment of potential effects on ecological interests will follow guidelines published by the Institute of Ecology and Environmental Management (IEEM) (2006)³² and will take into account the considerations of national legislation and policy and the aims of the European Habitats Directives. The assessment will include proposals for the mitigation of adverse effects and will consider enhancement measures to increase biodiversity in the area.

7.7 Key Questions for Consultees

- Do consultees agree that it can be assumed that no further habitat or protected mammal surveys would be required unless the site area including other infrastructure³³ expands beyond the survey boundaries used in 2014?
- Do consultees agree that based on the risk profile of the project, dedicated reptile, amphibian or invertebrate surveys are scoped out?
- Do consultees agree that based on the sufficient data set with relatively low rates of activity by potentially higher risk species in 2014, that bat recording at representative heights of the wind turbine rotors can be scoped out?

³² IEEM. 2006. *Guidelines for Ecological Impact Assessment in the United Kingdom*. IEEM

³³ Excluding the grid connection route which will be subject to assessment at a later stage.

8 ORNITHOLOGY

8.1 Introduction

This section details the methodologies employed to assess the potential effects of the Proposed Development on local bird species and summarises the results of bird surveys collected to date. The ornithological surveys are being undertaken by Lawrence Environmental Consultants. Given the previous wind energy applications at the site, it has been subject to a substantial degree of historical ornithological survey, with surveys being undertaken in 2002, 2003/4 and 2005/6. The data collected during these years are summarised within section 8.3.2 and will be used to supplement the ongoing ornithological surveys to inform the assessment of effects of the Proposed Development.

8.2 Relevant Legislation and Policies

The following guidance/legislation will be used as part of the survey and assessment process for the ornithological study at the Proposed Development:

- SNH (2005). 'Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities' (as revised – December 2010);
- SNH (2006) 'Assessing the Significance of Impacts from Onshore Windfarms on Birds outwith Designated Areas';
- The Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- UK Biodiversity Action Plan (BAP);
- Birds of Conservation Concern (BoCC 3) 'Red list';
- Scottish Natural Heritage (2000). 'Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action'. SNH Guidance Note;
- Scottish Natural Heritage (2006). 'Assessing Significance of Impacts from Onshore Windfarms on Birds outwith Designated Areas';
- Scottish Natural Heritage (2009). 'Environmental Statements and Annexes of Environmentally Sensitive Bird Information';
- Scottish Natural Heritage (2005 – Revised 2010). 'Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities';
- Scottish Natural Heritage (2010). 'Post-construction management of wind farms on clear-felled forestry sites; reducing the collision risk for hen harrier, merlin and short-eared owl from Special Protection Areas'.

8.3 Methodology

This section details the survey methods and available results to date in relation to ornithology interests, and sets out the approach that will be taken to assessing the effects of the Proposed Development on the ornithology resource.

8.3.1 Baseline Surveys

Ornithological surveys started in 2002 have been undertaken at the site or over sectors of the Proposed Development during 2003/04 & 2006/07 (previous surveys) and from November 2012 (ongoing surveys). Table 8.1 summarises the survey effort of previous and ongoing surveys, with results discussed in sections 8.3.2 and 8.3.3 respectively.

The roost flights of the Tayinloan Greenland White-fronted goose population represents one of the more detailed studies in the UK and Europe. Over 250h of vantage point watches and 870h of continuous radar tracking have been undertaken over three different winters over the last decade. Table 8.1 provides a summary of the previous and ongoing survey effort to date. Dawn and dusk roost flights of Greenland White-fronted geese (as well as nocturnal flights) are a known feature of the site from previous surveys and this population continued to use similar routes when monitored in the 2013/14 and 2014/15 winters.

Table 8.1: Summary of previous and ongoing survey effort

Type	2003/04	2006/07	2012/13	2014
Vantage point watches- geese flying to/from roosts	January- April n=20 watches 60h total		November 2012- April 2013 n= 12 watches 36h total	
	October 2003- April 2004 n=28 watches 84h total			
Geese radar flight tracking with VP watches*	4d & 7d November December (227h)		10d + 10d (241+ 168h) Feb-March & mid-March	10d (240h) March-April
Vantage point watches	June-July 2003 n=9 watches 27h total May -July 2004 43h total			April-Sept. & on-going in 2015 3 VPs @ 36h/season
Black grouse leks		March / April		April X2
Raptors & diver nests	2002; June 2003; May- June July 2004- raptors & divers	April x4	Sept x2	March-July 8 surveys
Owls		March-May 4 surveys		March-May 4 surveys
Moorland bird survey	April-June 2 visits	April-June 2 visits		April-June 3 visits

* Radar observations ran continuously over the 24h day/night cycle over the days duration listed above. VPs were also undertaken by human surveyors simultaneous with the dawns/dusks periods of the radar deployment and these were separate to those detailed in the above table once the results of these are available.

8.3.2 Previous Field Surveys (2002-2007)

Geese flight surveys (human VP & radar surveillance) over both the northern and southern groups of hills took place in 2003/04 winters (Table 8.1). A sample of summer vantage point watches took place in 2003 and 2004 and in 2006 along with checks for nest sites of hen harrier, short-eared owl, long-eared and barn owls and divers on the nearest freshwater lochs (Table 8.1). Moorland bird surveys were undertaken in 2004 and 2006.

Geese roost flights took place along relatively well-defined corridors over the Largie Hills and the majority of movements occurred around one hour from dawn and dusk. The 2003/04 radar tracking studies also highlighted nocturnal flights to and from the feeding fields. A thorough understanding of the variations in this local population's behaviour in response to different weather conditions was gained a decade ago.

In summary for breeding birds identified during the previous surveys, there was no evidence of red-throated or black-throated diver commuting routes over the Largie hills from the scattered breeding population on the Kintyre spine to the east. One hen harrier nest was identified in 2002 and 2003, two hen harrier nesting attempts were recorded in 2004 with one successful. Two short-eared owl nest sites were active in 2004 and one barn owl nested on site.

There was a relatively varied and dense population of moorland/scrub songbirds found around the slopes of the main hills and along willow scrub along watercourses and apart from snipe a lack of nesting waders.

The commonest species recorded in flight during the standard vantage point watches were raven, hooded crow, buzzard and kestrel. There were breeding season records of hen harrier and short-eared owl flights over their territories in 2003 and 2004.

8.3.3 Ongoing Field Surveys (2012-present)

Field surveys to assess the potential effects of the Proposed Development on local bird species recommenced in November 2012 for geese and for all other groups in March 2014. These surveys will follow current SNH guidance³⁴ on survey methods. To date, bird survey data collected includes summer flight activity, nests/territories of moorland birds and raptors and lek attendance by black grouse.

In the 2012/13 and 2014 winters, geese roost flights took place along relatively well-defined corridors as demonstrated in the previous studies and live-tracking radar parameters were measured from different parts of the terrain.

Black grouse leks are present on the moorland with a combined total of c. 8-13 males at one main lek site and other satellite locations. Three hen harrier nest sites were recorded in 2014 and matched the territory locations found a decade previously. A short-eared owl nest site was active in 2014 at a similar location as detected in the summers of 2003 and 2004.

Snipe nested at two locations but otherwise other species of upland wader were not present. The variety, density and distribution of moorland songbirds in 2014 matched the survey data from a decade previously. There was no evidence that nightjar were present during the dusk watches. Autumn/winter migrants such as redwing and fieldfare were recorded over the site.

As per the previous surveys, there were breeding season records of hen harrier flights over their territories (2014) as well as hunting golden eagle, peregrine falcon and merlin.

8.3.3.1 Moorland Bird Survey

A breeding moorland bird survey following the Brown and Shepherd (1993)³⁵ methodology was undertaken with a 500 m buffer around the proposed turbine locations on Sron Albanach and Cnoc Airigh Luachraich and the north and south access tracks. These surveys were undertaken six times between 24th April 2014 and 10th June 2014. The start times were within an hour of sunrise. Previous surveys and walk over surveys in 2013 indicated that the Largie moorland possessed limited higher quality habitat for the subset of waders likely to occur in South Argyll & Kintyre. Therefore the lack of a fourth survey visit as per SNH 2014 guidance is unlikely to have led to under-recording of the key, conservation-sensitive species.

Survey Results

Table 8.2 summarises the current data collected to date from the 2014 summer season.

³⁴ SNH (2014) *Recommended bird survey methods to inform impact assessment of onshore wind farms* [online]. Available at: <http://www.snh.gov.uk/docs/C278917.pdf> [Accessed on 08/01/2015]

³⁵ Brown, A.F. & Shepherd, K.B. (1993). A method for censusing upland breeding waders, *Bird Study*, 40: 189-195.

