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SP Energy Networks

On behalf of
SP Transmission Plc

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UK12-22885

ROUTEING STRATEGY CONSULTATION DOCUMENT

STRANOCH WIND FARM TO MARK HILL SUBSTATION 132KV OVERHEAD LINE

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132KV OVERHEAD LINE**

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GLOSSARY

132 kV	132 kilo-volt capacity of an electricity power line
AOD	Above Ordnance Datum
ASA	Archaeologically Sensitive Area
EIA	Environmental Impact Assessment
ES	Environmental Statement
GDL	Garden and Designed Landscape
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HER	Historic Environment Records
Holford Rules	A set of 7 rules, first developed in 1959 by Sir William Holford, which define the principles of route selection and which continue to inform transmission line routeing in the UK.
IBA	Important Bird Areas are designated by Birdlife as places of international significance for the conservation of birds and other biodiversity ¹ . They are a non-statutory, international designation.
LCT	Landscape Character Type
LECU	Local Energy Consents Unit (Scottish Government)
OHL	Overhead line
PAN	Planning Advice Note
Planning application	An application for planning permission under the Town and Country Planning (Scotland) Act 1997, as amended by the Planning etc. (Scotland) Act 2006. It should be noted that consent under section 37 of the Electricity Act 1989 usually carries with it deemed planning permission from the Scottish Ministers under Section 57 of the Town and Country Planning (Scotland) Act 1997.
Preferred route	The route option which is considered to represent the optimum balance between the various environmental considerations.
Proposed route	The final route within which alternative OHL route alignments will be defined and appraised.
Ramsar site	Site protected under The Convention on Wetlands, called the 'Ramsar Convention', which provides the framework for the conservation and use of wetlands and their resources.
Regional Scenic Area	Areas identified by Dumfries & Galloway Council as being areas of regional importance for scenic quality. They are afforded protection under Policy NE2 of the Dumfries & Galloway Local Development Plan (2014).
Route options	A number of possible routes within the study area, for comparative analysis.

¹ www.birdlife.org

Section 37 (s37) application	An application for development consent under section 37 of the Electricity Act 1989.
SAC	Special Area of Conservation - designated under Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (known as - The Habitats Directive).
Scenic Area	Areas identified by South Ayrshire Council as being areas of regional importance for scenic quality, based on The Ayrshire Landscape Character Assessment (SNH 1998). These areas are afforded protection under LDP Policy: Protecting the Landscape, within the South Ayrshire Local Development Plan (2014).
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SPA	Special Protection Area – designated under Directive 2009/147/EC on the conservation of wild birds (the Birds Directive).
SPEN	Scottish Power Energy Networks
SPP	Scottish Planning Policy
SPT	Scottish Power Transmission
SSSI	Site of Special Scientific Interest – designated by SNH under the Nature Conservation (Scotland) Act 2004.
Study area	The area of land which comprises the area within which route options will be identified and evaluated.
SUW	Southern Upland Way
Wood pole OHL	An overhead line design specification comprised of either single poles or an 'H' pole configuration. The nominal height of the wood poles is likely to be c.15m, with a maximum above-ground height of 22m and a minimum above-ground height of 10m. The spacing between the poles will vary but will generally be 100m, with a maximum span length of 150m.
ZTV	Zone of Theoretical Visibility - the theoretical visibility of an object in the landscape.

EXECUTIVE SUMMARY

Scottish Power Energy Networks (SPEN) proposes to construct a new 132 kilovolt (kV) overhead line (OHL) to connect the proposed Stranoch wind farm to the existing Mark Hill substation, approximately 4 km north of Barrhill. The OHL will be supported on wood poles of a typical height of 15 m, and an anticipated average span length of 100 m.

This routeing strategy consultation document outlines the process by which a preferred route for the OHL has been identified.

The preferred route will be selected based on a balance of environmental, technical and economic factors. The selection of preferred proposed route is undertaken by means of a five-stage process as follows:

- Stage 1: development of route options;
- Stage 2: appraisal of route options and selection of a preferred route;
- Stage 3: consultation on preferred route;
- Stage 4: modification of preferred route following consultation; and
- Stage 5: selection of a proposed route.

The project has currently reached stage 3 of the above process.

Stage 1 involved environmental baseline data gathering to identify existing environmental features and sensitivities across a study area, which was defined as the area between the existing Mark Hill wind farm to the north and the proposed Stranoch substation to the south. A buffer zone around the study area was also defined for the purposes of identifying potential impacts of the proposed development on the surrounding environment. To the west the study area is bounded by the Glen App and Galloway Moors Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) and, to the east, lies the western periphery of the consented Kilgallioch wind farm.

The following environmental features were identified and mapped: sites/features designated at international/European/national level (Special Protection Areas (SPAs); Special Areas of Conservation (SAC); Ramsar sites; Sites of Special Scientific Interest (SSSIs); landscape character types; gardens and designed landscapes; listed buildings; scheduled monuments; settlements, residential properties and housing allocations; other infrastructure including wind farms (existing and proposed), roads and railways, and existing transmission infrastructure; and recreational amenity features including core paths and tourist accommodation. A sensitivity weighting of high, medium or low sensitivity was defined for each environmental feature identified, with reference to relevant guidance² and professional judgement. Based on the relative sensitivity of environmental features, three possible route options were identified.

At Stage 2, a comparative analysis of the route options was carried out, in order to differentiate between these options and identify an overall preferred route. For the purposes of this analysis, the study area was divided into three sections, based on the characteristics of land use within each section. Each route option was assessed separately in respect of the high and medium sensitivity environmental factors within and adjacent to it, within each section of the study area. The route option containing fewest high and medium sensitivity constraints was identified as preferred; this adopts a central route through the study area.

Consultation on the preferred route (Stage 3) will be undertaken in spring 2017. The design of the project will be informed by responses received from this consultation exercise and by

² Guidance has included SP Energy Networks (May 2015) *Major Electrical Infrastructure Projects - Approach to Routeing and Environmental Impact Assessment*, as well as guidance pertinent to each environmental topic

continuing detailed surveys, which may identify any as yet unknown engineering, environmental or land use constraints and give rise to further modifications to the route.

All comments received will inform further consideration of the preferred route (Stage 4) and the selection of a proposed route (Stage 5), which will be taken forward for more detailed environmental assessment prior to submission of an application for section 37 consent under the Electricity Act 1989 (for the OHL). These applications will be developed for submission in 2017.

Comments on this document should be sent to:

Colin Wylie
Community Liaison Manager
Ochil House
10 Technology Avenue
Hamilton International Technology Park
Blantyre
G72 0HT

Copies of this document can be found online at
www.spenergynetworks.co.uk/pages/community_consultation

Public consultation events detailing the proposals within this document will be held on 1st and 2nd March 2017 from 2pm to 7.30pm at the following location:

Barrhill Memorial Hall,
Barrhill,
Girvan

SP Energy Networks request that all consultation responses are received by 30th April 2017.

1. INTRODUCTION

1.1 Background

Scottish Power Transmission Plc (SPT) is the transmission license holder in south west Scotland and is obligated, under Section 9 of the Electricity Act 1989:

- to develop and maintain an efficient, coordinated and economical system of electricity transmission; and
- to facilitate competition in the generation and supply of electricity.

The company also has obligations to offer non-discriminatory terms for connection to the transmission system, both for new generation and for new sources of electricity demand.

Scottish Power Energy Networks (SPEN) is responsible for the delivery of the transmission network on behalf of SPT. Under Section 37 of the Electricity Act 1989, SPEN is required to seek consent from the Scottish Ministers for the construction of any non-exempted overhead line operating at a voltage greater than 20 kilovolts (kV).

There is a need to connect the proposed Stranoch wind farm to the transmission grid and, as such, SPEN is obliged to provide a connection for the wind farm which lies within the area covered by their license. The proposed grid connection will comprise an overhead line which will run from a substation on the Stranoch wind farm site to the existing Mark Hill wind farm substation, approximately 4 km north of Barrhill.

The scope of this study is limited to the routeing of the Stranoch wind farm OHL connection and does not consider the siting of the Stranoch substation (located at approximate NGR NX 150698). The locations of the different elements of the existing electrical infrastructure within the routeing study area, including the wind farm locations, are illustrated on Figure 1.1.

This routeing strategy consultation document is intended to inform the consultation process on the location of the preferred route.

1.2 Project Need

SPT has received a Grid Connection Application from the developers of the Stranoch wind farm. The proposed wind farm comprises up to 24 turbines and has a potential installed capacity of up to 72 MW. Stranoch wind farm is being developed by the electricity generator Wind Prospect Developments Ltd and was consented by the Scottish Ministers in July 2016.

Figure 1.1 shows the location of the proposed Stranoch wind farm and the existing Mark Hill and Arecleoch wind farms. It also shows the location of the proposed Stranoch wind farm substation and the existing Mark Hill substation.

1.3 Planning Policy Context

Section 37 of the Electricity Act 1989 provides that an application to install or keep installed an above-ground electricity line shall be made to the Scottish Ministers who may direct that planning permission for the development and any ancillary development shall be deemed to be granted under Section 57 (2) of the Town & Country Planning (Scotland) Act 1997.

The UK is legally committed to meeting 15% of its energy demand from renewable sources by 2020, as set out within the Renewable Energy Directive 2009/28/EC. The Scottish Government's *Electricity Generation Policy Statement* (July 2013) states that Scotland's generation mix should:

- deliver a secure source of electricity supply;
- deliver energy at an affordable cost to consumers;

- be largely decarbonised by 2030; and
- achieve the greatest possible economic benefit and competitive advantage for Scotland including opportunities for community ownership and community benefits.

The proposed development will provide a grid connection to a renewable energy project; therefore, it is a necessary part of energy infrastructure without which new generation projects are unable to contribute to the achievement of these targets.

Sections 25 and 37 (2) of the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning etc. (Scotland) Act 2006) require that planning decisions are made in accordance with the development plan, unless material considerations indicate otherwise.

There are two current development plans to cover the area between the proposed Stranoch wind farm and the existing Mark Hill substation as follows:

- Dumfries and Galloway Local Development Plan (2014); and
- South Ayrshire Local Development Plan (2014).

Policies within the following documents are also considered material considerations:

- The Climate Change Scotland Act (2009);
- The Scottish Renewables Action Plan (2009) and 2020 Route Map for Renewables in Scotland;
- The National Planning Framework 3 (NPF3) (2014);
- Scottish Planning Policy (SPP) (2014);
- Planning Advice Notes (PANs); and
- Scottish Government Web-based renewable energy advice³.

1.4 Project Scope

In response to the grid connection application from the developers of the Stranoch wind farm SPEN proposes to discharge its obligation based on a balance of technical, economic and environmental considerations. . To achieve this SPEN therefore proposes a single circuit overhead line (OHL) supported on wood poles typically 15 m in height, with span lengths of approximately 100 m. The proposed OHL is to be constructed at 132 kV to facilitate the capacity of the proposed Stranoch wind farm only.

1.4.1 Overhead Line Design

The ENA Specification 43-50 overhead line design specification⁴ (commonly referred as to a 'trident' overhead line design) is a UK Electricity Industry Design Standard and the final designation of pole type is generally dependant on three main factors: altitude, weather and the topography of the route. The size of poles and span lengths will also vary depending on these factors, with poles being closer together at high altitudes to withstand the effects of greater exposure to high winds, ice and other weather events. The pole configuration, height and the distance between poles will therefore only be fully determined after a detailed line survey.

The proposed wood pole will support three conductors (wires) in a horizontal flat formation as shown in Figure 1.2.

Following identification of the proposed route for the new OHL, a detailed topographical survey will be carried out. This is required to identify the proposed positions and heights of each individual wood pole. Site surveys to examine the subsoil conditions will also be carried out at

³ <http://www.gov.scot/Topics/Built-Environment/planning/Policy/Subject-Policies/Utilities/Delivering-heat-electricity/renewables-advice>, accessed 16/06/2016

⁴ Energy Networks Association (1984) *Technical Specification 43-50 132kV Single Circuit Overhead Lines on Wood Poles*; Issue 1

proposed wood pole positions where required. These will inform the wood pole foundation designs.

1.4.2 Overhead Line Construction and Maintenance

Overhead line construction typically follows a standard sequence of events as follows:

- prepare access to the pole locations;
- install pole foundations, where necessary;
- erect wood poles;
- string conductors; and
- reinstate pole sites and remove temporary accesses.

For wood pole line construction, the 'poles' are erected using normal agricultural machinery such as a digger with a lifting arm. A tracked excavator and low ground-pressure vehicles, (e.g. tractor, argocat, quad bikes) are used to deliver, assemble and erect each wood pole structure at each location. The erection of the wood poles requires an excavation to allow the pole brace block and/or steel foundation braces to be positioned in place. A typical pole excavation is 3 m² x 2 m deep. The excavated material is then sorted into appropriate layers and used for backfilling. It would be rare for concrete to be used in the foundations of wood poles. This would normally only be used where ground conditions are particularly unstable. The excavator(s) then hoists the assembled structure into position and once the structure has been braced in position the trench is backfilled.

Prior to stringing the conductors, roads and railways that are to be crossed by the power line have to be protected by building a scaffold tunnel through which vehicles/trains can pass. Other obstacles such as existing power lines have to be either switched off, deviated or protected using 'live line' scaffolds.

In all cases, every effort is made to cause the least disturbance to landowners and local residents during construction, and ground disturbance during construction of the new line is reinstated.

1.5 The Development and Consenting Process

1.5.1 Phase A: Routeing and Consultation

Applying SPEN's approach to routeing the objective of the route selection process is to identify a technically feasible and economically viable OHL route, between specified points, which causes the least disturbance to people and the environment. This involves the collation and analysis of existing environmental and technical information in order to identify a 'Preferred Route' for the new OHL.

SPEN is committed to consulting with statutory and non-statutory bodies throughout the development process, not only as a statutory duty within the planning system, but as a measure to involve and gain feedback from as broad a range of consultees and stakeholders as possible. This routeing strategy consultation document sets out the steps taken in identifying the 'Preferred Route' for the new OHL and is provided for issue to interested stakeholders, giving them the information required to engage and comment on the project at an early stage.

Following this consultation, it is possible that some changes to the route will be suggested as a result of the emergence of new information. The suggested changes would be evaluated and, if necessary, subjected to additional consultation. Consultation on the Preferred Route will inform the identification of a 'Proposed Route' which will be taken forward for further assessment and consultation as part of the Environmental Impact Assessment (EIA) process.