Table 8.2: Largie breeding bird & flight line surveys- ongoing results summary

Species	Total No. territories	No. territories in wind farm zone	Total No. Flights	No. Flights in 200m buffer
Red-throated diver	1	0	1	0
Greenland white-fronted goose	NA	NA	See footnote ³⁶	See footnote ³⁶
Greylag goose	0	0	1	0
Hen harrier	3	1	166	37
Golden eagle ³⁷	None confirmed	None confirmed	10	3
Peregrine falcon	0	0	1	0
Merlin	0	0	1	0
Black grouse ³⁸	13 (M in leks)	Y	4	1
Red grouse	10	5	0	0
Snipe ³⁹	3	2	0	0
Barn owl	1	0	-	-
Short-eared owl	1	0	10	0
Raven	2	1	2	2
Skylark	11/ km ²	Y	-	-
Grasshopper warbler ⁴⁰	15	0	-	-
Sedge warbler	17	0		
Whitethroat	29	3	-	-
Whinchat	18	2	-	-
Stonechat	21	1	-	-
Wheatear	13	2	-	-
Reed bunting	4	0	-	-
Willow warbler	41	4	-	-

³⁶ Separate collision risk analysis ongoing

³⁷ Despite an increasing frequency of sightings of white-tailed sea eagle in Knapdale and Mid Argyll, none were detected during these summer surveys at Largie

³⁸ Regionally, this population is possibly one of the larger concentrations and of importance at the Argyll level.

³⁹ There was no evidence of other species of nesting waders breeding on these hills.

⁴⁰ The main diversity of breeding bird interest (scrub songbirds) was focussed along the riparian willow scrub, heather, bracken and grassland habitats around the flanks of the hills.

8.3.3.2 Flight Activity Survey – Vantage Point Watches

Vantage Point (VP) watches have been undertaken using the standard methodology published in the 2014 SNH guidance⁴¹ providing data for assessment of the flight activity and collision risk of target species.

Three VPs have been selected to provide visual coverage of the Proposed Development footprint and surrounding area. The coverage of these vantage points is shown on Figure 7: Vantage Points in Appendix A. The main aim of the observational work was to collect flight activity data for key target species that use the study area. Raptors listed under Schedule 1 (primarily golden eagle, hen harrier, peregrine falcon, merlin, barn owl), short-eared owl, divers (primarily red-throated divers), geese, waders such as golden plovers and black grouse were targeted for vantage point watches. Secondary data were noted such as the flight activity of non-target species such as buzzard, sparrowhawk, kestrel and raven.

126 hours of vantage point surveys were made from three VPs between 9th of April and 20th August 2014 and spanned the summer diurnal periods from 04:50 to 22:10. Information was collected over three hour timed watches from the VPs covering the development area for the proposed turbine locations. Each observation period lasted three hours, but if necessary they were suspended and later resumed to take account of changes in weather. The area in view within 2km was scanned constantly until a target species was detected perched or in flight. Once detected, the bird was followed until it ceased flying or was lost from view. The time the bird was first detected and the duration of the flying period were recorded. The route followed by the bird was plotted in the field onto 1:25,000 scale maps. The bird's flying height was estimated at the point of detection and throughout the observed flight, classified as below turbine rotor height (<20m), at turbine rotor height (20m to 130m) and above turbine rotor height (>130m).

Survey Results

The overall flight activity per watch was relatively high with a total of 166 flights by hen harrier recorded. Of these, 63 flight paths recorded were considered to be within a 500m buffer of the Proposed Development site and at risk height. For a collision risk estimate, 37 of the above flights (or sections of these flights) occurred at risk height and within a 200m buffer and are likely to lead to a relatively high collision risk prediction.

There was a lower frequency of golden eagle flights that were relatively evenly distributed over the Largie Moorlands and adjoining forests to the east. A total of 10 flights were recorded during watches in May and August. Of these, seven occurred with at least part of the flight considered to be within a 500m buffer of the Proposed Development and at risk height. For a collision risk estimate only three flights occurred at risk height and within a 200m buffer. These birds either hunted or meandered over the Largie moorlands and all apart from one exited or were lost from view as they moved to or towards an easterly direction.

Despite an increasing frequency of sightings of white-tailed sea eagle in Knapdale and Mid Argyll, none were detected during these summer surveys at Largie.

There was a cluster of eleven short-eared owl flights associated with the active nest in 2014 and none occurred at risk height within 500m of the proposed turbine locations.

There were single flights of merlin and peregrine falcon, both beyond the site buffer to the west, one red-throated diver flight and a flock of 19 greylag geese. The majority of flight activity from non-target species involved raven, buzzard, kestrel and sparrowhawk. There was no evidence that the flocks of gulls present on the Tayinloan coastal fields commuted over the Largie Hills.

⁴¹ 36 hours per VP per season

8.3.3.3 *Breeding Raptor and Owl Survey*

Eight site walkover/VP surveys were undertaken following the Hardey *et al.* (2006)⁴² method between 29th March 2014 and 2nd July 2014 to detect the presence of any target raptor species within a 2km buffer of the red line boundary. Target raptor species included golden eagle, merlin, peregrine falcon, red kite, hen harrier and goshawk. In addition, checks for barn owl were made at a previously known rock cleft nest location on the northern edge of the site. The local Argyll Raptor Study Group provided information on the nearest known golden eagle territory, but there has been sporadic and incomplete survey coverage in this part of Kintyre.

Survey Results

The nearest known golden eagle eyrie occurs at 6km to the east of the site at Cour and therefore on the edge of standard accepted range boundaries (based on PAT⁴³ model assumptions). This territory was assumed to have nested unsuccessfully in 2014 however a pair of golden eagles were recorded perched on and in flight over the Largie hills in 2014 and on one occasion in mid-September with a first year immature (assumed fledged in 2014). This juvenile did not carry a satellite transmitter and therefore is unlikely to be from the Beinn an Tuirc monitored range, approximately 12km to the south-east.

Three hen harrier breeding territories were established on the Largie moorlands in April 2014 and two of these successfully produced 11 fledging juveniles. These locations show a close match with the nesting areas used in previous surveys in 2003/04. Nest provisioning rates were sampled and one of the nests was monitored with a trail camera. One pair of short-eared owls nested in the lower hills to the west of the main ranges in 2014 and within 400-500m of the 2003/04 nests⁴⁴ (Eurus 2003/04). Both species of owl are categorised as of local importance in this part of Kintyre.

There was no evidence of nightjar observed around the quarry area at dusk periods.

8.3.3.4 *Black Grouse Survey*

Black grouse surveys have been undertaken following the Gilbert *et al.* (1998)⁴⁵ method under appropriate weather conditions. Background knowledge of lek sites was employed from previous surveys as well as observations from shepherds and keepers to focus the surveys as well as coverage of potential new or subsidiary lek sites. Dawn surveys were undertaken over the northern and southern parts of the Proposed Development site between the 25th-27th April 2014 and on 16th May 2014 (start times from 05:30 to 06:00 in April and 04:50 in May)

Survey Results

The main lek at Cour (5km to the east) supported 12 cocks on 1st April 2014 and a flock of ten males were flushed (but not leking) from the forest 1.4km north-east of Largie around Cruach Bhreac.

There was one regular lek with up to eight males present on the quarry track on the northern part of the Largie site and seven other locations with single or two males that displayed on different dates. The latter sites appear to be satellite display areas used intermittently.

The estimated total number of displaying males at Largie is between 8 and 13 individuals. The majority of flight activity recorded during other surveys coincided with lek sites but otherwise was dispersed over the two hill ranges. A single greyhen was recorded from the quarry lek site and there were two other flights by grey hens over the survey area. Local records indicate an

⁴² Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2006). *Raptors- A field guide to Survey and Monitoring*. Scottish Natural Heritage.

⁴³ Predictive Aquila Territory mapping

⁴⁴ Eurus Ltd (2003/2004). *Bird survey data for the Largie wind farm proposal*.

⁴⁵ Gilbert, G., Gibbons, D.W. & Evans, A. (1998). *Bird monitoring methods: a manual of techniques for key UK species*. Sandy, UK: RSPB.

autumn/early winter roost site on the edge of the birch/oak woodland 600m south-west of Coalashee that has supported up to c. 20 black grouse. Local information from the last decade indicates a stable or increasing black grouse population in this sector of the Kintyre peninsula around Narachan Forest. Regionally, this population is possibly one of the larger concentrations and of importance at the Argyll level.

8.3.3.5 Breeding Diver Survey

Diver surveys were undertaken as detailed in Table 8.1.

Survey Results

There was an unconfirmed red-throated diver nesting site on Loch Dirigadale in 2014. However this site is outside the recommended 1km buffer zone for inclusion in surveys (SNH loc. cit) and peripheral to the Proposed Development.

8.3.4 Future Ornithology Surveys

Based on a sufficient data set over a typical breeding season in 2014, it is proposed not to continue for a second summer of VP watches, lek surveys, Schedule 1 raptors (apart from golden eagle) and general moorland bird surveys. It is also proposed to scope out a second winter of standard VP surveys 2015/16 beyond the ongoing surveys that are due to end March 2015. Subject to agreement from SNH and RSPB confirmation of nesting divers on the nearest lochs will not be undertaken in summer 2015.

The correlation of data from the previous surveys with that from ongoing surveys suggests that there is a clear understanding of the ornithological resource at the site. The data collected as part of the previous, current and future proposed surveys is therefore considered to provide a sufficient understanding of baseline conditions to inform an assessment of ornithology effects for EIA purposes

8.3.5 Data Analysis

All flight activity data collected will be input into a Microsoft Access database and flight lines digitised in a GIS to allow collision risk to birds present in each season to be calculated as required. Collision risk modelling will follow the method presented by Band et al. (2007)⁴⁶. This information will allow a standardised assessment of the impacts of the development on ornithological interests. Locations of all breeding bird territories and any important wintering bird areas will be plotted in a GIS and superimposed on a large-scale map of the Development.

Full details of all survey methods, including timing and weather conditions will be presented within the ES. All survey results will be clearly presented in tables and figures, to allow an independent review of the assessment.

8.3.6 Assessment of Effects

Information from the above survey work will be analysed and collated into a technical report detailing the baseline conditions at the Proposed Development. This will include data appendices, figures and a confidential annex where appropriate. An assessment of potential impacts will be presented in the ES accompanying the planning application. The assessment of potential impacts on ornithological interests will follow guidelines published by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2006)⁴⁷ and by SNH (2014) and will take into account the considerations of national legislation and policy and the aims of the European Birds and Habitats Directives. An Appropriate Assessment under the Habitats Regulations will be undertaken for the Kintyre SPA population of Greenland white-fronted geese.

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

⁴⁷ IEEM. 2006. *Guidelines for Ecological Impact Assessment in the United Kingdom*. IEEM

The assessment (including the appropriate assessment) will include proposals for the mitigation of adverse effects and will consider enhancement measures to increase biodiversity in the area. Cumulative ornithological impacts with other nearby schemes will also be assessed where relevant and where sufficient data is available to allow this to be undertaken.

8.4 Key Sensitivities

- Roost flights by Greenland white-fronted geese associated with the nearby Kintyre Goose Roosts Special Protection Area (SPA) as shown in Figure 6: *Ecological Designations* in Appendix A;
- Nest sites of hen harrier, short-eared & barn owls and associated summer flight activity;
- Flight activity and habitat use of golden eagles; and
- Lek and habitat use by a population of black grouse.

8.5 Key Questions for Consultees

The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:

- Could consultees confirm they are satisfied with the survey scope and survey effort proposed?
- Could consultees confirm they are satisfied with the proposed approach to the evaluation and impact assessment methods for ornithological receptors?
- Based on a sufficient data set over a typical breeding season in 2014, it is proposed not to continue for a second summer of VP watches, lek surveys, Schedule 1 raptors (apart from golden eagle), nesting divers and general moorland bird surveys. It is also proposed to scope out a second winter of standard VP surveys 2015/16 after that described in Section 8.3.2. Could consultees confirm this approach is acceptable?
- A desk-top review of bird radar shut down mitigation methods and monitoring/efficacy for both wind farms and airports will be undertaken to inform the Appropriate Assessment for Greenland white-fronted geese, combined with the findings of the radar surveys undertaken for the Proposed Development. Could consultees confirm this approach is acceptable?

9 HYDROLOGY AND HYDROGEOLOGY

9.1 Introduction

A hydrological and hydrogeological assessment will be undertaken in order to establish the baseline conditions and assess the potential effects the Proposed Development, the likely significance of these effects and the potential or requirement for mitigation.

An initial desk-based review of the hydrology and ground conditions of the Proposed Development has been undertaken. This section of the Scoping Report outlines the potential hydrological receptors which have been identified within Proposed Development and a wider study area of 5km.

The hydrology core study area will focus upon receptors within the site boundary, while a wider study area of 5km from the proposed wind turbine locations is proposed. At distances greater than 5km within upland catchments close to coastal waters, it is considered that schemes are unlikely to contribute to a hydrological effect, in terms of chemical or sedimentation effects, due to attenuation and dilution over distance of potentially polluting chemicals. This is based on professional judgement and experience assessing similar scale developments within Argyll and Bute.

9.2 Relevant Guidance and Legislation

The following legislation and guidance will be adhered to during the Hydrology and Hydrogeology assessment of the Proposed Development.

9.2.1 Legislative Background

The Water Framework Directive (WFD) (2000/60/EC)⁴⁸ establishes a framework for the protection, improvement and sustainable use of all water environments. It is transposed within Scotland by The Water Environment and Water Services (Scotland) Act 2003⁴⁹ and subsidiary Regulations.

9.2.2 Pollution Prevention Guidelines (PPGs)

Produced by the Scottish Environment Protection Agency (SEPA), PPGs⁵⁰ give advice on statutory responsibilities and good environmental practice. Each PPG addresses a specific industrial sector or activity. The following are of relevance principally to surface water, however as surface water has the potential to affect groundwater, they are also of relevance to the assessment of groundwater:

- PPG1: General guide to the prevention of water pollution;
- PPG2: Above ground oil storage tanks;
- PPG4: Disposal of sewage where no mains drainage is available;
- PPG5: Works and maintenance in or near water;
- PPG6: Working at construction and demolition sites;
- PPG18: Managing fire water and major spillages; and
- PPG21: Pollution incident response planning.

Other relevant guidance and regulation comprises the following:

- PAN61: Planning and Sustainable Urban Drainage Systems⁵¹;

⁴⁸The Water Framework Directive (2000/60/EC) [online]. Available at: http://ec.europa.eu/environment/water/water-framework/index_en.html [Accessed on 14/11/2014]

⁴⁹ Water Environment and Water Services (Scotland) Act 2003 [online]. Available at: <http://www.legislation.gov.uk/asp/2003/3/contents> [Accessed on 14/11/2014]

⁵⁰ SEPA (various). Pollution Prevention Guidelines. PPG 1 to 21 [online]. Available at: http://www.sepa.org.uk/about_us/publications/guidance/ppgs.aspx [Accessed on 14/11/2014]

⁵¹ PAN61 "Planning and Sustainable Urban Drainage Systems" [online]. Available at: <http://www.scotland.gov.uk/Publications/2001/07/pan61>. [Accessed on 14/11/2014]

- 'Sewers for Scotland 2nd Edition'⁵²;
- SEPA 'Construction of River Crossings'⁵³;
- SEPA Aquifer and Vulnerability Maps⁵⁴;
- SEPA Policy 26: Policy on the Culverting of Watercourses⁵⁵;
- SEPA Land Use Planning System Guidance Note 4, Version 7, May 2014 (LUPS-GU4)⁵⁶;
- SEPA 'Managing River Habitats for Fisheries'⁵⁷;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR)⁵⁸;
- SEPA 'CAR – A Practical Guide' Version 7.1, March 2014⁵⁹;
- The Private Water Supplies (Scotland) Regulations 2006⁶⁰;
- The Water Quality (Scotland) Regulations 2010⁶¹;
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013⁶²;
- SEPA River Basin Management Plan⁶³;
- Forestry Commission 'Forests and Water: UK Forestry Standard Guidelines'⁶⁴;
- Scottish Natural Heritage, Good Practice During Wind Farm Construction, (2013)⁶⁵;
- The Scottish Government Guidance: 'Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation Developments' (2006)⁶⁶;
- The Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C692) (2010)⁶⁷; and
- CIRIA Control of Water Pollution from Construction Sites (C532) (2001)⁶⁸.

9.3 Assessment Methodology

The methodology outlined in the following section has been developed by Arcus over the past seven years in consultation with SEPA and Scottish Natural Heritage. The assessment is based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of potential change upon those receptors is identified within the study area.

⁵² Scottish Water (2007) 'Sewers for Scotland 2nd Edition' [online]. Available at: http://www2.scottishwater.co.uk/portal/page/portal/SWE_PGP_CONNECTIONS/SWE_CORP_CONNECTIONS/SWE_CONN_SUDDS/20070402SfS2DRAFT%20%AD_CONSULTATION_%20APRIL_JUNE_07.pdf [Accessed on 14/11/2014]

⁵³ SEPA "Construction of River Crossings" [online]. Available at: <http://www.sepa.org.uk/planning/idoc.ashx?docid=813bf507-416f-4186-96d1-7ea4f963884f&version=-1> [Accessed on 14/11/2014]

⁵⁴ SEPA Aquifer and Vulnerability Maps [online]. Available at: http://www.sepa.org.uk/water/monitoring_and_classification/assessment_tools/interpretation_of_the_maps.aspx [Accessed on 10/08/2014]

⁵⁵ SEPA Policy 26: "Policy on the Culverting of Watercourses" [online]. Available at: <http://www.sepa.org.uk/planning/idoc.ashx?docid=77d6eb29-bede-474f-9258-1fdc14e977f5&version=-1> [Accessed on 10/08/2014]

⁵⁶ Land Use Planning System Guidance Note 4, Version 7, May 2014 [online]. Available at: <http://www.sepa.org.uk/idoc.ashx?docid=e2f23e2a-8db8-4c9d-8495-11228b266430&version=8> [Accessed on 22/07/2014]

⁵⁷ SEPA (2002). Managing River Habitats for Fisheries [online]. Available at: <http://www.scotland.gov.uk/Resource/Doc/47133/0009767.pdf> [Accessed on 10/08/2014]

⁵⁸ OPSI (2005). The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [online]. Available at: <http://www.legislation.gov.uk/ssi/2011/209/made> [Accessed on 10/08/2014]

⁵⁹ SEPA, 2014 – CAR – A Practical Guide [online]. Available at: <http://www.sepa.org.uk/water/idoc.ashx?docid=f8e4798e-2cab-4ceb-968b-f2a10d7fd8e7&version=-1> [Accessed on 22/07/2014]

⁶⁰ The Private Water Supplies (Scotland) Regulations 2006 [online]. Available at: <http://www.legislation.gov.uk/ssi/2006/209/contents/made> [Accessed on 23/07/2014]

⁶¹ The Water Quality (Scotland) Regulations 2010 [online]. Available at: <http://www.legislation.gov.uk/ssi/2010/95/contents/made> [Accessed on 23/07/2014]

⁶² The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [online]. Available at: <http://www.legislation.gov.uk/ssi/2013/29/introduction/made> [Accessed on 18/03/2013]

⁶³ SEPA River Basin Management Plan [online] Available at: <http://map.sepa.org.uk/rbmp/> [Accessed on 10/08/2014].