1.5.2 Phase B: Environmental Impact Assessment

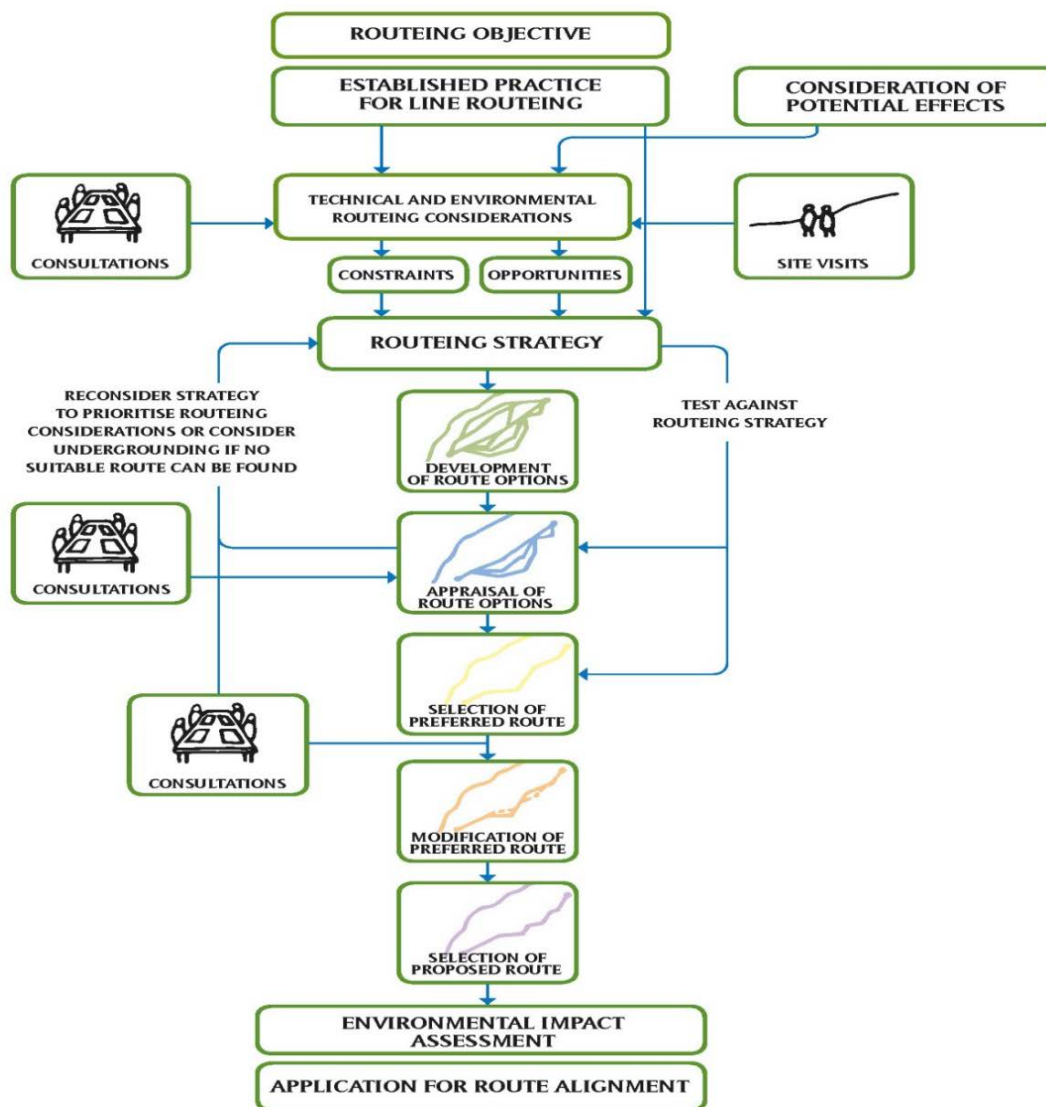
The EIA Process is set out in full within the *Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000* (hereafter 'the EIA Regulations'). EIA is required for developments falling within Schedule 2 to the EIA Regulations that are likely to have significant effects on the environment by virtue of factors such as nature, size or location. In determining whether the proposed development is likely to have significant effects on the environment, regard should be had to the selection criteria detailed at Schedule 3 to the EIA Regulations.

Under the EIA Regulations, any development defined by Section 37 of the Electricity Act that is considered likely to have significant effects on the environment, because of factors such as its nature, size or location, must be subject to EIA and an Environmental Statement (ES) must be submitted with the consent application.

Where EIA is required, environmental information must be provided by the developer in an Environmental Statement. Schedule 4 specifies the information that must or may be provided in such a Statement.

The proposed development will be some 20 km in length and, although it will not include ancillary infrastructure in the form of substation development, it has the potential to give rise to significant effects on the environment due to its nature and size. On this basis, SPEN proposes to submit an Environmental Statement with the application for consent for the development.

The following diagram illustrates the main stages in identifying a Proposed Route and carrying out the EIA, and highlights the stages at which consultation will occur:



1.6 Structure of this Document

This Routeing Strategy Consultation Document is structured as follows:

- Section 2 outlines the methodology adopted for the routeing process;
- Section 3 summarises the environmental and technical features and sensitivities which have informed this study;
- Section 4 presents the route options and the analysis of each route option and provides a description the preferred route that has been identified as a result of the analysis; and
- Section 5 provides an overview of the proposed consultation process, highlighting the timescale and the key questions to consider when responding. It also describes the next steps in the routeing and environmental assessment process.

This document is supported by appendices as follows:

- Appendix 1 presents the figures accompanying this report;
- Appendix 2 provides a list of sources of the environmental data used in this report;
- Appendix 3 provides a list of the environmental features within the study area and details their relative sensitivity; and
- Appendix 4 describes the detailed environmental analysis of the route options.

2. ROUTEING STRATEGY METHODOLOGY

2.1 Overview

As set out in Chapter 1, the objective of the routeing strategy is to identify a technically feasible and economically viable OHL route, between specified points, which causes the least disturbance to people and the environment.

The methodology used for developing and assessing route options is consistent with SPEN guidance⁵. The guidance recommends that every project should broadly follow the process set out below:

- Recognition of established practice for overhead line routeing;
- Consideration of potential effects;
- Technical and environmental routeing considerations and collection of background information;
- Development of route options;
- Appraisal of route options;
- Selection of a Preferred Route;
- Consultation and subsequent modification of the Preferred Route; and
- Selection of the Proposed Route.

The sections below describe the way in which we have applied this process to the proposed development.

2.2 Established Practice for Overhead Line Routeing

The approach adopted in developing and assessing route options is consistent with relevant SPEN guidance (*Ibid*) and relevant National Grid guidance⁶. This guidance recommends that the identification and comparison of route options should adopt the following overarching principles:

- preference for an option which could involve using or adapting existing infrastructure, rather than building new infrastructure;
- preference for a shorter option over a longer one;
- preference for a financially less expensive option over more expensive options; and
- preference for options which avoid or mitigate environmental and socio-economic impacts.

The guidance recommends appropriate application of the "Holford Rules" to inform routeing. The Holford Rules were first developed in 1959 by Sir William Holford and continue to inform transmission line routeing in the UK⁷. These rules advocate the application of a hierarchical approach to routeing which first avoids major areas of highest amenity, then smaller areas of high amenity, and finally considers factors such as backdrop, woodland and orientation.

It should be noted that the Holford Rules apply the term 'highest/high amenity' to refer to environmental designations and classifications such as Natura 2000 sites, Sites of Special Scientific Interest (SSSI), Scheduled Monuments, and Listed Buildings.

⁵ SP Energy Networks (May 2015) *Major Electrical Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment*, available here: http://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_FINAL_20150527.pdf

⁶ National Grid (2012) *Our approach to the design and routeing of new electricity transmission lines*; and National Grid (2012) *Our approach to Options Appraisal*

⁷ The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) Plc. (now National Grid Transmission (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by Scottish Hydro Electric Transmission Limited (SHETL) in 2003 to reflect Scottish circumstances.

The Holford Rules are reproduced in Box 1 below.

Box 1: The Holford Rules

Rule 1: Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence.

Rule 2: Avoid smaller areas of high amenity value or scientific interest, by deviation; provided that this can be done without using too many angle towers (i.e. the more massive structures which are used when line change direction).

Rule 3: Other things being equal, choose the most direct line, with no sharp changes of direction and thus fewer angle towers.

Rule 4: Choose tree and hill backgrounds in preference to sky background wherever possible and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.

Rule 5: Prefer moderately open valleys with woods, where the apparent height of the towers will be reduced and the views of the line will be broken by trees.

Rule 6: In country which is flat and sparsely planted, keep the higher voltage lines as far as possible independent of smaller lines, converging routes, distribution lines and other masts, wires and cables so as to avoid a concatenation or 'wirescape'.

Rule 7: Approach urban areas through industrial zones where they exist and where pleasant residential and recreational land intervenes between the approach line and substation, go carefully into the costs of undergrounding, for lines other than those of the highest voltage.

The SPEN guidance also recommends application of Forestry Commission guidelines⁸, where a new overhead line may pass through woodland. These guidelines recommend that overhead lines should be routed to avoid passing through woodland, where possible, by following open space and/or running alongside woodland. However, where there is no alternative, an overhead line through a forested area should:

- avoid areas of landscape sensitivity;
- avoid the line of sight of important views;
- be kept in valleys and depressions;
- cross skyline or ridges where they drop to a low point;
- not divide a hill into two similar parts where it crosses over a summit;
- follow alignments diagonal to the contour as far as possible; and
- be inflected upwards in hollows and downwards on ridges.

2.3 Consideration of Potential Effects

SPEN's approach to the routeing of overhead lines⁹ is based on the premise that the major effect of an overhead line is visual and that the degree of visual intrusion can be reduced by careful routeing. A reduction in visual intrusion can be achieved by routeing the line to fit the topography, by using topography and trees to provide screening and/or background, and by routeing the OHL at a distance from settlements and roads. In addition, a well-routed OHL takes into account other environmental and technical considerations and will avoid, wherever possible, the most sensitive and valued natural and man-made features.

⁸ Forestry Commission (2014) *Design techniques for forest management planning*

⁹ As described within section 6.2 of the SPEN guidance (May 2015)

2.4 Technical and Environmental Routeing Considerations and Collection of Background Information

2.4.1 Study Area and Buffer Zone

Based on the likely effects, a study area and a surrounding buffer zone are defined for this routeing process, as described below. The purpose of these is as follows:

- the study area comprises the area within which various options for locating the proposed development are identified and assessed; and
- the buffer zone comprises a larger area within which potential impacts of the proposed development on the environment may occur. Potential impacts are identified and evaluated, in order to define the overall preferred route option.

The study area for the proposed development has been defined through:

- Identification of the start and end points for the connection, which represent the fixed geographical elements of the route; and
- Identification of the technical, environmental and economic constraints which exist in the area between these two points. This responds to the requirements of Holford Rules 1 and 2, and recognises that the route is not required to take a direct point between the start and endpoints, and must route according to the constraints identified.

The buffer zone is defined as a 6 km buffer distance from the study area, on the basis of maximum perceptibility of a wood pole OHL in the landscape¹⁰.

2.4.2 Collection of Background Information

An initial evaluation of the range of environmental and technical constraints is undertaken during this stage. Through a combination of Geographic Information Systems (GIS) analysis, field work, consultation and liaison with the wider technical and environmental project team, those constraints considered key in terms of avoidance, are mapped for the study area and buffer zone. This includes current baseline conditions, as well as known potential future conditions, in relation to the following features:

- Ecology;
- Ornithology;
- Landscape and visual amenity;
- Archaeology and cultural heritage;
- Recreation and tourism;
- Hydrology, hydrogeology and geology;
- Residential dwellings and land use; and
- Other infrastructure (incl. transmission lines, wind farms (planned and consented), and roads).

Digital data sets describing the nature and extent of each of the environmental features described were obtained from published sources and from SPEN records¹¹, and were transferred to a Project Geographic Information System (GIS) for subsequent analysis, and have been verified during field reconnaissance. Data sources for all of the digital data sets are listed in Annex B.

¹⁰ As set out within D Horn, I McAulay and M Turnbull (May 2010) *High Voltage Wood Pole Transmission and Distribution Main Interconnector Lines in Rural Landscapes: Perceptibility*

¹¹ Data for existing and proposed transmission lines and substations was provided by SPEN

Of critical importance during this stage, for many overhead lines, is the identification and understanding of the range of technical constraints that may influence the routeing of a line. Whereas environmental constraints may be somewhat flexible in the degree of constraint they represent, technical constraints commonly are not. An example would be the location of large waterbodies that cannot be crossed by an OHL.

2.5 Stage 1: Development of Route Options

In response to the identification of the key environmental and technical constraints, a sensitivity weighting (high, medium or low sensitivity) is defined on an aspect-by-aspect basis, for each environmental feature identified. This is undertaken with reference to Holford Rules 1 and 2 and by using relevant guidance and professional judgement.

A "heat map" is generated which assigns colours (red, amber, green) to features of high, medium and low sensitivity, respectively. The purpose of heat mapping is to provide a graphic indication of overall receptor sensitivity across the study area; it does not ascribe absolute values to any particular area (i.e. the red areas are not considered absolute 'no go' areas and the green areas are not considered to be absolutely constraint-free).

Table 2.1 describes how the sensitivity of features to the type of development proposed is assigned, and outlines the typical response for route selection.

Table 2.1: Sensitivity Analysis and Route Identification Response			
Sensitivity	Justification	Examples	Route Identification Response
High	Holford Rule 1 features (international and national designations) or environmental features considered particularly sensitive to transmission infrastructure Technical constraints of key significance	European designated sites (e.g. Special Protection Areas); National Park; National Scenic Area; High voltage OHL	Avoid wherever possible and prioritise for mitigation
Medium	Holford Rule 1 features considered less sensitive to transmission infrastructure; Holford Rule 2 features (regional and local designations)	Geological SSSIs; Category B and C Listed Buildings; Local Nature Reserve	Proceed with caution
Low	Holford Rule 2 features considered not to be sensitive to transmission infrastructure	Geological Conservation Review Sites	Some constraints of lesser sensitivity - no issue for route identification

In the case of landscape and visual amenity, it is not the case that particular areas or features can be easily recognised and separated into high, medium and low sensitivity categories. In addition, the study area for this project includes two different local authority areas with differing types of local landscape designations. Therefore, the sensitivity of the constituent landscape character types to the type of development proposed has been considered with reference to criteria provided in Landscape Institute and IEMA (2013)¹² and the following parameters:

- the value attributed to landscapes based on clear evidence such as literary reference or formal landscape designation and/or classification;
- landscape quality and condition;

¹² Landscape Institute and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition

- existing land-use;
- the pattern and scale of the landscape;
- visual enclosure/openness of views and nature and distribution of visual receptors;
- the scope for mitigation that would be in character with the existing landscape; and
- the degree to which the particular element or characteristic contribution to the landscape character and can be replaced or substituted.

It should be noted that the definition of features as being of high, medium and low sensitivity does not necessarily denote that the proposed development would have a significant adverse effect on this feature. The determination of potential effects shall be undertaken as part of a detailed environmental impact assessment on a proposed OHL alignment, and any associated development, carried out as part of a future application for consent under section 37 of the Electricity Act 1989.

Based on the relative sensitivity across the study area, a number of route options are identified. There is no definitive width for the route options and these will be as broad or as narrow as the constraints and sensitivity analysis dictate. The preferred alignment will, notwithstanding the emergence of further constraints information, fall within one of these routes. The aim of identifying routes is to identify a geographic area within which a range of alignment options can be identified.

Based on the constraints analysis undertaken, three route options were identified within the study area.

2.6 Stage 2: Appraisal of Route Options and Selection of Preferred Route

To allow identification of a Preferred Route, an appraisal of the route options is undertaken. The purpose of this is to identify the relative potential of each route option, with a focus on potential landscape and visual impacts of the options as directed by Holford Rules 3 to 7. It may be that all routes exhibit a comparative level of potential. However, this is rare, especially when appraised in terms of potential impacts on all of the constraints identified.

The conclusion of this appraisal will be the emergence of a 'Preferred Route'. Whilst this route will be defined based upon the available data to date, further consultation or technical matters may emerge which render the Preferred Route no longer the best option (for example the emergence of hitherto unknown technical constraints). Where this occurs, a review of the route options would be undertaken to determine the proposed route.

This appraisal is carried out by means of the following principal steps:

2.6.1 Step 1: Field Surveys

In order to ground truth and to supplement the landscape and visual desk work, a site walkover was undertaken by landscape specialists from Ramboll Environ on 12-13th May 2016. The Duisk River valley was surveyed from the A714 and B7027. Its upper slopes were accessed using local tracks, with no access restrictions. The plateau moorland area was assessed from the minor road which runs between Barhill and New Luce. The valleys of Water of Tig and Dunnack Burn were accessed via the farm track of Balkissock.

A field visit to gain a more detailed understanding of the survival of designated cultural heritage assets and the surrounding landscape was also undertaken by cultural heritage specialists from CFA Archaeology on 20th May 2016. The visibility, prominence and setting of scheduled monuments within the study area were examined using public roads.

2.6.2 Step 2: Environmental Analysis

A comparative environmental analysis of identified route options was undertaken, on a topic-by-topic basis, in order to identify a Preferred Route.

To allow the detailed consideration of each route option, the study area was split into three sections on the basis of land cover. The three sections were defined as follows:

- Section A: the Stranoch wind farm site, comprising open moorland landscape;
- Section B: Arecleoch Forest, comprising plantation woodland and Arecleoch wind farm;
- Section C: Barrhill, comprising the Duisk river valley and village of Barrhill.

The splitting of the study area also allowed for the consideration of potential opportunities to link a preferred route option in one section with a different preferred route option in another section.

The environmental analysis comprised a qualitative appraisal of each route option, which involved professional judgement regarding the sensitivity of individual environmental features. The appraisal considered the potential interaction of transmission infrastructure with key environmental features and sensitivities, focussing on factors which differentiate the route options.

2.6.3 Step 3: Selection of the Preferred Route

Based on the analysis described above, an indicative Preferred Route has been identified, which avoids environmentally sensitive features to the greatest extent possible and offers the greatest potential for mitigation. The definition of the Preferred Route is based on professional judgement regarding the overall potential of each route option to accommodate the proposed OHL.

This Preferred Route will be taken forward for formal consultation.

2.7 Stage 3: Consultation on the Preferred Route

Consultation on the Preferred Route is a key part of identifying the best on-balance route option, i.e. that which is technically feasible and economically viable, and which causes the least disturbance to people and the environment. This Routeing Strategy Consultation Document facilitates consultation on the Preferred Route for the proposed Stranoch wind farm to Mark Hill substation OHL.

2.8 Stage 4: Modification of the Preferred Route

Whilst the analysis of route options undertaken up to this point is based upon all available technical and environmental constraints and consultation with statutory bodies, consultation with a broader range of stakeholders can raise further constraints which were hitherto unidentified, but which are important in the local context of the study area. In response to consultation feedback, the preferred route may be modified in some locations.

2.9 Stage 5: Selection of Proposed Route

Following the consultation, any changes required to the Preferred Route are evaluated and, if it is found that these can be accommodated in general routeing terms, they are incorporated. With the changes incorporated, the route then forms the Proposed Route which is taken forward for further analysis within the Environmental Impact Assessment (EIA).

The Environmental Statement (ES) will report the findings of the EIA, identify and describe in detail the potential environmental impacts of the proposed development during construction and operation, identify any appropriate mitigation measures, and confirm whether any potentially significant environmental effects remain.

3. TECHNICAL AND ENVIRONMENTAL ROUTEING CONSIDERATIONS

3.1 Study Area

The study area is defined as the area between the existing Mark Hill wind farm to the north and the proposed Stranoch substation to the south. The main environmental and technical constraints in the area between these two points are:

- various proposed and existing wind farm developments;
- the Glen App and Galloway Moors Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI);
- water bodies, including the Duisk River;
- cultural heritage features, particularly scheduled monuments in the vicinity of The Stranoch hill;
- Arecleoch Forest commercial plantation forestry area;
- the Kilmarnock railway line; and
- residential dwellings in and around Barrhill.

These main constraints have led to the definition of the study area as shown on Figure 3.1. The boundaries of the study area are defined as follows:

- to the west, the study area is bounded by the Glen App and Galloway Moors SPA and SSSI and;
- to the east, the study area is bounded by the western periphery of the consented Kilgallioch wind farm, the proposed Altercannoch wind farm and the existing Mark Hill wind farm. Turbine locations within each wind farm site have been plotted in GIS and, for the purposes of identifying of potential route corridors, a conservative buffer distance of 350 m was applied to each turbine, in order to minimise potential technical issues (turbulence) associated with proximity of an OHL to a wind turbine.
- to the north, the study is bounded by Craig Wood SSSI and is defined in accordance with the principle of adopting as direct and short a route as possible for new infrastructure.

For the purposes of the environmental appraisal, a buffer zone of up to 6 km from this study area is also defined, as described in section 2.4.1. The definition of this buffer zone allows for consideration of the potential for the proposed development to indirectly impact upon important designated areas, landscapes and views. The buffer zone is shown on Figure 3.2.

3.2 Environmental and Technical Baseline

Baseline information was used as a basis for the analysis of environmental constraints and to inform the approach adopted in the identification and appraisal of route options. The environmental and technical baseline information is presented in Table 3.1 below.

The constraint analysis was undertaken using Geographical Information Systems (GIS) which utilised available digital datasets. In addition, ecological survey results were taken from a number of Environmental Statements produced in respect of wind farms within the study area and buffer zone¹³. This analysis provided for the identification of alternative routes which were then tested in respect of technical priorities.

¹³ Wind Prospect Developments Ltd (January 2013) *Stranoch Wind Farm Environmental Statement*;
Chirmorie Wind Farm Ltd (November 2015) *Chirmorie Wind Farm Environmental Statement*;
Scottish Power Renewables (March 2006) *Areacleoch Wind Farm Environmental Statement*;
Catamount Energy Ltd and Force 9 Energy Ltd (July 2005) *Mark Hill Wind Farm Environmental Statement*;
Scottish Power Renewables Ltd (January 2010) *Kilgallioch Wind Farm Environmental Statement*

Topic	Study Area	6 km buffer zone
Ecology and Ornithology	<p>No designated sites are present within the study area.</p> <p>Ancient woodland areas are concentrated around the banks of the River Duisk near Barrhill, in the north of the study area. A smaller area of ancient woodland is also present along the Water of Tig in the north west of the study area. Ancient woodland may provide habitat for red squirrel, pine marten and wildcat.</p> <p>Habitat in the northern part of the study area comprises blanket bog, modified bog, wet heath and coniferous forestry plantation. There is semi-improved and improved grassland around the settlement at Barrhill, and wet modified bog, blanket bog, and marshy grassland south of B7027.</p> <p>The central section of the study area is comprised primarily of plantation forestry and modified bog on peat of varying depths and in varying condition, with lowland acid grassland and rush pasture to the east.</p> <p>Habitat within the southern part of the study area is dominated by wet modified bog (~67%), but also contains marshy grassland, acid/neutral flush, blanket bog, semi-improved acid grassland, dry dwarf shrub heath, coniferous plantation, swamp, continuous bracken, valley mire, improved grassland, ephemeral grassland, standing water, acid fen, and continuous scrub.</p> <p>The NBN Gateway identifies the following protected species within the three 10 km grid squares that encompass the study area:</p> <ul style="list-style-type: none"> • Otter <i>Lutra lutra</i>; • Pine marten <i>Martes martes</i>; • Red squirrel <i>Sciurus vulgaris</i>; • Badger <i>Meles meles</i>; • Soprano pipistrelle bat <i>Pipistrellus pygmaeus</i>; • Atlantic salmon <i>Salmo salar</i>; • Common frog <i>Rana temporaria</i>; and • Common toad <i>Bufo bufo</i>. 	<p>Thirteen ecological designated sites are located within the 6 km buffer zone as shown in Figure 3.3. These are:</p> <ul style="list-style-type: none"> • Glen App and Galloway Moors SPA/SSSI, -immediately west and southwest of the study area designated for the protection of Hen Harrier; • Kirkcowan Flow SAC/SSSI, approximately 4.5 km east of the study area designated for the protection of blanket bog and depressions on peat substrates; • Lendalfoot Hills Complex SAC, approximately 3.5 km north west of the study area designated for the protection of upland habitat features; • Kilhern Moss SAC/SSSI, approximately 5.5 km south east of the study area designated for the protection of blanket bog and depressions on peat substrates.; • River Bladnoch SAC, which flows roughly south east, approximately 2.5 km east of the study area at its closest, designated for the protection of Atlantic Salmon; • Aldons Hill SSSI, approximately 4 km north west of the study area designated for the protection of Subalpine calcareous grassland, dry heath and wet heath as well as Upland assemblages; • Bennane Head Grasslands SSSI, approximately 6.0 km north west of the study area, designated for the protection of Green-winged orchid (<i>Orchis morio</i>) and lowland neutral grassland; • Craig Wood SSSI, approximately 200 m east of the study area, designated for the protection of upland oak woodland; • Feoch Meadows SSSI, approximately 1.0 km east of the study area, designated for the protection of fen meadow and lowland neutral grassland; • Knockdaw Hill SSSI, approximately 3.5 km northwest of the study area designated for the protection of Alkaline fen, and Subalpine calcareous grassland, dry heath, and wet heath as well as Upland assemblages;

Table 3.1: Baseline Environment of Study Area and Buffer Zone		
	<p>Protected species recorded during baseline ecological studies for wind farm developments within the study area include:</p> <ul style="list-style-type: none"> • Soprano pipistrelle <i>Pipistrellus pipistrellus</i> • Common pipistrelle <i>Pipistrellus pygmaeus</i> • Daubenton's bat <i>Myotis daubentonii</i> • Leisler's bat <i>Nyctalus leisleri</i> • Common lizard <i>Lacerta Zootoca vivipara</i> • Common frog <i>Rana temporaria</i> • Adder <i>Vipera berus</i> • Water vole <i>Arvicola amphibius</i> • Otter <i>Lutra lutra</i> • Pine Marten <i>Martes martes</i> • Palmate newt <i>Triturus Lissotriton vulgaris</i> • Hen harrier <i>Circus cyaneus</i> • Merlin <i>Falco columbarius</i> • Short-eared Owl <i>Asio flammeus</i> • Golden Plover <i>Pluvialis apricaria</i> <p>The invasive species Japanese Knotweed and Rhododendron sp have also been recorded within the study area.</p>	<ul style="list-style-type: none"> • Knockdolian Hill SSSI, approximately 3.8 km northwest of the study area, designated for the protection of Subalpine calcareous grassland; • Littleton and Balhamie Hills SSSI, approximately 3.7 km northwest of the study area, designated for the protection of Alkaline fen, Basin fen, and Subalpine calcareous grassland; and • Galloway Forest Park IBA, approximately 5.5 km east of the study area, which supports a range of breeding waders and waterbirds. <p>The Ancient Woodland Inventory shows ancient woodlands to be concentrated in river glens near Barrhill, Pinwherry and the River Stinchar, with some scattered ancient woodland areas near New Luce, Drumlamford Loch, and Cowar House.</p>
Landscape	<p>Landscape Designations and Classifications</p> <p>There are no designated landscapes of national importance within the study area.</p> <p>However, the northern part of the study area contains part of the South Ayrshire Scenic Area. Scenic Areas are designated within the South Ayrshire Local Development Plan Strategic Policy ENV8 as 'notable areas of particular landscape quality'.</p> <p>Landscape Character Types</p> <p>The northern half of the study area lies within South Ayrshire while the southern half is within Dumfries and Galloway local</p>	<p>Landscape Designations and Classifications</p> <p>The buffer area contains no nationally important designated landscapes. However, part of the South Ayrshire Scenic Area covers the upper reaches of the River Duisk and extends westwards towards the coastline and along the Stinchar Valley.</p> <p>Two Gardens and Designed Landscapes; Glenapp and Castle Kennedy, are located within the buffer area. These are both situated close to the west/south western boundary of the buffer.</p> <p>Landscape Character Types</p> <p>Beyond the study area the landscape character does not immediately</p>

Table 3.1: Baseline Environment of Study Area and Buffer Zone	
<p>authority area (Figure 3.4). The landscape character of the study area is described within two landscape classification documents:</p> <ul style="list-style-type: none"> • Dumfries and Galloway Landscape Assessment, SNH Review No 94, Land Use Consultants on behalf of Scottish Natural Heritage, 1998; and • Ayrshire Landscape Assessment, SNH Review No 111, Land Use Consultants on behalf of Scottish Natural Heritage, 1999. <p>The study area comprises contrasting upland hills and valley landscapes character types (LCTs), including:</p> <ul style="list-style-type: none"> • Plateau Moorland LCT (~40.4% of the study area); • Plateau Moorland with Forest LCT (~32.5% of the study area); • Intimate Pastoral Valleys LCT (~17.4% of the study area); • Southern Uplands with Forest LCT (~7.6% of the study area); • Upland Glen LCT (~2.0% of the study area); and • Southern Uplands LCT (<0.1% of the study area). <p>The landscape character areas are described in Appendix 4 and their location and extent is shown on Figure 3.5.</p> <p>Cumulative Context</p> <p>The study area contains a large number of existing, consented and proposed wind turbines, including:</p> <ul style="list-style-type: none"> • Arecleoch Wind Farm - 60 operational turbines are located within the Plateau Moorland with Forest LCT and Southern Uplands with Forest LCT. • Stranoch Wind Farm – 24 consented turbines are located with the Plateau Moorland LCT. • Chirmorie Wind Farm – 22 proposed turbines (application stage), located within the Plateau Moorland LCT. Although these turbines are not yet consented, they are considered 	<p>change, as the same character types extend 2 km to 10 km from the boundary of the study area. In addition to the character types contained within the study area, the following upland character types appear within the Buffer:</p> <ul style="list-style-type: none"> • Foothills LCT; • Shallow Flat bottomed Valley LCT; and • Southern Uplands LCT. <p>Cumulative Context</p> <p>The operating Mark Hill turbines, 2.2 km to the north of Barhill, form a long-established cumulative context within the 6 km buffer area.</p> <p>Kilgallioch Wind Farm related construction activities are seen within Balker Moor landscape, beyond the eastern boundary of the study area. The 96 turbines will occupy the 6 km buffer zone to the east of the study area.</p> <p>The Altercannoch Wind Farm proposal would introduce an additional 8 turbines, and Glen App proposal another 11 turbines, within the Plateau Moorland with Forest. 8 proposed turbines of Corwar Wind Farm would be within Plateau Moorland landscape.</p>

Table 3.1: Baseline Environment of Study Area and Buffer Zone		
	<p>within the cumulative context in accordance with best practice guidance¹⁴.</p> <p>The cumulative context of the existing/consented and proposed wind farms is shown in Figure 3.8.</p> <p>Apart from the retained commercial forestry and wind turbines, there are a number of other man-made structures such as an overhead power line, which extends from Craiggannochie Hill and crosses the north western part of the study area, and several wooden pole lines extend within the study area.</p>	
Visual Amenity	<p>The study area is sparsely settled with occasional farms accessed by long farm tracks, and individual properties alongside the main roads.</p> <p>The small village of Barrhill lies on the A714 on the bottom of Duisk River valley, which also accommodates the Kilmarnock railway line.</p> <p>The minor road which crosses Balker Moor between Barrhill and Luce, extends mainly within Cross Water of Luce valley.</p> <p>Within the study area two Core Paths cross Balker Moor; one which extends through Davenholme Burn valley and the other extends over the forested landform of Glenkitten Fell.</p> <p>The Barrhill Holiday Park and Queensland Holiday Park are located adjacent to the A714.</p>	<p>Within the buffer zone, settlements are located on the main roads/railway, which extend within the river valleys. The villages of Pinmore and Pinwherry are on the A714 within Duisk River Valley, Colmonell lies on the B734 within River Stinchar valley. The village of New Luce is on the minor road (which links the A714 at Barrhill with the A75 at Glenluce) within Water of Luce valley.</p> <p>The Scottish National Trail, coast to coast walk, known as the Southern Upland Way (SUW), crosses the south eastern section of the buffer area where it partially extends through the Kilgallioch Wind Farm, which is under construction.</p> <p>A network of core paths within the buffer area extends across Moorland Plateau (with Forest); from Beneraird Hill (439 m AOD) to White Hill (176 m AOD); within Brockloch Forest and through the Kilgallioch Wind Farm.</p> <p>Views within the river valleys are enclosed; therefore no views of the study area are anticipated from the valleys of River Stinchar, Water of Tig and Cross Water of Luce. Views of the southern section of the study area are likely from the Water of Luce valley, due to its north-south orientation. Above the valleys there are elevated views available of the plateau moorland landscape, occasionally restricted by the intervening topography, forestry and/or wind energy developments.</p>
Archaeology and Cultural	56 Scheduled Monuments exist within the study area, all of which are located south of Drumahastie and Arecleoch Wind Farm.	261 Scheduled Monuments have been recorded within the 6km buffer around the study area. The vast majority of these are located in the

¹⁴ Scottish Natural Heritage (March 2012) *Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*