⁶⁴The UK Forestry Standard: Forests and Water [online] Available at: <http://www.forestry.gov.uk/website/forestry.nsf/byunique/infid-8bvqx9> [Accessed on 21/08/2014]

⁶⁵ SNH (2013) Good Practice During Windfarm Construction, [online]. Available at: <http://www.snh.gov.uk/docs/A1168678.pdf> [Accessed on 11/08/2014]

⁶⁶ The Scottish Government Guidance: 'Peat Landslide Hazard and Risk Assessments – Best Practice Guide for Proposed Electricity Generation Developments' (2006) [online]. Available at: <http://www.scotland.gov.uk/Publications/2006/12/21162303/0> [Accessed on 10/08/2014]

⁶⁷CIRIA (2010). "Environmental Good Practice on Site (C692)" [online]. Available at: <http://www.ciria.org.uk> [Accessed on 22/07/2014]

⁶⁸ CIRIA (2001). "Control of Water Pollution from Construction Sites (C532)" [online]. Available at: <http://www.ciria.org.uk>. [Accessed on 10/08/2014]

The sensitivity of the receiving environment is defined as its ability to absorb an effect without perceptible change and can be classified as high, moderate or low. These classifications are dependent on factors such as the quality of the subsurface water within the receptor, their purpose (*e.g.* whether used for drinking, fisheries, *etc.*) and existing influences, such as land-use.

The magnitude of change is determined by the timing, scale, size and duration of the potential effect resulting from the Proposed Development. The magnitude of potential effects can be classified as major, moderate, minor or negligible.

The significance of the potential hydrological effects of the site would be classified by taking into account the sensitivity of receptors and the magnitude of the potential effect on them, combined with the likelihood of an event occurring.

Effects assessed as major or moderate significance are considered to be significant for the purposes of the EIA Regulations. Effects assessed as minor or less are considered to be not significant for the purposes of the EIA Regulations.

9.4 Baseline Conditions and Information Gathered to Date

9.4.1 Surface Water

There are numerous surface watercourses at the Proposed Development site draining into the Sound of Gigha coastal waters and Loch Cluaineach:

- Ballachroy Burn in the northern section of the Development - has a SEPA water quality classification of 'Good' (under the Water Framework Directive (WFD));
- Leth Uillt in the northern section of the Development – not assessed by SEPA under the WFD;
- Allt an Sgornain in the southern section of the Development – not assessed by SEPA under the WFD; and
- The headwaters of Tayinloan Burn in the southern section of the Proposed Development – not assessed by SEPA under the WFD.

The Sound of Gigha coastal waters have a SEPA water quality classification of 'Good' are not designated as a hydrological resource (SACs, SSSIs *etc.*).

Loch Cluaineach is not assessed by SEPA under the WFD.

Loch Garasdale lies to the north of the Proposed Development but is not hydrologically linked to the site by surface water sources, as it lies out-with the watershed of the Proposed Development.

The ES will identify all watercourse crossings and include a systematic table of watercourse crossings or channelising, with detailed justification for any such elements and design to minimise effects. The table will be accompanied by photography of each watercourse affected and include dimensions of the watercourse.

Forestry plantation exists in the north-eastern section of the Proposed Development. Felling of trees can increase surface water run-off and cause impediments to river flow through accumulation and transfer of brash. An assessment of the potential effects of deforestation will be undertaken in accordance with the Forestry Commission 'Forests and Water: UK Forestry Standard Guidelines' (Fifth Edition).

9.4.2 Flood Risk

New Flood Maps⁶⁹ produced by SEPA show areas of Scotland with the following likelihoods for flood extent:

- High risk - 10% (10 year return period);

⁶⁹ SEPA (2014) *SEPA Flood Maps*, SEPA [online]. Available at: <http://map.sepa.org.uk/floodmap/map.htm> [Accessed on 21/08/2014].

- Medium risk - 0.5% (200 year return period); and
- Low risk - 0.1% (1000 year return period or 200 year plus climate change for surface water).

A preliminary review of SEPA's flood extent map shows that the majority of the Proposed Development is not located in an area prone to flood. Minor areas either side of Leth Uillt are shown to flood, while areas in proximity to Cruach Mhic Gougain are shown to flood from pluvial sources.

Should sensitive infrastructure, such as compounds and transformers, be located within an area prone to flooding Arcus will produce a succinct Flood Risk Assessment for inclusion within a Water Management Plan, in accordance with SPP, to append to the ES chapter.

Additionally, should watercourse crossings be located in areas shown to flood, Arcus will the following information to be included within the ES for at least a typical watercourse within the development area:

- Flows for the Mean Annual Flood, 1:100 and 1:200 year return period; and
- From a flow duration curve, the mean daily flow and Q95 flow.

Any felling of forestry will be assessed within the ES in terms of increased surface water run-off, in accordance with the Forestry Commission 'Forests and Water: UK Forestry Standard Guidelines'.

9.4.3 Geology and Hydrogeology

The Proposed Development is located on the Kintyre bedrock and localised sand and gravel aquifers drinking water protection zone. The groundwater body has a SEPA ground water body quality classification of 'Good'.

The ES chapter will highlight any risks to the groundwater resource from the Proposed Development.

British Geological Survey (BGS) information indicates the majority of the site comprises minimal superficial (or absent) covering with rock head near to the surface. Aerial photography shows that the areas to the south of Loch Garasdale have peaty soil deposits.

Other than peat, deposits of glacial till are noted in the central and western site area.

The thickness of the superficial deposits are not known but are conjectured to be relatively shallow in sloped topography but potentially thicker in flat lying areas common with moorland/forested conditions.

Given the superficial geology cover it is expected that Groundwater Dependent Terrestrial Ecosystems (GWDTEs) will be present within the site. Should consultation responses or the desk-based study indicate that a particular issue requires validating, such as the presence of GWDTEs, field surveys will be undertaken in conjunction with an ecologist to ensure a consistent approach between the two technical disciplines. Potential effects on GWDTEs will be assessed within the Hydrology and Ecology Chapters of the ES, in accordance with SEPA's LUPS-GU4.

Underlying bedrock is primarily metamorphic rock of the Ben Lui Schist Formation comprising Semipelite and Calcareous. Central sections of the Proposed Development comprise intrusions of Amphibolite and Hornblende Schist. One inferred geological fault line exists in the central section of the Proposed Development. Turbines will not be sited on the fault line.

9.4.4 Statutory Designations

Two statutory designations exist within 5km of the Proposed Development, which are designated for hydrological and/or hydrogeological interest:

- Kintyre Goose Roosts SPA and RAMSAR is located approximately 1.5km north-east of the Proposed Development and is designated for supporting habitat (open water) for populations of Greenland white-fronted goose; and

- Rhunahaorine Point SSSI is located approximately 1.8km west of the Proposed Development and is designated for supporting habitat for populations of Greenland white-fronted goose and for Supralittoral sediment (shingle).

The above designations will be assessed within the ES chapter. However, hydrological effects are not anticipated to occur at either designation, given that the Proposed Development is located out-with the hydrological catchments of the designations.

9.5 Key Sensitivities

The main potential hydrological effects are considered to be:

- Potential chemical pollution effects on the hydrological environment;
- Potential erosion and sedimentation effects on the hydrological environment;
- Potential impediments to stream flow;
- Potential effects on private water supplies;
- Potential changes in soil and peat interflow patterns;
- Potential for the compaction of soils;
- Potential effects on the hydrological function of GWDTEs;
- Potential for peat destabilisation; and
- Potential for an increase in runoff and flood risk.

A full assessment of hydrological and hydrogeological effects will be undertaken. This will be reported in the Hydrology and Hydrogeology Chapter of the ES.

9.6 Key Questions for Consultees

The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:

- Could consultees confirm their agreement with the proposed approach and scope of the geology, hydrology and hydrogeology assessment?
- Do consultees have any specific knowledge of geological, hydrological or hydrogeological issues or information which could inform the collation of baseline data?