Table 3.1: Baseline Environment of Study Area and Buffer Zone		
Heritage	<p>These include features such as hut circles, burnt mounds, various cairns and farmsteads.</p> <p>Listed Buildings within the study area include:</p> <ul style="list-style-type: none"> • Kildonnan House, Barrhill (Category A) • Glenwhilly Farmstead (Category B) • Glenour (Category B) • Martyr's Tomb, Barrhill (Category B) • Ballochmorrie House (Category B) • Glenwhilly Farmhouse (Category C) • Former Arnshean Church, Barrhill (Category C) • Dirniemow Bridge (Category C) • Footbridge at Marklach (Category C) <p>The Historic Environment Records (HER) for the area includes records for over two hundred non-designated assets throughout the study area. Concentrated at the southern end of the study area, these comprise sites ranging from prehistoric cairns and agricultural features, through to post-medieval buildings, bridges and features associated with the railway and the agricultural use of the land.</p> <p>Cultural heritage features within the study area are shown on Figure 3.6.</p>	<p>southern third of the study area buffer, south of Arecleoch Wind Farm and roughly encompassed by Brockloch Fell and the forestry at Glenkitten Fell. The majority of the Scheduled Monuments fall within the East Rhins Archaeologically Sensitive Area (ASA) a Dumfries and Galloway Council regional designation.</p> <p>There are a total of 47 Listed buildings within the buffer. There are two Category A Listed Buildings, Kildonnan House, which is situated to the north-east of Barrhill, and Old Windmill, Mill Hill which is located almost 6km away to the north-east of Ballantrae. The twenty Category B Listed Buildings and 25 Category C Listed Buildings are mainly located along the A714 and B734, at the settlement at New Luce, and small settlements between The Stranoch and Dirnie Flow Fell.</p> <p>There are two Inventory status Garden and Designed Landscapes (GDL) located at the periphery of the 6km buffer; Glenapp is situated at the western edge of the study area and Castle Kennedy at the south-west of the buffer.</p> <p>Two Conservation Areas lie within the 6km buffer, one located at Colmonell, and the other at New Luce.</p> <p>There is a single Property in Care within this area, Laggangarn Standing Stones, which is situated in a forestry clearing to the south east of the study area.</p> <p>The HER contains details of many sites throughout the 6 km buffer.</p>
Geology Hydrogeology and Hydrology	<p>Bedrock underlying the study area predominantly consists of the Ordovician Kirkcolm Formation, described as sequences of sandstone and siltstone turbidites (approximately 4500 m in thickness), with subordinate faulted bands of the Ordovician Galdenoch Formation noted in the southern and central regions, orientated north-east/south-west, which consists of massive wacke and siltstone turbidite sequences (approximately 500 m in thickness). Ordovician Dalreoch Formation deposits infringe the north-western site boundary; described as sandy and pebbly greywackes, with a minor presence of the North Britain Palaeogene Dyke Suite; microgabbro, which are also recorded in this region.</p>	<p>The buffer area has bedrock of principally Kirkcolm Formation, described as sequences of sandstone and siltstone turbidites (approximately 4500 m in thickness), spliced with subordinate bands of Blackcraig Formation And Galdenoch Formation (Wacke), and Crawford Group And Moffat Shale Group (Mudstone, Chert And Smectite-claystone). The Tappins Group (Wacke) roughly follows the study area boundary in the north west, encompassing Pinwherry. Cambrian And Ordovician Rocks (Mafic Lava And Mafic Tuff) occupies the north west of the buffer area, with occasional faulted bands of unnamed igneous intrusions.</p> <p>The superficial geology within the buffer area mirrors that of the study area with superficial deposits primarily of Quaternary Peat, with dispersed patches of Quaternary Glacial Till, and to a lesser extent,</p>

Table 3.1: Baseline Environment of Study Area and Buffer Zone

	<p>According to the BGS website, superficial geological deposits within the study area are primarily of Quaternary Peat, with dispersed patches of Quaternary Glacial Till, and to a lesser extent, Quaternary Alluvium.</p> <p>The Hydrogeological and Groundwater Vulnerability Maps of Scotland (1:625,000) characterises the bedrock underlying the study area as a weakly permeable concealed aquifer of limited potential. Though generally recognised to be absent of groundwater, there is potential for shallow groundwater bodies to exist where flow would be confined to near-surface fractures and other discontinuities. The overlying superficial deposits are considered to be of low permeability.</p> <p>Areas of carbon rich soil, deep peat and peatland habitats are prevalent within the study area, as mapped by Scottish Natural Heritage¹⁵. The top two classes (1 and 2) taken together identify the nationally-important resource and are defined as follows:</p> <ul style="list-style-type: none"> • Class 1 – Nationally important carbon-rich soils, deep peat and priority peatland habitat, and areas likely to be of high conservation value; • Class 2 – Nationally important carbon-rich soils, deep peat and priority peatland habitat, and areas of potentially high conservation value and restoration potential. <p>The areas of Class 1 and 2 peatland are mainly concentrated in the central southern part of the study area, to the south and east of Arecleoch Forest.</p> <p>The most significant watercourses in the area are the Cross Water of Luce, Main Water of Luce, Water of Tig and Duisk River. Loch Alty is the only inland loch visible within the study area, located south and east of Barrhill.</p> <p>SEPA identify the study area as located within the regional groundwater body of the Newton Stewart bedrock and localised sand and gravel aquifers, classifying it as being of “good” status.</p>	<p>Quaternary Alluvium. There are also some small patches where no data has been recorded by BGS.</p> <p>As within the study area, the Hydrogeological and Groundwater Vulnerability Maps of Scotland (1:625,000) characterise the bedrock underlying the buffer area as a weakly permeable concealed aquifer of limited potential.</p> <p>The largest water body in the area is the Penwhim Reservoir, joined to the smaller Loch Ree to its west. Several other small lochs are present including: Loch Superior, Loch Derry, Drumlamford Loch, Loch Crongart, Loch Goosey, and Kilantrigan Loch.</p> <p>The south of the area is dominated by the Main Water of Luce, Cross Water of Luce and their various tributaries. To the north and west, the River Stinchar is the most significant river, connecting to the River Duisk in the north and Water of Tig in the central west. There is a wide network of rivers/streams throughout the buffer area. Surface water flooding is unlikely across the majority of the buffer area, with small localised areas of high risk scattered throughout forested areas and in close proximity to waterbodies. Areas of most significant risk are the banks of the Duisk River between Pinwherry and Barrhill, low ground surrounding the Penwhim Reservoir and land immediately surrounding the small lochs within the buffer area, in particular those near Chirmorie.</p>
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¹⁵ Carbon rich soil, deep peat and priority peatland habitats map (2016), available on the SNH website: <http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/soils-and-development/cpp/>

Table 3.1: Baseline Environment of Study Area and Buffer Zone		
	<p>Surface water flooding is unlikely across the majority of the study area, with small localised areas of high risk scattered throughout forested areas and along waterbodies, the most significant of which is on the banks of the Duisk River between Pinwherry and Barrhill.</p> <p>Hydrological and peatland features within the study area are shown on Figure 3.7.</p>	
Recreation and Tourism	<p>Two Core Paths are located within the study area; one which includes an approximate 3 km stretch between The Stranoch and Stab Hill, and a second located on Glenkitten Fell.</p> <p>Accommodation within the study area includes:</p> <ul style="list-style-type: none"> • Queensland Holiday Park; • Barrhill Holiday Park; • Trout Inn; • Blair Farm; and • Galloway Hotel. <p>The estates within the study area are used for shooting and fishing, as well as recreational walking using the network of paths in the area.</p> <p>Recreation and Tourism features are shown on Figure 3.8.</p>	<p>A network of core paths is located within the buffer area, particularly to the south around Glenkitten Fell, New Luce, Brockloch Fell, and White Hill.</p> <p>Tourist facilities, including hotels, guest houses and other accommodation serving the tourism industry in the 6 km buffer are located mainly around the settlements located along main roads.</p>
Land Use and Infrastructure	<p>Forestry and Agricultural Land</p> <p>An extensive block of plantation woodland is present at Arecleoch Forest which spans the centre of the study area. Smaller and more fragmented forestry blocks are located in the north of the study area, near Barrhill.</p> <p>Historic land use assessment data indicates the following land uses within the study area:</p> <ul style="list-style-type: none"> • Agriculture and Settlement (17%) • Built-up area (<1%) • Designed Landscape (1%) • Energy, extraction and waste (2%) 	<p>Forestry and Agricultural Land</p> <p>Large blocks of forestry and woodland cover the 6 km buffer area including Glentrool Forest to the north and east, which is part of the Galloway Forest Park. In addition, further areas of forestry are located on Wee Leith Hill to the south west and Beaker Hill to the north west. Smaller areas of forestry are found generally within the various river valleys.</p> <p>The historic land use assessment data within the 6km buffer area mirrors that of the smaller study area, and comprises:</p> <ul style="list-style-type: none"> • Agriculture and Settlement (19%) • Built-up area (<1%) • Designed Landscape (1%)

Table 3.1: Baseline Environment of Study Area and Buffer Zone

<ul style="list-style-type: none"> • Leisure and recreation (<1%) • Moorland and Rough Grazing (42%) • Water body (<1%) • Woodland and Forestry (37%) <p>In terms of its agricultural land classification, the land is mainly Class 6 (capable of supporting rough grazing) with pockets of Class 5 (capable of supporting improved grassland) in the southern part of the study area.</p> <p>Settlement Distribution and Housing Allocations</p> <p>Residential properties are concentrated around Barrhill, with further properties located along the minor road running from Barrhill southwards through the study area.</p> <p>A review of the South Ayrshire Council planning portal has identified one live planning application for a new residential dwelling within the study area, adjacent to Queensland Caravan Park. No relevant live planning applications were identified for Dumfries and Galloway.</p> <p>Roads and Railway</p> <p>The primary road within the study area is the A714. This road traverses the northern section of the study area from east to west, connecting to the B7027 at Barrhill. Several tracks/unnamed roads extend south from the A714, connecting into a network of access throughout Arecleoch Forest and the majority of the study area. An unnamed road bisects the study area, running north to south and joining the A714 at Barrhill.</p> <p>Utilities Infrastructure</p> <p>There are several electricity transmission/distribution lines within the study area, including two OHL's supported on lattice steel towers between Arecleoch wind farm and Mark Hill substation, and Craiggannochie Hill and Leffin Donal Hill. No high pressure gas pipelines are located within the study area.</p> <p>Wind Farms</p> <p>Areacleoch wind farm and its associated infrastructure (access</p>	<ul style="list-style-type: none"> • Energy, extraction and waste (1%) • Leisure and recreation (<1%) • Moorland and Rough Grazing (46%) • Water body (<1%) • Woodland and Forestry (34%) <p>In terms of its agricultural land classification, the buffer area is predominantly Class 6 (capable of supporting rough grazing) with pockets of Class 5 (capable of supporting improved grassland) around New Luce and the Penwhirn Reservoir.</p> <p>Settlement Distribution and Housing Allocations</p> <p>Residential properties concentrated along the valleys of the River Stinchar and Duisk River, and New Luce in the south.</p> <p>Roads and Railway</p> <p>Roads within the 6 km buffer area include the A77, A714, B7027, B734, and B7044.</p> <p>A 4 km stretch of the A77 lies in the central western part of the buffer area, between Ballantrae and Smyrton.</p> <p>The B734 lies in the north of the buffer area and follows the River Stinchar, linking the A714 and A77 between Pinwherry and Ballantrae and extending further northwards at Merkland.</p> <p>The A714 extends from the site northwards towards Pinmore, and also lies within the eastern part of the study buffer.</p> <p>The B7027 also lies in eastern part of the buffer area, joining the A714 to the east of Barrhill.</p> <p>The unnamed road through the study area extends further southwards to New Luce, where there is a network of minor roads following the Water of Luce and extending to Auchmantle.</p> <p>Wind Farms</p> <p>Mark Hill wind farm and its associated infrastructure (access tracks, grid connection, etc) are located in the northern part of the study area.</p> <p>Further proposed and consented wind farms are located within the buffer area including:</p>
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Table 3.1: Baseline Environment of Study Area and Buffer Zone		
	<p>tracks, grid connection, etc) are located in the central western part of the study area.</p> <p>Proposed wind farms within the study area include Stranoch, Chrимorie and Altercannoch wind farms.</p> <p>Figure 3.8 shows the main land uses and infrastructure occurring within the study area.</p>	<ul style="list-style-type: none"> • Mark Hill extension wind farm; • Altercannoch wind farm; • Assel Valley wind farm; and • Kilgallioch wind farm.

4. ROUTE SELECTION

4.1 Introduction

Figure 4.1 shows the key environmental features, as described in Chapter 3, along with the heat mapping (see section 2.2.3). The relative sensitivity assigned to the specific environmental features within the study area is set out in **Appendix 3**.

The mapping of combined constraints and their relative sensitivity have allowed the identification and evaluation of possible routes, as described below.

4.2 Stage 1: Identification of Route Options

The study area was refined in response to the key environmental and socio-economic constraints described in Chapter 3. The refined study area is shown on Figure 4.2.

Three main route options have been identified within the refined study area. These were defined through consideration of constraints within the refined study area as well as topography and proximity to the road network. The three route options are identified as Option 1, Option 2 and Option 3 and are shown on Figure 4.3. Option 2 also includes variations 2a, 2b, 2c and 2d, which allow more detailed consideration of how to cross Arecleoch Forest and the Duisck river valley.

Option 1 lies in the western part of the study area, to the west of the Stranoch wind farm site and the Arecleoch wind farm site, and represents the northernmost route on the approach to Mark Hill substation.

Option 2 runs through the centre of the study area and along the eastern edge of Stranoch wind farm site, then between Arecleoch and Chirmorie wind farm sites. In the northern part of the study area, variation 2a includes the route of the existing Arecleoch wind farm grid connection, while variation 2b passes on the eastern side of the hill summits shown on the OS background mapping. Variation 2c crosses the A714 approximately 280 m west of Barrhill Holiday Park, while variation 2d crosses the A714 at its junction with the minor road to Scourhead.

Option 3 lies in the eastern part of the study area and runs along the western edge of the Kilgallioch wind farm site. Further north, it lies to the east of Barrhill village.

4.3 Stage 2: Environmental Analysis and Selection of Preferred Route

For the purposes of the environmental analysis, the study area has been divided into three sections, based on land cover (see section 2.6.2). The three sections are:

- Section A: Stranoch wind farm site;
- Section B: Arecleoch Forest;
- Section C: Barrhill to Mark Hill substation.

The section breaks are also shown on Figure 4.1.

The detailed analysis of the three route options is contained within **Appendix 4** of this report.

Table 4.1 below provides a colour coded summary of the detailed analysis, based on the following key¹⁶:

	Preferred option: greatest potential to accommodate the required infrastructure within the context of the environmental constraints identified.
	Some potential to accommodate required infrastructure within the context of the environmental constraints identified.
	Least relative potential to accommodate the required infrastructure within the context of the environmental constraints identified.

¹⁶ Note that these colour codings represent relative weightings. A green colour code does not mean that no environmental issues have been identified nor does a red colour code necessary reflect any insurmountable environmental constraint.

Table 4.1: Environmental Appraisal of Route Options – Section A: Stranoch wind farm site				
Topic	Route Options			Summary
	1	2	3	
Ecology				Route option 3 is preferred as it crosses the least amount of sensitive peatland habitats and the greatest area of farmland habitats of lower ecological value. Route option 1 is less preferred as it crosses a mosaic of marshy grassland and wet-modified bog, while route option 2 is least preferred as it crosses an area dominated by wet-modified bog and blanket bog. There is very little to differentiate between the three route options in terms of protected species.
Ornithology				Route option 3 is preferred as it is furthest from the Glen App and Galloway Moors SPA and does not appear to support significant levels of hen harrier activity. Route option 1 is least preferred as it lies immediately adjacent to the SPA. There is abundant hen harrier activity on the Arecleoch wind farm site and route option 1 lies between the SPA and Arecleoch wind farm; therefore, hen harrier are regularly flying over the location of Route Option 1. Route Option 2 is the intermediate preference as it crosses areas used by protected bird species but does not lie within an area of such abundant activity as route option 1.
Landscape				Route options 1 and 2 are of equal preference in this location; both of these route options cross the Balker Moor area of the Plateau Moorlands LCT within which the proposed development could be contained, therefore, no landscape constraint is identified in relation to these route options. Route option 3 is related to the more sensitive landscape of Cross Water of Luce, which accommodates the main communication routes such as road and railway.
Visual Amenity				Route option 2 is preferred in this location, with no visual impact on any sensitive receptors identified, dependant on an appropriate routeing design in relation to potential views from Main Water of Luce valley. An OHL within Section C of route option 1 would affect mainly medium sensitivity visual receptors related to Penwhirn reservoir and road users. Route option 3 would pose the greatest design challenge within Section C, which is related to the crossing of Cross Water of Luce valley, in particular at Dirniemow Bridge.
Cultural Heritage				There are no designated assets within route option 1 which is the preferred option when measured against this constraint. The Scheduled Monuments closest to it have localised settings which are unlikely to experience significant impacts on their setting as a result of the proposed development. There are no designated assets within route option 2, but it runs close to several Scheduled Monuments, including some (eg. Cairn Kenny SM1925) which are considered vulnerable to impacts on their setting from development.