10 ENGINEERING, GEOLOGY AND PEAT

10.1 Introduction

The consideration of engineering design and delivery of the construction work taking into account ground conditions and peat will form an integral part of the EIA. In this manner it will be ensured that both the effects of construction can be accurately assessed, and that all assessments consider a Proposed Development that is deliverable and represents the likely construction methodologies. Whilst this will not form a stand-alone assessment chapter within the ES, the outputs of the work discussed in this section will inform other assessments within the ES and technical reports will be included as technical appendices.

10.2 Relevant Guidance, Legislation and Policies

The engineering design and assessment effects on geology and peat will be conducted to meet the guidance set out in the following documents:

- PPG6: Working at construction and demolition sites, SEPA;
- PPG21: Pollution incident response planning, SEPA;
- CIRIA Report C692 Environmental Good Practice on Site Guide (2010);
- CIRIA Report C532 Control of Water Pollution from Construction Sites (2001);
- Good Practice During Windfarm Construction - Scottish Renewables, SNH, SEPA, FCS, 2010;
- SEPA Regulatory Position Statement - Developments on Peat, issued by Scottish Environment Protection Agency, 2010;
- Scottish Natural Heritage / Forestry Commission Scotland - Floating Roads on Peat, 2010;
- Managing Geotechnical Risk: Improving Productivity in UK Building and Construction, issued by the Institution of Civil Engineers, 2001;
- CIRIA report 179 - Ground Engineering spoil: good management practice, 1997;
- Scottish Roads Network Landslides Study Summary Report, issued by the Scottish Executive, 2005;
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments, issued by the Scottish Government, 2007; and
- Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat, issued by the Forestry Commission, 2006.

10.3 Baseline Conditions and Information Gathered To Date

Baseline geological conditions are summarised in section 9.4.3.

Whilst peat is not recorded within the Proposed Development area on either the BGS superficial layer or in the Soil Survey Maps, blanket peat is shown in the forested areas immediately to the north of Loch an Fhraoich to the east of the Proposed Development. These peat deposits are coincident with the flatter bowl area noted in the topographic maps, and as such may extend into some of the northern areas of the site beyond what is shown on maps.

On the grounds of this assessment, and to be determined by further desk study and site walkover, it may be necessary to undertake as a minimum Phase 1 probing as described in the following section to determine locations and extents of peat. In the event that the Proposed Development extends into any areas of peat deposits, the work will extend to Phase 2 probing and risk assessment.

10.4 Assessment Methodology

10.4.1 Desk Based Studies and Site Walkover

The baseline conditions of the site would be established by undertaking a desk-based assessment of GIS datasets as well as online SEPA and British Geological Survey (BGS) and the James Hutton Institute Soil Survey Maps for Scotland. This information would be supplemented by available documentary and topographic information. The purpose of the desk based assessment is to determine any potential effects resulting from the Proposed Development and to inform the site walkover.

Arcus will undertake a site walkover to visually appraise the conditions and gain an understanding of the engineering, geotechnical and geological constraints.

The site walkover would also be used to determine potential borrow pit locations which, combined with review of geology and topography will permit potential yields to be assessed.

10.4.2 Peat Risk Assessment

In the event that peat is found within the development area, a peat slide risk assessment may be required in accordance with Scottish Government guidance⁷⁰ to establish baseline, inform design and assess peat slide risk.

The purpose of this assessment will be to:

- Identify any areas susceptible to peat slide, using peat thickness and digital terrain model (DTM) data to analyse slopes;
- Assist in the micro-siting of turbines and tracks in areas of no peat or shallow peat;
- Assess potential effects on soils, peat and geology; and
- Develop an acceptable code for working on the site that will adopt best practice procedures, effective management and control of onsite activities to reduce or offset any detrimental effects on the geological, hydrogeological and hydrological environment.

The Phase 1 assessment works will include:

- Peat depth within the proposed developable area will be obtained utilising a 100m grid (the probing will also give an indication of the substrate below the peat);
- The investigation will look at turbine locations, access routes and borrow pits for signs of existing or potential peat instability; and
- Output from the field survey will comprise a record of investigation locations and summary of peat depths recorded.

This data combined with the constraints mapping, will be used to design an appropriate infrastructure layout. Once the layout has been identified, and if the Proposed Development potentially extends into areas of peat, Phase 2 works will be undertaken. Phase 2 works will be a focused probing exercise which will consider the identified locations of the site infrastructure and refine the identified layout to result in a fixed infrastructure layout.

Phase 2 works would include peat probing and sampling of identified areas to establish the thickness of the peat on a systematic basis. Determination of the detail peat depths within the Proposed Development will be undertaken on a 10-50m grid. The probing would also provide information of the substrate below the peat.

If significant peat deposits are proven a Peat Landslide Hazard and Risk Assessment will be completed using the site survey data and slope analysis (using DTM data), highlighting areas that may be impacted by a peat slide so that appropriate mitigation measures and can be identified.

10.4.3 Engineering Design

The design of the infrastructure will be progressed using 3D digital terrain model data to ensure tracks, turbine hardstandings and other compounds can be accommodated within the terrain based on candidate turbine design standards. The works resulting will be assessed within the EIA.

In the event that peat is found within the site, peat formation thicknesses will be incorporated within the design model to allow quantities of excavation to be assessed, and a peat management plan will be required.

⁷⁰ Peat Landslide Hazard and Risk Assessments. Best Practice Guide for Proposed Electricity Generation Developments [online]. Available at: <http://www.scotland.gov.uk/Resource/Doc/161862/0043972.pdf> [Accessed on 08/09/2014].

10.5 Key Sensitive Receptors

The main potential impacts are considered to be:

- Local sourcing of materials from borrow pits to facilitate construction of tracks and hardstandings;
- Construction on peat and peat management;
- Management of surplus materials;
- Construction phase pollution control; and
- Protection of sensitive habitats.

10.6 Key Questions for Consultees

During the course of consultation, baseline and the assessment of effects during transport of plant, materials and staff to the site, the following specific questions will be raised to consultees:

- Do the consultees agree that the scope of the proposed desk and field surveys is sufficient to inform the definition of baseline to inform the EIA?
- Does the Council, SNH, SEPA or other consultees have any information that would be useful in the preparation of the peat assessment, particularly in relation to baseline data?

11 CULTURAL HERITAGE

11.1 Introduction

This section of the ES will assess the effects of the Proposed Development on the archaeology and cultural heritage resource.

11.2 Relevant Guidance, Legislation and Policies

The study will be conducted with reference to the relevant statutory and planning frameworks for cultural heritage.

Legislation includes the Ancient Monuments and Archaeological Areas Act 1979, The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, and the Town and Country Planning (General Development Procedure) (Scotland) Order 1992.

The primary planning guidance comprises the Scottish Historic Environment Policy (SHEP), Scottish Planning Policy (SPP) and PAN2/2011 at national level, and the Argyll and Bute Structure Plan and Argyll and Bute Local Plan at regional and local level respectively with consideration for the Wind Energy Development Interim Planning Policy and emerging Local Development Plan.

The assessment will be in accordance with current best practice and guidelines which includes the Institute for Archaeologists (IFA) and Historic Scotland's Managing Change in the Historic Environment Series, specifically their volume on setting.

11.3 Methodology

For the purposes of the assessment cultural heritage interests are deemed to include both above ground (the built heritage) and below ground remains. The assessment will consider both direct and indirect (largely visual) effects upon the following cultural heritage receptors:

- Archaeology – above and below ground, designated or not. Consideration will be given to the potential for currently unknown (buried) archaeological remains to exist within the site; and
- Listed buildings, Conservation Areas and Gardens and Designed Landscapes.

11.4 Desk Based Assessment

A desk based assessment of cultural heritage records will be carried out. Data will be gathered from the following sources:

- The National Monuments Record of Scotland (NMRS) and Scottish Sites and Monument Records (SSMR);
- Royal Commission on the Ancient and Historic Monuments of Scotland including PASTMAP;
- Aerial records of known sites and monuments;
- Cartographic evidence;
- Aerial photographs and other cartographic information on pre-recent land uses;
- Historic Scotland's databases of listed buildings, Scheduled Ancient Monuments and monuments proposed for scheduling;
- West of Scotland Archaeology Service which maintain the Highland Historic Environment Record;
- The Inventory of Gardens and Designed Landscapes in Scotland (1988); and
- Local Studies libraries and other archives as appropriate; and
- Other relevant information, as appropriate and available.

The desk based assessment will be augmented by a walkover survey to provide information on the archaeological potential of the area, and to validate the documentary evidence. This fieldwork will be conducted to:

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

Subject to the findings of the desk based assessment the requirement for and extent of any additional surveys will be agreed in consultation with West of Scotland Archaeology Service.

An assessment will be made of the potential indirect effects upon the setting of cultural heritage features including historic landscapes. This assessment will be made against the same ZTV used in the Landscape and Visual Assessment.

The assessment will be supported by presentation of the data in assessment tables, with a gazetteer and location plan. The Cultural Heritage chapter will also include proposals for mitigation of any identified impacts where necessary.

11.5 Baseline Conditions and Information Gathered To Date

Initial information relating to cultural heritage and archaeology has been gathered through a preliminary online search to identify potential features of interest. For purposes of this scoping report, an initial search of 16km from the turbine layout has been undertaken. 16km reflects a distance of 15km from the turbine locations at the time of scoping, with an additional 1km to ensure that data are collected within 15km of turbine movements during the design evolution process.

A large scale archaeological survey was carried out over much of the site in 1994 (excluding development area within woodland) in advance of a previous plan for the Largie wind farm application. This survey found a number of features of interest including within the present development area including cup and ring marks, hut circle, possible dun, farmsteads, enclosures and cairns

In the north-eastern section of the site is recorded Loch Cluaineach Limekiln with buildings and enclosure. In the north-western area of the site is a stone enclosure, just to the south there is another lime kiln and associated buildings and structures present, and further to the south there is recorded a modern quarry.

Recorded just to the south-east of these sites are four shieling huts on the western slope of an unnamed hill, along with a possible stone circle. There is also a recorded farmstead with associated enclosures and buildings to the south of these sites.

In the southern section of the site are recorded five cup marked boulders and a nearby stone bounded enclosure with ridge and furrow and associated field boundaries.

For purposes of visual assessment, data on nationally designated cultural heritage features will be collected to a maximum of 16km from the outermost turbines of the Proposed Development. Preliminary data indicates there are no World Heritage Sites, Registered Battlefields, Protected Wrecks, or Conservation Areas within 16km of the outermost turbines. However, there are 58 Scheduled Monuments (1 of which is a Property in Care); 74 Listed Buildings (5 Category A, 43 Category B and 26 Category C(S)); and 1 Garden and Designed Landscape is situated within 15km of the outermost turbines.

11.6 Key Sensitivities

The assessment will focus on the following sensitive receptors:

- Recorded archaeological sites of local importance and the potential for unknown archaeological sites within and adjacent to the site;
- The settings of the Scheduled Monuments within close proximity to the site (see Figure 8: *Cultural Heritage Designations* in Appendix A for Scheduled Monuments within 5 km of the Proposed Development);
- The settings of the Gardens and Designed Landscapes within close proximity to the site;
- The settings of the Listed Buildings within close proximity to the site; and
- The settings of Conservation Areas within close proximity to the site.

It is considered only those assets within a relatively close proximity to the Proposed Development may potentially receive a significant effect on their settings. As such, detailed assessments would be undertaken for designated sites within 5km of the final site boundary (when decided) and within the ZTV as well as for heritage assets beyond 5km identified during

consultation or with a larger presence in the landscape such as Parks and Gardens. This would potentially include:

- 20 Listed Buildings as shown in **Table 11.1**;
- 16 Scheduled Monuments shown in **Table 11.2**;
- Achamore House Garden and Designed Landscape (GDL); and
- Kilberry Castle Scheduled Monument and Property in Care.

It is usual to include designated sites within 5km of the site boundary in the detailed assessment. However, the site boundary was not finalised at time of writing and so designated sites within 6km of the outermost turbine have been listed to ensure accuracy.

Table 11.1 Listed Buildings within 6km of outermost turbine

HB Number	Name	Category
12004	Kintyre, Killean, St John's Church	A
12005	Killean House	A
12006	Killean Home Farm, Farmsteading, Northern Range	B
12013	Ballure	C(S)
12014	Gortinanane House	C(S)
12017	Clachan, Kilcalmonell and Kilberry Parish Church and Burial- Ground	B
12018	Clachan, Kirkland	B
12019	Clachan, Kilcalmonell Free Church	B
12020	Clachan, Kilcalmonell Free Church, Gateway	C(S)
12021	Balinakill Hotel	C(S)
12022	Balinakill Estate, Balinakill Steading	B
12023	Clachan, Balinakill Estate, Balinakill Lodge	C(S)
12024	Ronachan Estate, Ronachan House	B
12025	Ronachan Estate, Bridge	C(S)
12026	Ronachan Estate, Bridge	C(S)
13070	Ronachan Estate, North Lodge	C(S)
13073	Killean Home, Farmhouse	B
13074	Killean House, Lodge	B
43250	Killean, Hall	B
43266	Killean, The Doll's Houses, North Range, North Wing	A

Table 11.2 Scheduled Monuments within 6 km of outermost turbine

Index Number	Name
175	Ballochroy, three standing stones & cist 400m NE of
182	Beacharr, standing stone & long cairn
212	Loch Ciaran, standing stone 1430m SW of Achaglass
2487	Corriechrevie, cairn
2491	Dun Skeig, duns & fort
3030	St John's Church, church, burial ground and carved stones, Killean
3143	Dun Beachaire, dun
3179	Killean, fort NE of
3184	An Dunan, dun 70m SW of Minen
3185	Ronachan Bay, fort S of
3291	Red Cove, dun 215m N of Beachmenach
3659	Beachmeanach, enclosure 700m ESE of
3673	Dun Ronachain, dun 400m NE of Ronachan House
3676	Clachan Churchyard, Cross, Cross Slabs & Tombstones
3695	Ballinakill House, cross by entrance to drive
3817	Talatoll, shielings 1400m SE of, Kintyre

11.7 Key Questions for Consultees

The following information will be sought from the Council Archaeologist, Conservation Officer and Historic Scotland:

- Do the consultees agree with the list of likely effects and key sensitive receptors?
- Do the consultees agree with and/or have any comments on the baseline of those sites with statutory protection within the wider landscape whose settings may be affected by the Development?
- Could the consultees provide details of any current/recent archaeological work or projects within or near the site not yet recorded in the NMRS?
- Do the consultees agree with and/or have any comments on the proposed receptor evaluation and impact assessment methods?
- Can the consultees provide details of any cultural heritage sites in the vicinity of the Development site which it is considered may raise significant issues within the EIA process for this development?

12 TRAFFIC AND TRANSPORT

12.1 Introduction

This section of the ES will assess the effects of the Proposed Development on the access and traffic aspects of the EIA and will consider the effects of the Proposed Development on the road network and traffic volumes.

The Proposed Development is located to the north-east of Tayinloan in Argyll and Bute, close to the existing A83 which connects Campbeltown and the Kintyre peninsula to the A82 at Tarbert and the wider national road network.

Whilst the A83 forms part of the Trunk Road Network from Kennacraig north of the Proposed Development to its termination with the A82, the section from Kennacraig to Campbeltown is owned and operated by Argyll and Bute Council.

Given the Proposed Development's proximity to the A83 and the port of Campbeltown, it is likely that abnormal load Turbine Delivery Vehicles (TDVs) will approach the site via the A83 from the south.

The port of Campbeltown has been developed as a renewables hub with road improvement works within the town centre implemented to accommodate the movement of TDVs, and the A83 has been used for a number of commissioned wind farm developments to date.

During construction and operation it is likely that other traffic will take access from the north and south via the A83, dispersing into the wider road network thereafter.

As part of the EIA, a detailed traffic and abnormal load route assessment will be undertaken for roads approaching the Proposed Development. This will include identifying where to appropriately survey existing traffic movements, if required, and a visual survey of road geometry, features and condition.

12.2 Relevant Guidance, Legislation and Policy

The methodology to be employed in the assessments has been developed from guidance given in the 'Guidelines for the Environmental Assessment of Road Traffic' (IEMA 1993), 'Guidelines for Traffic Impact Assessment' (IHT 1994) and 'Transport Assessment Guidance'⁷¹ (Transport Scotland 2012).

The ES will contain a chapter assessing the access and traffic effects of the Proposed Development. This chapter will take into account relevant statutory guidance published by the Scottish Government and Argyll and Bute Council as well as any relevant guidance published by statutory bodies. The following guidance will be considered:

- Scottish Planning Policy (SPP);
- PAN 75 – Planning for Transport⁷²;
- Scottish Government Planning Specific Advice Sheet for Onshore Wind Turbines (last updated December 2013); and
- Argyll and Bute Renewable Energy Action Plan 2010-2013 (REAP).

It should be noted that the above list may be subject to change in the case that various policies and guidance are replaced or updated during the project. In addition, other relevant guidance required by the Applicant will be considered for inclusion.

12.3 Assessment Methodology

A preliminary assessment of the route to the Proposed Development site for TDVs has been undertaken based on previous experience in wind farm EIAs and road improvement works in the local area.

⁷¹ Transport Scotland (2012) *Transport Assessment Guidance* [online]. Available at: <http://www.thenbs.com/PublicationIndex/DocumentSummary.aspx?PubID=957&DocID=301489> [Accessed on 15/08/2014]

⁷² Scottish Executive (2005) *Planning Advice Note: PAN 75 – Planning for Transport*, Scottish Executive

A detailed swept path and pinch point analysis will be carried out once the parameters of the candidate turbines have been defined. If necessary, this would include site measurement and topographical survey.

Access to the Proposed Development site from the A83 will be taken via a new access junction designed in accordance with the Design Manual for Roads and Bridges (DMRB) with temporary overrun areas to accommodate the geometric requirements of the abnormal load vehicles. Visibility splays will be in accordance with standards agreed with the Council.