Table 4.1: Environmental Appraisal of Route Options – Section A: Stranoch wind farm site				
				Route option 3 is the least preferred option. Seventeen Scheduled Monuments and two Category C Listed Buildings are situated within it. There are additional Scheduled Monuments in proximity which are considered vulnerable to impacts on their setting from development.
Geology, Hydrogeology and Hydrology				Route option 1 is least preferred as it crosses the greatest extent of sensitive peatland habitat. Route option 2 also crosses sensitive peatland habitat, although it provides the opportunity to avoid impacts on peatland within part of the route. Route option 3 is marginally preferred as it contains least sensitive peatland habitat, although it does cross the Cross Water of Luce at a point where the river would be wider than within other route options.
Recreation and Tourism				All of the route options cross core paths in this section. However, route option 1 is considered to be least preferred as it crosses the core path in a relatively remote location, where the proposed development may be visually intrusive. Route option 2 crosses the same core path in a relatively less remote location. Route option 3 is preferred as, although it crosses two different core paths, these are both in locations where the paths lie close to the road and railway line.
Land Use and Infrastructure				Route option 2 is preferred in this section, on the basis that it lies within relatively close proximity to the existing road network but does not lie in close proximity to any residential dwellings. Route options 1 and 3 are less preferred; route option 1 because it is relatively remote and would the construction of new access roads, in addition to those required for construction of the proposed Stranoch wind farm, and route option 3 because there are a number of residential properties within it. Route option 3 would also have great visibility from the minor road and the railway line.
Combined preference through Section A				Route option 2 is identified as the overall preference in Section A, on the basis that it has less impact on cultural heritage features than route option 3 and is located further from Glen App and Galloway Moors SPA than route option 1. In addition, it contains less sensitive peatland than route option 1 and would cross the core path in an area less remote than route option 1. It is, however, acknowledged that sensitivities exist in relation to wet-modified bog and blanket bog habitat.

Topic	Route Options			Summary
	1	2	3	
Ecology				All three route options contain a mix of open habitats and areas of plantation forestry and all three are believed to support a similar suite of protected species. Route Option 3 is marginally preferred as it contains the greatest level of human disturbance already in the form of the road and farmland habitats. Route Option 2 (variations 2a and 2b) is least preferred as it crosses the greatest area of peatland habitat. However, variation 2a is marginally preferred over variation 2b, as it would allow a larger wayleave to be created, alongside the existing wayleave for the Arecleoch grid connection OHL, which would have the potential for more enhanced peatland restoration and habitat connectivity.
Ornithology				Route Option 3 is preferred as it is furthest from the Glen App and Galloway Moors SPA and does not appear to support significant levels of hen harrier activity. Route Option 1 is the least preferable for the same reason, i.e. it is immediately adjacent to the SPA. The construction of Arecleoch wind farm has opened up the forestry areas around Route Options 1 and 2 and increased its suitability for hen harrier and other moorland species, meaning that those options are more likely to result in adverse effects on those species.
Landscape				Route options 2 and 3 are both preferred in Section 2, on the basis that they do not have landscape related sensitivities. A marginal preference for variation 2a over variation 2b is identified, on the basis that this follows the same alignment as existing transmission infrastructure and would consequently have a lesser impact on the landscape. A key constraint within this section of route option 1 would be the cumulative context of the existing OHL within sensitive valleys of Water of Tig and Dannacks Burn.
Visual Amenity				Route option 2 is preferred in this location, as there are no sensitive receptors located in proximity to this route option and visibility of the proposed development would be limited by landform and tree cover. Variation 2a would be preferred over variation 2b, as it is located at greater distance from surrounding receptor locations including track crossings. Within route option 1, there is potential to screen views of the proposed development, should it be routed to the east of the existing OHL. Route option 3 has potentially no impact on visual amenity, dependant on an appropriate routeing design, which would not impact on views of the distinctive landform of Chirmorie Cairn or on views of the Merrick Hills.
Cultural Heritage				There are no designated assets in any of the three route options. Route option 1 is preferred due to its low concentration of non-designated archaeological features.

				<p>Route option 3 has a relatively low concentration of archaeological features, which could be avoided in the detailed design stage.</p> <p>Route option 2 is the least preferred option. It has a low number of non-designated heritage assets, but at its southern end it has the potential to impact on the setting of Scheduled Monument Cairn Kenny (SM1925).</p>
Geology, Hydrogeology and Hydrology				<p>Route options 1 and 2 contain a similar amount of sensitive peatland habitat and therefore are less preferred than route option 3, which provides the opportunity to avoid peatland (as recorded on SNH mapping). Variation 2b offers greater potential to avoid impact on carbon-rich soils and peatland, than variation 2a.</p> <p>All three route options contain numerous small streams and ditches within this section, as well as a number of larger watercourses, such as Dunnack Burn, Cross Water of Luce and Laggish Burn.</p>
Recreation and Tourism				<p>There are very few features related to tourism and recreation within this section; however, route options 2 and 3 are identified as less preferable on the basis that they contain a network of forestry tracks which may be suitable for mountain biking and walking. Variation 2a is preferred over variation 2b as it includes fewer track crossings.</p>
Land Use and Infrastructure				<p>Route option 2 is preferred in this section, on the basis that it contains the least number of residential dwellings and is characterised by plantation woodland, which would screen the proposed development from view. Variation 2a is preferred over variation 2b, as it follows the same alignment as the existing Arecleoch wind farm grid connection and would therefore require a lesser amount of new land take.</p> <p>Route options 1 and 3 are less preferred. A number of residential properties, as well as the existing 275 kV OH, lie within the northern part of route option 1, and a new OHL within this route would have potential for 'wirescape' impacts on views from these properties. The minor road to Barrhill from the south, as well as dwellings at Chirmorie and Dochroyle, lie within route option 3.</p>
Combined preference through Section B				<p>Route option 2 is identified as preferred within Section B on the basis that it would have least impact in terms of visual amenity and landscape impacts. It also lies at a distance from the eastern boundary of the Glen App and Galloway Moors SPA. However, it is acknowledged that route option 2 would affect a greater area of peatland habitat than other route options, and has the potential for significant impacts on cultural heritage features. In the northern part of Section B, variation 2a is preferred over variation 2b in the basis of potential impacts on ecology, landscape, visual amenity, recreation and land use.</p>

Topic	Route Options			Summary
	1	2	3	
Ecology				Similar to Section B, there is very little to differentiate the three options in terms of habitats or protected species in Section C. Route option 2 is marginally preferred as it would involve the least tree felling and as such the least alteration of habitats and therefore the least effects on species. Variation 2c would be marginally preferred over variation 2d, as it would involve a lesser amount of tree felling, including of ancient woodland. There is very little difference between Route options 1 and 3 but Option 3 is considered the least preferable as it contains some areas of bog habitat.
Ornithology				Route option 3 is least preferred as it contains open peatland habitats which could support more species than the other route options. Option 2 is preferred as it crosses the fewest open areas of habitat where species at risk of collision might occur.
Landscape				Route option 2 is preferred in this section. This route option has the least constraints in landscape terms, subject to suitable routeing that would conserve and take advantage of the screening effect of woodland cover. Variation 2d is preferred over variation 2c as it would be screened by existing scrub vegetation between the railway line and the A714 and by existing woodland to the north of the Duisk River. A key constraint in this section of route option 1 would be the cumulative context and potential wirescape effect within a sensitive/designated landscape. The key issue in respect of this section of route option 3 relates to its position within a sensitive/designated landscape, where the proposed development would comprise a new feature.
Visual Amenity				Route option 2 is preferred in this section. This route option has the least constraint in landscape terms, and variation 2d would take advantage of the screening effect of woodland cover while variation 2c would be more visible as it runs up the hillside east of Belhamage Farm. The key consideration for this section of route option 1 is the number of highly sensitive visual receptors within and adjoining the route. Route option 3 involves the highest number of high sensitive visual receptors within the route. However it is predicted that the potential impact on visual amenity can be reduced to some extent through careful design and mitigation.
Cultural Heritage				Route option 1 is preferred due to the low density of non-designated heritage assets. The detailed design of the proposed development would ensure that the Category B Listed Building Ballochmore (LB1053) is avoided, and that the proposed development would not lie in close proximity. There are no other designated assets within route option 1 whose settings might be affected by the proposed development.

Table 4.3: Environmental Appraisal of Route Options – Section C: Barrhill to Mark Hill substation				
				Route options 2 and 3 both lie closer to Category A Listed Kildonan House (LB1052) and its non-inventory designed landscape, and would have the potential to affect its setting. Route option 2 is preferred over route option 3 due to the presence of less extensive non-designated heritage assets. The recorded non-designated assets in route option 3 comprise more extensive features such as field systems, which would be more difficult to route around.
Geology, Hydrogeology and Hydrology				Route option 2 is marginally preferred in Section C as it contains the least amount of sensitive peatland habitat, although it offers the least potential for consideration of suitable locations for crossing the Duisk River. Route options 1 and 3 contains a greater number of small watercourses and lochans, as well as sensitive peatland habitat.
Recreation and Tourism				Route option 2 is identified as least preferred due to the location of Queensland Holiday Park and Barrhill Holiday Park within it, although variation 2d is located at greater distance from these features than variation 2c. The accommodation providers at Blair Farm and the Galloway Hotel are located within route option 3, whilst there are no features related to tourism and recreation located within route option 1. Therefore, route option 1 is preferred.
Land Use and Infrastructure				No preference is identified within Section C, as all three routes are characterised by constraints in terms of proximity to residential dwellings and the requirement to cross the Duisk River, the A714 and a number of minor roads. Further constraints relate to potential 'wirescape' issues associated with the existing 275 kV OHL and the Arecleoch grid connection OHL, in the northern part of Section C.
Combined preference through Section C				An overall preference for route option 2 is identified, with variation 2d preferred over variation 2c; however, it is recognised that the Queensland and Barrhill Holiday Parks are located in close proximity to variation 2d and the proposed development may impact on amenity and properties associated with these features. Route options 1 and 3 have greatest potential for impact on landscape and visual amenity, while route option 3 has greatest potential for impact on ecology, ornithology and cultural heritage.

4.3.1 Preferred Route and Key Issues

The Preferred Route is identified as route option 2 through the length of the study area, with variations 2a and 2d being the preference in Section B and C of the study area, respectively. The preferred route is shown on Figure 4.4.

Key issues associated with this Preferred Route are:

- Proximity to scheduled monuments in the southern part of the study area, including Glenwhilly hut circles and surrounding burnt mounds, Marklach hut circles and surrounding burnt mounds, Marklach field clearance cairns, Markdhu cairn, Cairn Kenny chambered cairn and Markdhu hut circle;
- Watercourse crossings and proximity to larger watercourses including the Davenholme Burn, the Cross Water of Luce and the Duisk River;
- Requirement for tree felling within Arecleoch Forest to ensure appropriate safety clearances from the overhead line. The required wayleave would include this area;
- Proximity to residential dwellings on the edge of Barrhill;
- Potential disturbance to peatland habitat in the southern part of the study area;
- Road and railway crossings; and
- Proximity to wind turbines and potential for the proposed development to cause wake effects.

5. CONSULTATION ON THE PROPOSALS AND NEXT STEPS

SPEN is inviting comments on the development proposals described in this document. You may comment in person, at the forthcoming public exhibition detailed in the preface to this document, by post, or by email. When providing comments, SPEN would be grateful for your consideration of the following questions:

- Do you have any comments regarding the rationale for the project, as set out in this routeing strategy consultation document?
- Do you have any comments regarding the approach to the selection of the preferred route as set out in this routeing strategy consultation document?
- Are there any factors you consider may have been overlooked or given either insufficient or too much consideration during the routeing process?
- Do you have any other comments about the preferred route of the overhead line?

The public exhibition will be held in the locations and at the times detailed in the preface to this document.

The exhibition will be advertised in the local press, and in the local community.

Comments forms will be available at the public exhibition. Comments can be posted or emailed to the SPEN Community Liaison Manager, at the address below:

Colin Wylie
Community Liaison Manager
Ochil House
10 Technology Avenue
Hamilton International Technology Park
Blantyre
G72 0HT

cwylie@spenergynetworks.com

Consultation responses are requested by 30th April 2017.

All comments received will inform further consideration of the preferred route alignment and the selection of a proposed route alignment, which will be taken forward for more detailed environmental assessment prior to submission of an application for section 37 consent under the Electricity Act 1989 (for the OHL). These applications will be developed for submission in late 2017.

APPENDIX 1 FIGURES

APPENDIX 2 ENVIRONMENTAL BASELINE DATA SOURCES

Table B.1: Environmental Data Sources		
Feature	Abb	Source
Ancient Woodland Inventory	AW	SNH
Conservation Areas	CA	Historic Scotland
Core Paths	-	Dumfries and Galloway Council (DGC) and South Ayrshire Council (SAC)
Wild Land Areas 2014	WLA	SNH
Cycle Routes	-	SUSTRANS
Existing Transmission Infrastructure	-	SPEN
Flood Risk Zones	FRZ	SEPA online flood mapping
Hydrogeology	-	BGS (online)
Landscape Character Types (Landscape Character Assessment)	LCT (LCA)	SNH
Listed Buildings	LB	Historic Scotland
National Tourist Routes	-	VisitScotland
National Scenic Areas	NSA	Scottish Government
Regional Scenic Areas	RSA	Dumfries and Galloway Council
OS Maps 1-250k	-	OS Open Data
OS Maps 1-50k	-	Emapsite
Ramsar sites	-	SNH
Residential Settlements and housing allocation areas	-	OS_Address_Layer (downloaded from emapsite)
RSPB Reserves	-	RSPB
Scheduled Monuments	SM	Historic Scotland
SEPA Assessed Watercourses	-	SEPA online river basin management plan mapping
Sites of Special Scientific Interest	SSSI	SNH
South Ayrshire Scenic Area	-	South Ayrshire Council
Special Area of Conservation	SAC	SNH
Special Protection Areas	SPA	SNH
Wind farms	-	SNH

APPENDIX 3 ENVIRONMENTAL CONSTRAINT SENSITIVITY

Constraint	Sensitivity (High / Medium / Low)	Buffer (m)	Sensitivity of Buffer (High / Medium - Amber Low - Green)	Notes
Landscape				
Dumfries and Galloway Regional Scenic Area	Medium	0	-	
South Ayrshire Scenic Area	Medium	0	-	
Gardens and Designed Landscapes	High	100	High	Buffer to reduce potential setting impacts
Cultural Heritage				
Listed Buildings - A	High	100	High	Buffer to reduce potential setting impacts
Listed Buildings – B	Medium	50	Medium	Buffer to reduce potential setting impacts
Listed Buildings – C	Medium	50	Medium	Buffer to reduce potential setting impacts
Scheduled Monument	High	100	Medium	Buffer to reduce potential setting impacts
Conservation Area	High	0	-	
Ecology				
Special Area of Conservation	High	0	-	
RAMSAR	High	0	-	
Special Protection Area	High	0	-	
Site of Special Scientific Interest Biological or Mixed	High	0	-	
Important Bird Area	Medium	0	-	
Ancient Woodland Inventory	Medium	0	-	
Geology, Hydrogeology and Hydrology				
Waterbodies (rivers, burns, lakes, ponds etc.)	High	50	High	Buffer to ensure no infrastructure located within 50 m.
Recreation and Tourism				
Core Paths	High	0	-	
Land Use and Infrastructure				

Constraint	Sensitivity (High / Medium / Low)	Buffer (m)	Sensitivity of Buffer (High / Medium - Amber Low - Green)	Notes
Existing HV lines	Medium	70	Medium	Buffer allows for typical stand-off distance. Medium sensitivity assigned due to potential to cross via undergrounding.
Properties	High	100	High	Buffer to reduce potential impacts on residential amenity.
Wind farm turbine locations (existing, consented and application stage)	High	350	High	Buffer defined as 3x maximum rotor diameter, to avoid technical issues (turbulence, etc).

APPENDIX 4 DETAILED ENVIRONMENTAL ANALYSIS OF ROUTE OPTIONS

4.1 Introduction

Three potential routes have been identified as potentially feasible to accommodate the proposed OHL to connect the consented Stranoch wind farm to the existing Mark Hill substation. Route options 1, 2 and 3 are shown on Figure 4.3.

This annex provides the detailed environmental analysis of each route option, presenting a preference for each environmental topic area.

4.2 Ecology

Chapter 3 describes the main ecology interests which have been identified within the study area, including: designated sites and species; other protected species; habitat types and known sensitive habitats including potential for groundwater dependent terrestrial ecosystems (GWDTE).

The degree of interaction of each route option with these identified ecological sensitivities has been considered in order to identify differentiator(s) between the route options under consideration. The route option most able to avoid identified ecological sensitivities where ever possible is preferable.

The ecological sensitivities discussed below are shown on Figure 3.3.

4.2.1 Section A: Stranoch Wind Farm Site

Route Option 1

At its southern end, the route includes a habitat mixture dominated by wet-modified bog and marshy grassland. The northern part of this section contains coniferous forestry plantation. There are small acid flushes associated with the numerous small watercourses flowing east to west through the route into the Pilhatchie Burn.

There is potential for GWDTE within areas of marshy grassland and acid flush habitat types in the south of the section. The rides and gaps within areas of coniferous forestry plantation are likely to be of marshy grassland habitat type and hence have potential to support GWDTE.

No records of badger, otter or water vole were recorded from within this section during surveys as part of the Stranoch wind farm EIA. Activity by bats was limited to occasional passes by soprano and common pipistrelle (*Pipistrellus pygmaeus* and *Pipistrellus pipistrellus* respectively) with less frequent passes by Daubenton's bat *Myotis daubentonii* and Leisler's bat *Nyctalus leisleri*. Common lizard *Zootoca vivipara* and adder *Vipera berus* were recorded across the site in peatland habitats and as such are assumed to be present in this section.

Route Option 2

The habitats of this section are dominated by wet-modified bog with occasional small areas of marshy grassland, blanket bog and in the north of the section, semi-improved acid grassland. There are small acid flushes associated with small watercourses.

There is low potential for GWDTE outwith areas of marshy grassland habitat type.

No records of badger or water vole were recorded from within this section of the Stranoch wind farm site. Otter spraints have been recorded multiple times within route option 1, on the banks of the Cross Water of Luce near Drumhastie.

Limited activity by soprano and common pipistrelle bats was recorded, with less frequent passes by Daubenton's bat and Leisler's bat. Common lizard and adder were recorded in peatland habitats and as such are assumed to be present within route option 2.

Route Option 3

Route option 3 passes through marshy grassland on the eastern edge of the Stranoch wind farm site before passing through farmland comprising marshy grassland, semi-improved acid grassland and improved grassland. There are also areas of coniferous plantation in the northern part of this section.

Otter and water vole have been recorded within the eastern edge of route option 3, along the banks of Pelwhirn Burn. Pipistrelle bats have also been recorded within the route.

4.2.2 Section B: Arecleoch Forest

Route Option 1

In Section B, route option 1 is dominated by coniferous forestry plantation. North and west of Arecleoch Forest, at Farden Hill and Leffin Donald Hill, the route includes areas of farmland comprising improved grassland with small scattered broadleaved and mixed woodlands.

Rides and forestry gaps within Arecleoch Forest are likely to be of marshy grassland habitat type, and hence have the potential to support GWDTE.

Water vole colonies have been recorded near the route boundary, along Scurran Burn.

Bat species have been recorded within forested sections of the route at Arecleoch.

Route Option 2

South of Arecleoch Forest, route option 2 is dominated by wet modified bog habitat, with small patches of blanket bog and semi-improved acid grassland. In the northern part of Section B, route option 2 (both variations 2a and 2b) spans a large coniferous forestry plantation at Arecleoch Forest. Rides and forestry gaps within coniferous forestry plantations are likely to be of marshy grassland habitat type, with the potential to support GWDTE. Variation 2a is marginally preferred, as it would allow a larger wayleave to be created alongside the existing wayleave for the Arecleoch grid connection OHL, which would have the potential for more enhanced peatland restoration, and may create a greater extent of habitat connectivity for protected species in the area.

Otter spraints have been recorded within variation 2a, near the Water of Tig. Two further recordings were made on the boundary of variation 2b along the banks of Cross Water of Luce.

A significant water vole colony has been recorded along the banks of a tributary to the Water of Tig. Another large water vole colony has been recorded within option 2, along the banks of an unnamed stream approximately 500 m south east of Wee Fell.

The Arecleoch wind farm Environmental Statement (2006) contains several records of pipistrelle bat within Arecleoch Forest. Nyctalus bat species have also been recorded within option 2, to the west of Standard Knowe.

Route Option 3

In the southern part of Section B, the habitat comprises predominantly wet modified mire, including patches of marshy grassland and wet-modified bog. North of Chirmorie, a block of coniferous forestry plantation lies within the route, and further north the route covers a mixed habitat comprising poor semi-improved grassland, blanket bog, wet-modified bog, semi-improved neutral grassland, broadleaved semi-natural woodland, mixed plantation woodland, and marshy grassland.

Pipistrelle bats have been recorded throughout the route, focussed around the edges of forestry plantations and around waterbodies. Nyctalus bat species have also been recorded around the shores of Loch Alty, in the eastern part of the route.

Otter and water vole have been recorded within the route, along the banks of Laggish burn and its tributaries. Signs of badger presence are recorded within the route, approximately 700 m north of Chirmorie. Signs of pine marten have been recorded approximately 600 m east of the route, approximately 700 m southeast of Loch Alty. A palmate newt was recorded approximately 400 m east of the route at Drumchroyle.

4.2.3 Section C: Barrhill to Mark Hill substation

Route Option 1

There is coniferous forestry plantation at both ends of Section C, with improved grassland and scattered blocks of mixed woodland in the middle area. Much of the forestry in proximity to the Mark Hill substation has been recently felled. There are four small blocks of ancient woodland within route option 1, two of which are of semi-natural origin at Glenduisk, and the remaining two of plantation origin near Ballochmorrie.

There is limited potential for GWDTE within Section C, with only the rides and gaps of coniferous forestry likely to be of marshy grassland habitat type, and hence have potential to support GWDTE.

Protected species presence is unknown but given the habitats present, is likely to be limited to occasional foraging by bat species known from elsewhere in the area and possible presence of badger.

Route Option 2

In Section C, there is coniferous forestry plantation at the southern and northern ends of route option 2, with improved grassland and scattered blocks of mixed woodland in central part. Much of the forestry in proximity to Mark Hill substation has been recently felled. Route option 2 is similar in character to route option 1 within Section C, albeit with larger blocks of forestry and smaller areas of improved grassland.

A marginal preference for variation 2c is identified on the basis that it would involve a lesser amount of tree felling and therefore have a lesser effect on habitat. Variation 2d crosses through ancient woodland and therefore would give rise to a greater impact on sensitive woodland habitat.

Protected species presence is unknown but given the habitats present, is likely to be limited to occasional foraging by bat species known from elsewhere in the area and possible presence of badger.

Route Option 3

In the southern part of Section C, route option 3 includes a habitat mixture of improved grassland, wet-modified bog, blanket bog, marshy grassland, semi-improved acid grassland, broad-leaved semi-natural woodland, poor semi-improved grassland, scattered scrub, and scattered broad-leaved and coniferous trees. Further north, beyond the B7027 at Blair Farm, the route includes improved grassland and broad-leaved forestry (Blair Hill Wood). Further north, the route crosses improved grassland and small mixed and conifer plantations, as well as sections of modified and blanket bog in the east. At its northern most end is a block of coniferous forestry at Craiggannochie Hill.

Water vole have been recorded on the Mark Hill wind farm site, and there are further records on the banks of Drumhastie Burn and on the banks of Cross Water of Luce.

4.3 Ornithology

Chapter 3 describes the main ornithological interests which have been identified within the study area, including: designated sites and species; known feeding grounds and foraging habitats.

The degree of interaction of each option with these identified ornithology sensitivities has been considered in order to identify differentiator(s) between the route options under consideration. The route option most able to avoid identified ornithology sensitivities where ever possible is preferable.

4.3.1 Section A: Stranoch wind farm site

Route Option 1

Route Option 1 borders the Glen App and Galloway Moors SPA/SSSI which was classified as an SPA in 2003 and notified as a SSSI in 2000 for its breeding population of hen harrier *Circus cyaneus*. This species was regularly recorded hunting within and overflying the area of the Stranoch wind farm site within this section. Also recorded were merlin *Falco columbarius*, short-eared owl *Asio flammeus* and golden plover *Pluvialis apricaria*.

Route Option 2

Hen harriers were occasionally recorded hunting within and overflying the area of the Stranoch wind farm site within this section. Also recorded were merlin *Falco columbarius*, short-eared owl *Asio flammeus* and golden plover *Pluvialis apricaria*. The merlin activity recorded near Marklach appears indicative of a breeding territory and the golden plover recorded in the north part of this section was the most intensive of anywhere within the wind farm site, again suggesting possible nesting activity.

Route Option 3

Few protected species were recorded in this section during surveys for Stranoch wind farm. Golden plover were recorded but less frequently than in other areas of the wind farm site where route options 1 and 2 are located.

Breeding raptor VP surveys completed by Ramboll Environ in the area around Dirniemow have not identified activity by the species such as hen harrier, merlin or short-eared owl recorded elsewhere on the Stranoch wind farm site. This was to be expected as the section contains more farmland habitats than peatland habitats.

4.3.2 Section B: Arecleoch Forest

Route Option 1

In Section B, route option 1 borders the Glen App and Galloway Moors SPA/SSSI for much of its length.

The ES for Arecleoch wind farm which covers much of Section B, recorded occasional activity within the forestry areas by goshawk *Accipiter gentilis* and activity at forest edges by hen harrier, merlin, golden plover. Eight barn owl territories were identified within two km of the wind farm site. It is likely that the forestry also supports more common species such as sparrowhawk *Accipiter nisus* and tawny owl *Asio otus*.

Route Option 2

The southern area of Section B comprises an area of open peatland habitat continuous with the northern part of Section A and so it is likely to support similar species, i.e. golden plover and occasional hen harrier, merlin and short-eared owl.

The northern area is plantation coniferous woodland similar to Section B of Route Option 1. Breeding raptor Vantage Point (VP) survey by Ramboll Environ has not identified any protected raptor species activity but this was recorded only occasionally in the survey work for Arecleoch wind farm and this area could support goshawk and barn owl as well as being likely to support sparrowhawk and tawny owl.

Route Option 3

The peatland habitats in the south of this section are continuous with Section B of Route Option 2 and so are likely to support similar species with golden plover and occasional peatland raptors. The forestry in the centre of the section is likely to support common raptors such as sparrowhawk and tawny owl. The northern part of the section contains open habitats but ones more modified than those in the southern part of the section and therefore far less likely to support protected bird species.

4.3.3 Section C: Barrhill to Mark Hill substation

Route Option 1

This section passes through scattered woodland areas. It is likely to support species such as sparrowhawk, tawny owl and barn owl within some of the farms within the route.

Route Option 2

This section passes through scattered woodland areas. It is likely to support species such as sparrowhawk, tawny owl and barn owl within some of the farms within the route.

Route Option 3

South of Barrhill, route option 3 passes through an area of open habitats with some scattered areas of blanket bog and wet modified bog which might provide suitable habitat for a greater diversity of bird species. To the north of Barhill it is similar to the other route options and passes through scattered woodland areas likely to support species such as sparrowhawk or tawny owl. It also may support barn owl *Tyto alba* within some of the farms within the route.

4.4 Landscape Character

Chapter 3 describes the main landscape interests which have been identified within the study area, including national and regional level landscape designations and Landscape Character Types (LCT) and designations/classifications which could be directly affected by the proposed development. The degree of interaction of each route option with these identified landscape sensitivities has been considered in order to identify differentiator(s) between the route options under consideration. The potential impact of land take, as well potential wirescape impacts, are considered and the route most able to avoid identified landscape sensitivities where ever possible is preferable.

The landscape sensitivities discussed in this section are shown on Figures 3.4 and 3.5.

The Ayrshire Landscape Character Assessment (LCA) identifies a total of six LCTs within the study area and 6 km buffer zone for this assessment:

- Plateau Moorland LCT;
- Plateau Moorland with Forest LCT;
- Southern Uplands with Forest LCT;
- Upland Glen LCT;
- Intimate Pastoral Valleys LCT; and
- Upland Glen LCT.

The LCTs and designations within the study area are described below, and their location and extents shown on Figures 3.4 and 3.5.

4.4.1 Section A: Stranoch wind farm site

In Section A, all three route options cross the Plateau Moorlands LCT. This is a relatively flat or very gently undulating landscape with elevations ranging between 90 m and 275 m. It is an open and exposed landscape, often bleak and generally waterlogged with numerous streams. The landscape is characterised by heathland with bogs, mosses and upland grasses which form mosaics of ochres, browns and dark reds grazed by both sheep and cattle. Large areas are unenclosed, with occasional walls and fences dividing rough pastures into large units. The main built features are isolated farmsteads, minor roads and the Kilmarnock railway line.

Due to the scale of the plateau and absence of scale indicators, it is considered to have a low sensitivity to the type of development proposed.

Route Option 1

Route option 1 is located on the less sensitive Balker Moor area of the Plateau Moorlands LCT, where the route is surrounded by extensive Plateau Moorland landscape, which would contain the proposed development. Therefore no landscape constraint is identified.

Route Option 2

Route option 2 also crosses the less sensitive Balker Moor area of the Plateau Moorlands LCT, where the route is surrounded by extensive Plateau Moorland landscape, which would also contain the proposed development. A number of wind turbines are proposed, adjacent to the route; however, no landscape constraint is identified in relation to route option 2.

Route Option 3

Route option 3 extends within the shallow valley of Cross Water of Luce, which merges with the surrounding Plateau Moorland hills. A moderate level of landscape constraint is identified where the route crosses the river, then the road and railway line and ruins adjacent to the proposed turbines within Kilgallioch wind farm.

4.4.2 Section B: Arecleoch Forest

In Section B, all three route options cross the Plateau Moorland with Forest LCT, which is closely related to the Plateau Moorland LCT but is typified by extensive plantations of uniform age, colour and texture. Due to its expansive nature, the prevalence of forest cover and the predominance of wind farm development, sensitivity to the type of development proposed is considered to be low. However, care would be needed to avoid cumulative effects at key receptor locations and to avoid significant intrusion on the smaller scale Cross Water of Luce valley.

Route Option 1

Route option 1 extends through Arecleoch Forest and flanks the western boundary of the operational Arecleoch wind farm site. The route crosses the Southern Uplands with Forest LCT, which is characterised by the existing Arecleoch wind farm turbines in this area. These represent a considerable modification to this LCT; therefore, the LCT is considered to have a low sensitivity to the type of development proposed.

The northern part of route option 1 lies within the South Ayrshire Scenic Area. The cumulative context and potential wirescape effect with the existing OHL within the valleys of Water of Tig and Dannacks Burn, makes Section B medium constrained in terms of the proposed development.