The assessment methodology will follow the 'Guidelines for the Environmental Impact of Road Traffic'⁷³. A screening process using two broad rules outlined in the aforementioned guidelines is used to identify the appropriate extent of the assessment area. These are:

- Include highway links where traffic will increase by more than 30% (or where the number of heavy goods vehicles will increase more than 30%); and
- Include any other specifically sensitive areas where traffic flows have increased by 10% more.

Where the predicted increase in traffic flows is lower than the thresholds, the guidelines suggest effects can be stated to be not significant and further detailed assessments are not warranted. Where the predicted increase is higher than the thresholds, further details assessments will be undertaken to determine the extent of any effect and whether this could be considered to be significant.

Peak traffic flows will be identified to assess a worst case scenario. An assessment of effects on road safety, driver delay, pedestrian amenity, severance, noise and vibration will be undertaken as appropriate.

The Applicant does not propose to submit a formal Transport Assessment (TA) to accompany the planning application for the Proposed Development as TA's principally relate to developments that generate a significant permanent increase in traffic as a direct consequence of function, for example, retail parks.

12.4 Baseline Conditions and Information Gathered To Date

The A83 is a single carriageway owned and operated by the Council connecting Campbeltown and the Kintyre peninsula to the Trunk Road Network at Kennacraig to the north of the Proposed Development site.

Due to proximity to the Proposed Development and recent upgrades to the A83 and urban roads within the town as the result of other wind farm developments, it is likely that the port of delivery for turbine components will be Campbeltown.

With the exception of the turbine components, the majority of construction traffic is normal construction plant and could include tractors, excavators, rollers, cranes and dumper trucks. Most will arrive on site on low loader transporters and be classified as heavy goods vehicles (HGVs). The turbine components will arrive on specialist TDVs. A large scale self-propelled crane and supporting ballast vehicles would also travel to the Development site.

Subject to agreement with consultees, and in the event that existing data is not readily available, it is proposed that a single automatic traffic counter (ATCs) be installed on the A83 to determine baseline traffic flows at the Proposed Development access. This would be supplemented by readily available data from Transport Scotland collected on the A83 both to the south and north of Tarbert.

12.5 Key Sensitivities

The main potential impacts are considered to be:

- Increase in HGV traffic;
- Delay related to the movement of abnormal loads;

⁷³ Institute of Environmental Assessment (1993) *Guidelines for the Environmental Assessment of Road Traffic*, IEA.

- Abnormal road wear and tear;
- Effect on sensitive receptors; and
- Road widening/improvements to accommodate abnormal loads.

A full assessment of traffic and transport effects will be undertaken to establish the number of existing and additional traffic movements during the construction, operational and decommissioning phases of the Proposed Development and the impact on baseline conditions. This will be reported in the Traffic and Transport Chapter of the ES.

12.6 Key Questions for Consultees

During the course of consultation, baseline and the assessment of effects during transport of plant, materials and staff to the site, the following specific questions will be raised to consultees:

- Are there load limits as a result of existing structures on the proposed TDV route?
- Can the Council provide accident statistics for the A83 between Campbeltown and Kennacraig?
- Are consultees aware of any sensitive receptors for consideration, beyond those that would normally be considered as part of EIA?
- Can the Council confirm if traffic data is available for the A83, or provide any specific locations where survey should be undertaken to permit assessment of effects?

13 SOCIO-ECONOMICS, TOURISM AND RECREATION

13.1 Introduction

This section of the ES will assess the effects of the Proposed Development on the local and national economy, considers the effect of the tourism attraction and recreational value of the land surrounding the Proposed Development, and examines the effect on land-use within and surrounding the Proposed Development.

13.2 Methodology

Socio-economic effects will be considered based on the guidance from Guidelines for Environmental Impact Assessment and a Handbook for EIA. A range of existing surveys and assessments of socio-economic and visitor profiles, land use and ownership, and public attitudes will be collated to provide background information against which to assess the potential for significant effects.

A desktop socio-economic assessment will consider the potential direct and indirect effects of the Proposed Development. During the construction of the Proposed Development, local sourcing will be preferred where possible, bringing direct economic benefits from the Proposed Development. An estimate of economic benefits will be provided in the ES.

An assessment of effects upon tourism receptors will also be undertaken and will take into account published data on visitor numbers and the value of tourism to the economy of Argyll and Bute. This will also include consultations with local businesses such as Caledonian MacBrayne, the Ferry Farm Bed and Breakfast and Point Sands Camping and Caravan Park, and other relevant consultees within the vicinity of the Proposed Development.

In respect of recreation and access, consultations will take place to assess the effects to users of the public rights of way, cycle routes, and bridleways. This will include consultations with Argyll and Bute Council and organisations such as British Horse Society, Ramblers Association, Scotways, Sustrans, and other relevant organisations.

13.3 Baseline Information

The Kintyre Way is a 141km walking route which opened in 2006 and starts at the north of the Kintyre peninsula in Tarbert and crosses from the west coast to the east coast and back five times ending at the south-eastern tip of the peninsula in Dunaverty. The Proposed Development is located approximately 2.5km north-west of the Kintyre Way. Additionally, the ferry road path which starts at Portachoilann and ends in Quinhill is a heritage path which marks where a ferry historically used to cross West Loch Tarbert. This 1.6km path is located 5km north of the Proposed Development. Whilst this is not an exhaustive baseline, it indicates that outdoor access is a one of the key recreation activities in the area. Further information on local attractions and businesses will be identified during site visits and the consultation process, and will be presented in the ES.

13.4 Key Sensitivities

It is considered unlikely that any significant socio-economic effects will occur as a result of the Proposed Development. Effects on any on-site or nearby tourism and recreation receptors will be considered in detail where direct effects are predicted. Direct effects include effects such as temporarily diverting a public right of way during the construction phase of the Proposed Development. Indirect effects on any tourism or recreation receptors, namely visual effects, will be considered as part of the LVIA, and will not be re-assessed under this topic heading within the ES.

13.5 Key Questions for Consultees

Key questions for the Council and Statutory Consultees are:

- Are the Council/Statutory Consultees aware of any key sensitive receptors that should be taken into account?
- Are the Council/Statutory Consultees aware of any particular consultees in the area who may wish to provide comment on the scope of this assessment?

14 NOISE

14.1 Introduction

This section of the ES will assess the effects of the Proposed Development on the potential noise impacts associated with the Proposed Development during construction, operation and decommissioning.

14.2 Proposed Survey and Assessment Methodologies

The study area will comprise noise sensitive receptors considered to be representative of residential dwellings that may experience noise effects from construction or operation of the Development. A number of these noise sensitive receptors will be chosen as representative background noise survey locations.

The proposed background noise monitoring locations will be agreed with the Environmental Health Officers from Argyll and Bute Council. At this stage it is proposed that noise monitoring will be undertaken at four locations for a minimum of three weeks survey is proposed at each location. Data obtained from the noise monitoring will be related to wind and rainfall data on the site in accordance with current guidance and accepted best practice.

14.3 Existing Conditions

The existing background noise levels will be measured in accordance with the procedure set out in ETSU Report ETSU-R-97 (1996) '*The Assessment and Rating of Noise from Wind Farms*'. Suitable measurement locations will be determined following consultation with the Local Authority and inspection of the area.

Meteorological data will be gathered at a location within the site boundary for a period concurrent with the noise monitoring. This data will be gathered for a range of heights up to the proposed hub height, and across the full height of the blade swept area, such that standardised 10m wind data can be calculated from hub height data, in line with the Institute of Acoustics Good Practice Guide.

Survey data will be analysed and a trend of the background noise level versus 10m standardised wind speed will be determined and used for the existing baseline and setting of limits in accordance with ETSU-R-97 and the IOA GPG.

14.4 Relevant Standards and Guidance

General guidance and policy concerning noise associated with new developments in Scotland is presented in the following documents:

- Scottish Planning Policy (SPP);
- Planning Advice Note 1/2011: Planning & Noise;
- The Assessment and Rating of Noise from Wind Farms, ETSU-R-97, produced by the Energy Technology Support Unit on behalf of the DTI (1996) ;
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (2013) ;
- British Standard BS 5228, Code of Practice for Noise and Vibration Control on Construction and Open Sites (2009).

14.5 Significance Criteria

14.5.1 Construction

BS 5228-1 *Code of practice for noise and vibration control on construction and open sites – Part 1: noise* provides guidance on a range of considerations relating to construction noise including the legislative framework, general control measures, example methods for estimating construction noise levels, and example criteria which may be considered when assessing the significance of any effects.

Based on the range of guidance values set out in BS 5228 Annex E, and other reference criteria provided by the World Health Organization (WHO) and the National Planning Policy Framework the following significance criteria have been derived for construction noise. The values have been chosen in recognition of the relatively low ambient noise typically observed in rural

environments. The presented criteria have been normalised to free-field day-time noise levels occurring over a time period, T, equal to the duration of a working day onsite. BS 5228-1 Annex E provides varied definitions for the range of day-time working hours which can be grouped for equal consideration. The values presented in **Table 15.1** have been chosen to relate to day-time hours from 07:00 to 19:00 on weekdays, and 07:00 to 13:00 on Saturdays.