Route Option 2

Route option 2 extends through the Arecleoch Forest and along the eastern boundary of the operating Arecleoch wind farm. A marginal preference for the variation 2a is identified, on the basis that this follows the same alignment as existing transmission infrastructure and would consequently have a lesser impact on the landscape.

Route Option 3

Route option 3 crosses the Plateau Moorland with Forest LCT, at Knockshin Forest, and then the Plateau Moorland LCT, with the operating Arecleoch wind farm located 2 km to the west and the consented Kilgallioch wind farm located immediately to the east. The proposed Chirmorie wind farm turbines (application stage) would fill the area between route option 3 and Arecleoch wind farm. This landscape is therefore considered to have low sensitivity to the type of development proposed.

4.4.3 Section C: Barrhill to Mark Hill substation

In Section C, all three route options cross the Intimate Pastoral Valley LCT, associated with the Duisk River, which is a small/medium scale valley with steep slopes and a relatively flat valley bottom. Land cover is dominated by the structure of broadleaf woodland which includes shelterbelts, riparian woodland and policy woodlands and which separate the valley pastures into small parcels of fields. Other field boundaries comprise drystone dykes and some hedges. The pattern of lush pastures, hedges, hedgerow trees and shelterbelts is an essential feature of this landscape, providing contrasting textures and colours when compared with the moorland hills to north and south. The edges of more extensive coniferous plantations are visible along the upper slopes of the valley. Some areas of coniferous woodland extend into the valleys from surrounding high ground. Settlement comprises scattered dwellings and farms and the village of Barrhill, surrounding the A714.

Due to the small to medium scale of this well-settled and often intricately patterned landscape, sensitivity would be medium to high in respect of the type of development proposed.

Route Option 1

Route option 1 lies almost entirely within the South Ayrshire Scenic Area in Section C, descending across Farden Hill (188 m AOD) towards the bottom of the valley at a level of 50 m AOD, and then ascending towards Barbae Hill (205 m AOD).

The bottom of the valley is traversed by the A714 and Kilmarnock railway line. There are a small number of dispersed farmsteads on the valley sides and individual properties next to the A714.

Although the landscape of Section C has some characteristics consistent with the Intimate Pastoral Valley LCT, such as lush pasture, it contains less woodland. The other features which influence the landscape character are the existing man-made structures such as the existing 275 kV OHL towers. In addition, the upper slopes of the valley contain existing wind turbines. Cumulatively the existing steel towers, wood poles and wind turbines create a context of similar built development as the proposal.

Due to the cumulative context, this narrow section of designated Duisk River valley is considered to be highly constrained in terms of landscape.

Route Option 2

Route option 2 lies almost entirely within the South Ayrshire Scenic Area in Section C, descending from the forested Shiel Hill (230 m AOD) and towards the bottom of the Duisk River valley, before narrowing and ascending along the eastern slope of Barbae Hill (205 m AOD) towards Craiggannochie Hill.

The bottom of the valley is traversed by the A714 and the Kilmarnock railway line. There are a few dispersed farms on the valley sides, and individual properties next to the A714.

Although the upper slopes of the valley are indirectly impacted upon by the Mark Hill wind farm turbines, the landscape of Section C has all the characteristics of Intimate Pastoral Valley, being heavily dominated by deciduous woodland.

Variation 2d is preferred over variation 2c as it would be screened by existing scrub vegetation between the railway line and the A714, and by existing woodland to the north of the Duisk River. Variation 2c would have greater potential for impact on the landscape around Belhamage Farm, where it would have potential to create a scar on the hillside.

Route Option 3

Route option 3 lies almost entirely within the South Ayrshire Scenic Area in Section C, crossing the Duisk River to the east of Barrhill village, then stretching for almost 3 km along the south west facing slope of Mark Hill, above Duisk River valley policy woodland. It extends along the south west facing mid slope of Mark Hill, abutting with the southern boundary of Mark Hill wind farm.

The bottom of the valley is traversed by the A714 and B7027. There are a few dispersed farmsteads on the valley sides and scattered individual properties of Barrhill along the sides of the B7027. Although not as wooded as the typical Intimate Pastoral Valley landscape it is otherwise consistent with this LCT. The upper slopes of the valley include existing turbines of Mark Hill wind farm.

Although the section extends partially within the less sensitive Plateau Moorland with Forest LCT, the Duisk River valley crossing is considered to be highly constrained in terms of landscape.

4.5 Visual Amenity

Chapter 3 describes the main visual amenity interests which have been identified within the study area, including residential receptors; hill walkers, users of strategic recreational footpaths, national cycle routes, and visitors to tourist attractions/heritage sites, beauty spots or picnic areas, whose attention may be focused on the landscape.

4.5.1 Section A: Stranoch wind farm site

Route Option 1

Views of the proposed development within route option 1 would be likely from Penwhirn Reservoir and from a small number of properties at a distance of 900 m from the south western boundary of route option 1. The proposed development has potential to appear on the skyline in views from the minor road which passes the reservoir, and from the minor road which extends along Main Water of Luce to the south west of Section A.

An OHL within route option 1 would affect several medium sensitivity (anglers, road users) and high sensitivity (residential properties) visual receptors.

Route Option 2

Route option 2 extends across Balker Moor, above Cross Water of Luce, where there is a core path within Davenholme Burn valley. Due to the high elevation of the route, views from the bottom of Cross Water of Luce would be unlikely. Views of the southern end of the route on Slickconerie Hill would be likely from the railway and from the minor road within Main Water of Luce valley. However, these views may be screened by topography if the proposed development were sited above an altitude of 180 m. No potential effects on visual receptors are identified within for route option 2.

Route Option 3

It is predicted that an OHL within route option 3 would be visible from the Kilmarnock railway line, which extends along the western side of the Cross Water of Luce valley. Visibility of the proposed development would depend on its elevation/altitude. Due to the topography, visibility is predicted to a lesser extent from the minor road which extends along Cross Water of Luce valley. There are a few properties within the valley.

Where route option 3 crosses the valley to the south west at Dirniemow Fell, there would be potential for an OHL to impact on the channelled views through the valley from Dirniemow Bridge. The core path emerges from Davenholme Burn valley adjacent to the bridge, and the visual amenity of this kind of "active" area or bridging point would need to be considered in the detailed design of any OHL route within route option 3.

Potential views of an OHL within route option 3 on Slickconerie Hill would be gained from the road which extends along the Main Water of Luce valley. These views would be screened by topography if the proposed development is ultimately sited above an altitude of 180 m (on Slickconerie Hill).

Although route option 3 is not highly constrained in terms of landscape, there would be potential for views within the Cross Water of Luce valley to be affected by the proposed development.

The landform of Chirmorie Cairn (which lies within Section B), with its distinctive peak, features in views from the minor road through the study area, when travelling north within Section A. Where the route crosses the minor road, at the northern end of Section A, an OHL within it may affect views of the distinctive appearance of Chirmorie Cairn.

4.5.2 Section B: Arecleoch Forest

Route Option 1

Route option 1 contains no visual receptors in Section B. Views of the route could be gained from the higher hills (including Beneraird Hill (439 m AOD)) to the west, from where the proposed development would appear in the context of the Arecleoch wind farm.

A number of properties at the head of Water of Tig, and also core paths users, would have cumulative views of the proposed development in combination with the existing Arecleoch wind farm grid connection OHL. However if the proposed development were located to the east of the existing OHL, views would be screened by the forestry, should this be retained.

Route Option 2

Route option 2 contains no visual receptors in Section B. Where the route extends along the eastern boundary of Arecleoch wind farm, the landform of Standard Knowe would screen views from the east. Further north, variation 2a would be preferred over variation 2b, as it is located at greater distance from surrounding receptor locations. Variation 2b includes a greater number of track crossings, and therefore may be encountered by a greater number of receptors.

Route Option 3

Road users and residential receptors at Chirmorrie property would be the most sensitive visual receptors to be potentially affected by an OHL located within route option 3. Views from outside the route, from the east, would be screened by the forest and by Kilgallioch wind farm and from the west by the forest and landform of Chirmorie Cairn. It should be noted that views of the distant Merrick Hills (to the north east) are gained from the minor road within the section between Chirmorie Cairn and Arecleoch Forest.

4.5.3 Section C: Barrhill to Mark Hill substation

Route Option 1

Route option 1 has the potential for wirescape effects to occur if an OHL in this route were to be taken along the eastern boundary of the route, with the proposed development seen simultaneously with the Mark Hill turbines in views from the upper side of Duisk River valley.

The western side of route option 1 is formed by the west facing slope of Barbae Hill, and an OHL in this location would appear on the skyline, in views from several properties on the western edge and outside of the route.

This section of the Duisk River valley is highly constrained in terms of OHL routeing, due to the number of high sensitivity visual receptors, which may be affected by simultaneous visibility of the proposed development in conjunction with the existing power line connecting Arecleoch wind farm to Mark Hill substation.

Route Option 2

Visual amenity receptors associated with route option 2 include two caravan sites (Barrhill Holiday Park and Queensland Holiday Park) next to the A714, which represent high sensitivity receptor locations. However, variation 2d would potentially be screened by existing vegetation and woodland, while variation 2c would be more visible as it runs up the hillside east of Belhamage Farm.

Route Option 3

The majority of visual receptors within Section C (including the village of Barrhill) are contained within and adjacent to route option 3. The following receptors would be likely to have views of an OHL within route option 3 on the skyline when it crosses the landform of Blair Hill (178 m AOD): residential properties immediately west of route option 3; properties alongside the B7027; and road users on the A714 and B7027.

This area of Duisk River valley is highly constrained in terms of OHL routeing, due to the number of highly sensitive visual receptors, which would be affected by visibility of the proposed development within route option 3.

4.6 Archaeology and Cultural Heritage

Chapter 3 describes the main archaeology and cultural heritage interests which have been identified within the study area, including scheduled monuments and listed buildings.

The degree of interaction of each route option with these identified archaeological and cultural heritage sensitivities has been considered in order to identify differentiator(s) between the route options under consideration. The route option most able to avoid identified sensitivities where ever possible is preferable.

The locations of the key archaeological and cultural heritage features discussed in this section are shown on Figure 3.6.

4.6.1 Section A: Stranoch wind farm site

Route Option 1

In Section A, the central part of Route option 1 lies adjacent to the East Rhins Area of Archaeological Sensitivity (ASA), an area designated by Dumfries and Galloway Council. Within this part of route option 1, there are five non-designated cultural heritage sites. There are two hut circles (MDG1956 and MDG1957), one of which is considered to be of potentially national importance, and which should be avoided by the proposed development. The other features are

of likely medieval / post-medieval date, and include a sheepfold and area of rig and furrow (MDG1946) which suggests a former area of occupation, an area of small cairns (MDG1964), likely to result from agricultural improvement of the land, and the remains of a building (MDG13812). All of these assets could be avoided through careful routeing of the proposed development.

The other non-designated cultural heritage assets within Section A of route option 1 comprise a hay ree (MDG13811) to the north of the ASA area, and to the south two further cairnfields (MDG1963 & MDG1965) likely resulting from agricultural improvement of the land. The remains of an enclosure (MDG1609) and a possible cairn (MDG1966) may be of prehistoric origin. All are considered unlikely to be of more than local importance, and could be avoided through careful routeing of the proposed development.

Scheduled Monuments in closest proximity to route option 1 comprise hut circles and field systems, which survive as low relief remains, and are not prominent features within the landscape. It is recommended that the proposed development should be routed with the maximum possible stand-off from these features, to avoid impacts upon their setting. However, given the type of technology proposed, a 132kV wooden pole line, it is considered unlikely that the construction of the proposed development in the vicinity of the scheduled monuments would have a significant effect on their settings.

Route Option 2

Much of the route lies within the East Rhins Archaeologically Sensitive Area (ASA) as designated by Dumfries and Galloway Council.

Thirteen non-designated cultural heritage assets are located within route option 2. These include remnants of a prehistoric agricultural landscape, such as cairnfields of low cairns (WoSAS Pin 11286 & 11287 & MDG1827, MDG1864, MDG1866, MDG1848 MDG1847, MDG1869 & MDG1862), likely to result from agricultural improvement of the land, and believed to be of Bronze Age date.

Remnants of likely later medieval or post-medieval activity include shielings (MDG1832 & MDG1833), an area including an enclosure and field system (MDG13817), and a hay ree (MDG13816). The majority of these features could be avoided during the alignment selection stage. For the cairnfields (WoSAS Pin 11286 & 11287 & MDG1827, MDG1864, MDG1866, MDG1848 MDG1847, MDG1869 & MDG1862) it would be necessary during the detailed alignment selection stage to ensure the extent of the features is understood, and to avoid the upstanding elements. None of the features are suggested to be of national importance by the HER.

Route option 2 lies within an area with a concentration of scheduled monuments whose settings may be affected by the proposed development. Cairns, including Cairn Kenny (SM1925), Markdhu cairn (SM4861) Marklach cairn (SM4985), Dirniemow cairn (SM4914), Dirniemow cairn 1050m SW of (SM4950), and Kilfeddar cairn (SM7478) are considered to be the assets which have settings most likely to be subject to adverse effects.

Route Option 3

There are seventeen Scheduled Monuments within route option 3, in Section A, comprising hut circles, cairns, burnt mounds and farmsteads. All could theoretically be avoided through careful routeing of the proposed development; however, this would be challenging as the Scheduled Monuments are dispersed across the area. It is recommended that the maximum possible stand-off from the Scheduled Monuments is achieved during the alignment selection process, in order to avoid impacts on their setting.

There are two Category C Listed Buildings within route option 3, Dirniemow Bridge (LB19374) and Marklach footbridge (LB19379). Both could be avoided through careful routeing of the

proposed development. Taking into account their localised setting in relation to the rivers which they cross, and the nature of the technology proposed, a 132kV wooden pole line, it is considered unlikely that the construction of the proposed development would have a significant effect on either of the Listed Buildings.

The majority of route option 3 lies within the East Rhins Archaeologically Sensitive Area (ASA), an area designated by Dumfries and Galloway Council.

There are 48 non-designated heritage assets situated within route option 3. A large number of these are dated to the bronze age and related to the occupation and agricultural use of the land; they include cairn fields, burnt mounds, cairns and enclosures. The HER classify eighteen of these features as being of potential national significance. These features form a prehistoric landscape in combination with the Scheduled Monuments. The majority of features could be avoided through careful routeing of the proposed development. In the case of the cairn fields it will be necessary during the detailed alignment selection stage, to ensure the extent of the features is understood, and to avoid the upstanding elements.

Other features within route option 3 relate to medieval or post-medieval agricultural use of the land, or are related to the railway or road which occur within the route. These features could all be avoided during the detailed alignment selection stage.

Route option 3 lies within an area with a concentration of scheduled monuments whose settings may be affected by the proposed development. Cairns, including Cairn Kenny (SM1925), Markdhu cairn (SM4861) Marklach cairn (SM4985), Dirniemow cairn (SM4914), Dirniemow cairn 1050m SW of (SM4950), Kilfeddar cairn (SM7478), Pultadie cairn (SM4881), and six cairns near Craighirnoch (SM4971, SM4974, SM1947, SM4956, SM4932, & SM4952) are considered to be the assets which have settings most likely to be subject to adverse effects.

4.6.2 Section B: Arecleoch Forest

Route Option 1

There are sixteen non-designed cultural heritage assets situated within the route option 1, in Section B. At the northern end of the section (to the north of the Arecleoch Forest) the assets are primarily farmsteads and other buildings and structures associated with agricultural activity, including a hay ree (WoSAS Pin 42556) and a sheepfold (WoSAS Pin 42555). A findspot of a perforated axe hammer (WoSAS Pin 11358) is recorded at the north of the area, near Drumskeoch. All of these assets are considered unlikely to be of more than local importance, and could be avoided through careful routeing of the proposed development.