Table 15.1: Construction Noise Significance Criteria

Construction Noise Significance Criteria	
Major	Construction noise is greater than 72 dB $L_{Aeq,T}$ for any part of the construction works or exceeds 65 dB $L_{Aeq,T}$ for more than 4 weeks in any 12 month period
Moderate	Construction noise is less than or equal to 65 dB $L_{Aeq,T}$ throughout the construction period
Minor	Construction noise is generally less than or equal to 60 dB $L_{Aeq,T}$, with periods of up to 65 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12 month period
Negligible	Construction noise is generally less than or equal to 55 dB $L_{Aeq,T}$, with periods of up to 60 dB $L_{Aeq,T}$ lasting not more than 4 weeks in any 12 month period

14.5.2 Operation

The acceptable limits for wind turbine operational noise are clearly defined in the ETSU-R-97 document and these limits should not be breached. Consequently, the test applied to operational noise is whether or not the calculated wind farm noise immission levels at nearby noise sensitive properties lie below the noise limits derived in accordance with ETSU-R-97. Depending on the levels of background noise the satisfaction of the ETSU-R-97 derived limits can lead to a situation whereby, at some locations under some wind conditions and for a certain proportion of the time, the wind farm noise may be audible. However, if noise levels at the properties in the vicinity of the wind farm are still within levels considered acceptable under the ETSU-R-97 assessment method the level of noise from the wind farm will be considered not significant in EIA terms.

14.5.3 Approach to cumulative assessment

Cumulative impacts from large scale wind turbines in a 5km radius relating to noise will be addressed and scope of the cumulative assessment will be agreed through further detailed consultation with the Council.

14.6 Potential Impacts

A summary of the potential noise impact on nearby residents resulting from construction, operation and decommissioning of the scheme is provided in **Table 15.2** below. These will be considered in the EIA.

Table 15.2 Summary of Potential Effects

Summary of Potential Noise Effects
<p>Construction</p> <ul style="list-style-type: none"> Impacts from the construction of a new access track, turbine foundations, crane hardstandings, a temporary site compound and associated onsite and offsite traffic movements; Works directly associated with turbine erection.
<p>Operation</p> <ul style="list-style-type: none"> Effects from aerodynamic noise (from the movement of the blades through the air); Effects from mechanical noise sources (from machinery housed within the turbine nacelle).
<p>Decommissioning</p> <ul style="list-style-type: none"> Effects from the decommissioning phase will utilise similar plant and activities to that of the construction phase to a lesser extent.

14.6.1 Effects to be Scoped Out

On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects, it is considered likely that the following impacts can be scoped out:

- Effects associated with vibration.

14.7 Questions for Consultees

- Do consultees agree with the proposed approach to the noise assessment, particularly the approach to collecting baseline data and the issues to be scoped out?
- Are consultees aware of any cumulative wind energy developments in the area which should be considered from a cumulative perspective?

15 MISCELLANEOUS ISSUES

15.1 Introduction

This section of the ES will assess the potential effects of the Proposed Development on the following resources:

- Air Quality and Climate;
- Health and Safety;
- Shadow Flicker and Reflectivity;
- Telecommunications, Television Reception and Utilities; and
- Aviation.

15.2 Air Quality and Climate

The Proposed Development is a sufficient distance from the closest receptors to enable an assessment of effects on air quality during the construction phase to be scoped out of the EIA.

A wind farm has the potential to make savings on greenhouse gas emissions compared to electricity generation which involves the burning of fossil fuels. The EIA will consider the current electricity generation mix and assess the level of CO₂ savings that could potentially be saved depending on the source of electricity generation the wind farm is displacing at any given time. The assessment will be undertaken in accordance with Scottish Government recommended methodology.

15.3 Health and Safety

Due to the exposed nature of wind farm sites, turbines are designed to withstand extreme weather conditions. Modern turbines are fitted with sensors which will automatically shut down and brake when wind exceed a certain speed, likewise, modern turbines also have lightning protection equipment to restrict any potential damage. Cold weather may result in ice to form on the rotor blades and operational procedures would be able to ensure the safety of both workers and public in relation to ice throw and ice fall.

Comment on health and safety issues during the construction, operation and decommissioning of the Development will be provided in the ES, along with any appropriate control measures, although no assessment of this subject is proposed.

15.4 Shadow Flicker and Reflectivity

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.

Due to the lack of explicit guidance in Scotland, guidance within England is considered to be material for assessing shadow flicker effects. Guidance presented within the Companion Guide to PPS22⁷⁴ describes shadow flicker as an effect that:

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

The Companion Guide provides further advice that the shadow flicker effect can only occur within 130 degrees either side of north relative to the turbine positions, as turbines do not cast long shadows on their southern side. It is expected that shadow flicker should not be an issue beyond of 10 rotor diameters from the Proposed Development. As the layout of the Proposed Development is likely to evolve during the EIA process, it is not yet known whether there will be any receptors within 10 rotor diameters of the final turbine locations. However, should there

⁷⁴ Scottish Government (2004) Onshore wind turbine guide. [online]. Available at: <http://www.scotland.gov.uk/Resource/0040/00405870.pdf> [Accessed on 14/11/2014]

be no receptors within this distance of the final turbine locations, a detailed assessment of shadow flicker effects will be scoped out of the EIA.

If necessary, an assessment will be undertaken to identify any potential shadow flicker effects in line with government guidance. Effects will be quantified using a computer model⁷⁵ during the EIA process and mitigation, if required, will be outlined.

15.5 Telecommunications, Television Reception and Utilities

Wind farms have the potential to interfere with electro-magnetic signals passing above ground and physically with existing infrastructure below ground. This can 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 appropriate 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.

15.6 Aviation and Radar

Wind farms have the potential to affect civil and military aviation operations through interference with radar or causing a physical obstruction.

An initial review of GIS datasets indicates that there is one civil aerodrome within 30km of the Proposed Development, Campbeltown Airport, which is located approximately 27km to the south. The airport in Islay is located 40km west of the Proposed Development.

No Ministry of Defence (MoD) bases are located within 50km of the Proposed Development; RAF Leuchars is the nearest to the Development, approximately 187km north-east, however this site is currently closing down operations and is to be refitted as an army facility. The Proposed Development is identified as being within an area described as 'Low priority military low flying area less likely to raise concerns' on the MoD Low Flying Consultation Zones map⁷⁶.

Based on the NATS En-Route Plc (NERL) publically available radar maps, a turbine with a blade tip height of 130m would not be visible to NERL Primary Surveillance Radar (PSR).

No meteorological radar stations have been identified within 50km of the Proposed Development. Holehead Meteorological Station is the nearest, approximately 98km to the northeast. This meteorological station is located within the Campsie Hills, in central Scotland, and the Proposed Development site lies out-with the buffer zone within which concerns may be raised.

Consultation with relevant aviation providers is a routine part of wind farm development and consultees will include:

- Highlands and Islands Airports Limited (HIAL);
- Civil Aviation Authority (CAA);
- Defence Infrastructure Organisation, Ministry of Defence; and
- NATS.

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

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

⁷⁵ ReSoft Ltd. "Windfarm" software, release 4.2.1.6.

⁷⁶ Ministry of Defence. *Low Flying Consultation Zones* [online] Available at: <https://restats.decc.gov.uk/cms/assets/SiteFiles/datasets/LowFlyingConsultationZones23Nov2011.pdf> [Accessed on 26/08/2014].

The assessment will utilise the baseline information gathered and consultation to determine whether there is the potential for an effect to occur on any aviation infrastructure. Should it be determined that there is the potential for an effect to occur on aviation infrastructure, the Applicant will seek to engage the infrastructure operator to identify any potential mitigation options which may be available.

15.7 Key Questions for Consultees

Key questions for consultees are:

- Are the Council/Statutory Consultees aware of any additional consultees, including local airfields?

16 SCOPING CONSULTATION

All hard-copy responses should be addressed to:

Planning and Regulatory Services,
Argyll and Bute Council,
1A Manse Brae,
Lochgilphead,
Argyll,
PA31 8RD

Please also copy responses to Arcus Consultancy Services

7th Floor
145 St. Vincent Street
Glasgow
G2 5JF
T. 0141 221 9997

E. info@arcusrenewables.co.uk

Comments from consultees are specifically invited on:

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

APPENDIX A – FIGURES

APPENDIX B – SCOPING CONSULTATION

The organisations listed below will 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.

Consultees to receive a complete copy of the Scoping Report

Argyll and Bute Council

Argyll District Salmon Fishery Board

Association of Salmon Fisheries Board

British Horse Society

Campbeltown Community Council

Garden History Society, Scotland

Historic Scotland

Kintyre Way

Marine Scotland- Science

Royal Society for the Protection of Birds

Scottish Environment Protection Agency

Scottish Natural Heritage

Scotways

Tarbert and Skipness Community Trust

Transport Scotland

Consultees consulted under their own arrangements

BAA Plc

BT

Cable & Wireless / Vodafone

Civil Aviation Authority- Airspace

Defence Infrastructure Organisation (Ministry of Defence)

Highlands and Islands Airport

NATS Safeguarding

Ofcom

Scottish Power Energy Networks

Scottish Water