A cluster of nine other non-designated cultural heritage sites are situated within Arecleoch Forest. These are primarily related to the former agricultural use of the land, including a farmstead, surrounded by a field system and head-dyke (WoSAS Pin 11366), along with some other outlying buildings (WoSAS Pins 11367, 42553 and an enclosure (WoSAS Pin 42563). These sites all lie within the forestry plantations, although some appear to survive within clearings. All are considered unlikely to be of more than local importance, and could be avoided through careful routeing of the proposed development.

Two small enclosures (WoSAS Pin 11357), and a recorded area of possible cup-marks on a glacial erratic are recorded at the edge of route option 1, close to Glenour. These are situated in close proximity to an existing overhead line and would not be affected by the proposed development.

A standing stone (WoSAS Pin 11360) is recorded as being located within a clearing in the forestry plantation. It could be avoided through careful routeing of the proposed development, and it is also recommended that the proposed development is routed to avoid impacts upon its setting, albeit, its setting is currently limited to the forestry clearing in which it is located.

A Category B Listed Building (LB6451), Glenour, Colmonell is situated to the immediate north of Route option 1, within a clearing at the edge of the commercial forestry plantation. Taking into account the type of technology proposed, a 132kV wooden pole line, and the presence of an existing grid connection following the edge of route option 1 at this location, it is considered unlikely that the construction of the proposed development within route option 1 would have a significant effect on the listed building.

There are no other designated assets in close proximity to route option 1 for which it is considered likely that the construction of the proposed development could have a significant effect on its setting.

Route Option 2

Six non-designated cultural heritage assets are situated within route option 2, in Section B. Within the commercial forestry plantations of Arecleoch Forest there is an area of clearance cairns and other agricultural related features (WoSAS Pin 13053), an unroofed structure (WoSAS Pin 42464) and several sheepfolds (WoSAS Pins 42562 & 42502). It is unclear how much these features have been disturbed by forestry operations. At the southern end of route option 2, outwith the commercial forestry, an unroofed structure (MDG13777) and an enclosure (MDG13778) are recorded. All six features are considered unlikely to be of more than local importance.

To the immediate south of this section of route option 2 are a group of Scheduled Monuments including those whose settings may be affected by the proposed development. Cairn Kenny (SM1925) and Markdhu cairn (SM4861) are considered to be the assets with the most sensitive settings. However, given the type of technology proposed, a 132kV wooden pole line, it is considered unlikely that the construction of the proposed development would have a significant effect on the setting of any of this cluster of scheduled monuments.

Route Option 3

The southernmost part of route option 3, in Section B, coincides with the northernmost part of the East Rhins ASA; however, there are no recorded cultural heritage assets within this part of the ASA.

Twenty-two non-designated heritage assets are situated within route option 3. In the northern part of route option 3, within the commercial forestry of Arecleoch Forest, the recorded assets are primarily agricultural in nature, comprising sheep and hay rees (WoSAS Pin 17165 & 42480), and two enclosures, suggested to provide evidence of early farming (WoSAS Pins 17166 & 42478). Place name evidence suggesting the possible location of a castle (WoSAS Pin 11490) is also recorded, although no evidence for upstanding elements has been found. It is unclear how much these features have been disturbed by forestry operations.

To the south of Arecleoch Forest the recorded remains, with the exception of a single cairn (WoSAS Pin 11497), all relate to the agricultural use of the land. Chirmorie farmstead (WoSAS Pin 67637) continues to be occupied. Other features include rig and furrow cultivation remains (WoSAS Pin 67640), several sheepfolds (WoSAS Pins 67638 & 67639 67647), a sheep shelter (WoSAS Pin 67662), some groups of shielings (WoSAS Pins 51275 & 51281), an area of peat cutting (WoSAS Pin 67663), a quarry (WoSAS Pin 67643) and a cistern (WoSAS Pin 67661). All features are considered unlikely to be of more than local importance, and could be avoided through careful routeing of the proposed development.

4.6.3 Section C: Barrhill to Mark Hill substation

Route Option 1

One Category B Listed Building, Ballochmorrie House (LB1053) is situated within route option 1, in Section C. This should be avoided, and the grid connection should not be routed in close proximity to the listed building.

There are eighteen non-designated cultural heritage assets within route option 1. These primarily comprise the remains of medieval and post-medieval farmsteads (WoSAS Pins 11549, 17188, 22242, 22243, 42425-42427, 42455-42457 & 42564) and other remains associated with agricultural activity, such as an area of clearance cairns (WoSAS Pin 51320). A possible prehistoric cairn (WoSAS Pin 11515) is situated to the immediate south-east of Glenduisk farmstead. These features could all be avoided through careful routeing of the proposed development.

The location of the former Glenduisk non-inventory designed landscape (WoSAS Pin 53464) does not appear to have many surviving elements, but the area should be avoided. Given the type of technology proposed, a 132kV wooden pole line, it is considered unlikely that the construction of the proposed development in the vicinity of the former designed landscape would have a significant effect on its setting.

There are no designated assets in close proximity to route option 1 for which it is considered likely that the construction of the proposed development could have a significant effect on its setting.

Route Option 2

Twelve non-designated cultural heritage assets are situated within route option 2, in Section C. To the north of the A714 road, these comprise Knocktyinnal, Belhamage, and Barbour farmsteads (WoSAS Pins 42437, 42428 & 17189), and an outlying building known as Fordhouse (WoSAS Pin 22245); further to the north on Craiggannochie Hill a series of bridges and culverts are also recorded. All features are considered unlikely to be of more than local importance, and could be avoided through careful routeing of the proposed development.

To the south of the A714 road, there are a cairn (WoSAS Pin 11558), a possible former farmstead (WoSAS Pin 11543), three sheepfolds (WoSAS Pins 42468, 42463 & 42423) and a former structure and enclosure (WoSAS Pin 42424) which are assumed to be related to agricultural use of the land. These features could all be avoided through careful routeing of the proposed development.

GlenTaur (WoSAS Pin 59728) is highlighted as having the potential remnants of a designed landscape; any remaining features of the designed landscape could be avoided through careful routeing of the proposed development. Kildonan non-inventory garden and designed landscape lies to the immediate east of variation 2d. It is recommended that the final alignment is located as far as possible from the two non-inventory garden and designed landscapes to ensure that their settings are not significantly affected.

Route Option 3

Twenty-five non-designated cultural heritage assets are situated within route option 3, in Section A. At the northern end of route option 3, to the north of the A714 road, these comprise the former parish boundary and a series of culverts (WoSAS Pins 58067, 58065 & 58069) and bridges (WoSAS Pins 58065, 58066, 61514 & 11544), locations of former post-medieval farmsteads (WoSAS Pins 17190, 17191, 17192 & 42433), and the locations of two former buildings (WoSAS Pins 42435 & 42432). An enclosed settlement (WoSAS Pin 11546) and area of small cairns (WoSAS Pin 11537), which are considered likely to result from agricultural activity, may be of

prehistoric origin. These features could all be avoided through careful routeing of the proposed development.

To the south of the A714 road the non-designated features comprise two cairns of likely prehistoric origin (WoSAS Pins 11562 & 11541), the location of a former building (WoSAS Pin 42431) and a hay ree (WoSAS Pin 42429), all of which could be avoided through careful routeing of the proposed development.

The other features comprise two farmsteads (WoSAS Pins 42430 & 11555) with associated field system and rig and furrow cultivation remains, and the location of a possible former golf course (WoSAS Pin 11542). During the detailed alignment selection, it will be necessary to ensure the extent of these features is understood, and to try and avoid the upstanding elements.

The western part of route option 3 crosses the eastern part of the Kildonan non-inventory garden and designed landscape. Category A Listed Kildonan House is situated at the centre of the designed landscape, but outwith route option 3. The potential for effects upon the setting of both Kildonan House and the surrounding designed landscape should be considered through detailed alignment selection.

4.7 Geology, Hydrogeology and Hydrology

Chapter 3 describes the main geological, hydrogeological and hydrological interests which have been identified within the study area, including details of the solid and drift geology, the groundwater vulnerability, the surface water features and peatland.

The degree of interaction of each route option with any identified sensitivities is considered in this section, in order to identify differentiator(s) between the routes under consideration. The route option most able to avoid identified sensitivities where ever possible is preferable.

The locations of the relevant features discussed in this section are shown on Figure 3.7.

4.7.1 Section A: Stranoch wind farm site

Route Option 1

Route option 1 is characterised by open moorland and relatively high ground, and there are a number of watercourses that generally flow westwards and southwards off the slopes of Stab Hill, Liggart Hill and Studie Knowe.

In terms of peatland, route option 1 is characterised in the main by class 3 peatland in the southern part of Section A, with class 1 peatland in the remainder of Section A. There is also a small area of class 2 peatland on Liggart Hill, and class X peatland within Arecleoch Forest. The BGS 1:625,000 scale mapping also shows areas of peatland within the whole length of Route option 1 in Section A.

Route Option 2

Route option 2 is characterised by a number of small watercourses flowing from the slopes of The Stranoch, Maurs Cairn and Corly Craig, including the larger Davenholme Burn.

In terms of peatland, route option 2 is characterised in the main by class 3 peatland in Section A, with smaller areas of class 1 peatland in the northern part. There is also a small area of class 4/no peatland on the east side of The Stranoch. The BGS 1:625,000 scale mapping also shows areas of peatland which correspond with the carbon rich soils and deep peat mapping.

Route Option 3

Route option 3 crosses the Tongue Glen and associated watercourse, and the Cross Water of Luce. There are also a number of tributaries of the Cross Water of Luce located within the route.

In terms of peatland, the southern part of Section A mainly contains class 3 peatland, with smaller patches of class 1 peatland within the route. Further north, there are areas of class 4/no peatland, at lower elevations, with class 3 and class X peatland on the higher slopes of Dirniemow Fell and Glenkitten Fell. There are also patches of class 2 and class 1 peatland to the north of Pilwhirn Burn. The BGS peat mapping is largely consistent with this.

4.7.2 Section B: Arecleoch Forest

Route Option 1

In Section B, route option 1 is characterised by small streams running off the higher ground of Bennan Hill, Benaw, Loch Hill, as well as the larger watercourse of the Water of Tig. In addition, two small ponds lie adjacent to route option 1 on Eldridge Hill and Loch Hill.

In terms of peatland, route option 1 is characterised mainly by class X peatland in Section B, where vegetation cover (i.e. the plantation forestry) is not characteristic of peatland habitat but where all soils are carbon-rich soils and contain deep peat. Again, the BGS 1:625,000 scale mapping also shows areas of peatland within the majority of route option 1 in Section B.

The Arecleoch wind farm ES (2006) records peat depths of 0.5-1 m within the area included in route option 1, with localised zones of 3-4 m peat depth towards the northern part of this section, near Black Loch and Loch Hill.

Route Option 2

Route option 2 crosses the Cross Water of Luce as well as a number of small tributaries. There are numerous small burns and drainage ditches within Arecleoch Forest, and the Water of Tig lies directly west of route option 2.

In terms of peatland, route option 2 is characterised by class 1 peatland, and small patches of class 3 peatland, in the southern part of Section B, while class X peatland covers the majority of the forestry area in the northern part of section B. Variation 2b offers greater potential to avoid impact on carbon rich soils and peatland.

The Arecleoch wind farm ES (2006) records peat depths of 0.5-1 m, with some significant areas of 1-2 m depth and two localised areas of 3-4 m depth within Arecleoch Forest.

Route Option 3

There are numerous small streams and burns within Section B, including Laggish Burn and Haw Burn.

There is very little peatland recorded within Section B, with small areas of class 1, class 2 and class 3 peatland within the southern part of Section B, in proximity to Chirmorie, and an area of class 1 peatland in the northern part of Section B. There is no peat recorded within the forestry plantation within Section B.

The Arecleoch wind farm ES (2006) records variable peat depths within this area, with a mosaic of peat depths ranging from 0-4 m. Areas with peat depth of 3-4 m are limited to Chirmorie and the forestry plantation north of Chirmorie.

4.7.3 Section C: Barrhill to Mark Hill substation

Route Option 1

The Duisk River crosses route option 1 in Section A, and has a number of short tributaries also flowing into it within the route. In addition, Loch Lig lies within route option 1, in Section C.

There is very little peatland located within Section C, and therefore not hydrogeological sensitivity is identified.

Route Option 2

In Section C, route option 2 crosses the Duisk River and has a number of its tributaries flowing northwards and southwards within the route. No preference between variations 2c and 2d is identified.

There is very little peatland recorded within Section C, with only a small extent of class X peatland located on Craiggannochie Hill, on the immediate approach to the Mark Hill substation. This is also shown by the BGS 1:625,000 scale mapping.

Route Option 3

Route option 3 crosses the Duisk River in Section C and contains numerous small tributaries which flow into it. Mill Loch is also located within the northern part of the route, in Section C.

There is little peatland recorded within Section C of route option 3, with two small areas of class 1 peatland in the eastern part of the route and a small extent of class X peatland located on Craiggannochie Hill, on the approach to Mark Hill substation. This is also shown by the BGS 1:625,000 scale mapping.

4.8 Recreation and Tourism

As described in Chapter 3, the recreational and tourist resources in the vicinity of the route options are limited to core paths and various tourism resources.

The locations of key recreation and tourism features discussed in this section are shown on Figure 3.8.

4.8.1 Section A: Stranoch wind farm site

Route option 1

Route option 1 crosses the core path which follows the track between The Stranoch and Stab Hill, to the north of the summit of Stab Hill.

Route Option 2

Route option 2 also crosses the core path which lies between The Stranoch and Stab Hill, to the west of the railway.

Route Option 3

Route option 3 contains a section of the core path which lies between The Stranoch and Stab Hill, where it follows the minor road and lies parallel to the railway line. Further north, route option 3 also contains a section of the core path up Glenkitten Fell.

4.8.2 Section B: Arecleoch Forest

Route Option 1

There are no features related to tourism and recreation within route option 1, in Section B.

Route Option 2

Recreation and tourism related features within Arecleoch Forest comprise the network of forestry tracks which may be suitable for mountain biking and walking. Variation 2a includes fewer track crossings, in comparison to variation 2b and is therefore preferred.

Route Option 3

There are no features related to tourism and recreation within route option 3, in Section B although there are a number of forestry tracks which may be suitable for mountain biking and walking.

4.8.3 Section C: Barrhill to Mark Hill substation

Route Option 1

There are no features related to tourism and recreation within route option 1, in Section C.

Route Option 2

Route option 2 contains the Queensland Holiday Park and Barrhill Holiday Park, where it crosses the A714. Variation 2d is preferred over variation 2c, as it is located at greater distance from Queensland Holiday Park and Barrhill Holiday Park.

Route Option 3

Three accommodation providers at Blair Farm and the Galloway Hotel are located within route option 3, in Section C.

4.9 Land Use and Infrastructure

As described in Chapter 3, land use varies throughout the study area, between residential settlement and crofting land, open moorland and plantation forestry. The analysis documented here has taken account, where possible, of land use sensitivities.

The locations of the relevant features discussed in this section are shown on Figure 3.8.

4.9.1 Section A: Stranoch wind farm site

Route Option 1

Route option 1 lies on the western boundary of the proposed Stranoch wind farm, with the eastern boundary of the route defined by a 350 m buffer distance from the nearest of the proposed turbines.

Route Option 2

Route option 2 lies within the proposed Stranoch wind farm site. At its southern end, the route lies in close proximity to a number of the proposed turbines, while further north the western boundary of the route defined by a 350 m buffer distance from the nearest of the proposed turbines.

Route Option 3

Route option 3 lies partially within the proposed Stranoch wind farm site, in the southern part of Section A, and partially within the consented Kilgallioch wind farm site, in the central part of Section A. At its southern end, the route lies in close proximity to a number of the proposed Stranoch turbines, while further north the western boundary of the route defined by a 350 m buffer distance from the nearest of the consented Kilgallioch turbines.

Route option 3 also crosses the railway line and the minor road, to the east of the proposed Stranoch substation, and its western boundary runs largely parallel to the railway line through Section A. There are a number of scattered dwellings located within route option 3, alongside the minor road.

4.9.2 Section B: Arecleoch Forest

Route Option 1

Route option 1 lies on the western boundary of the existing Arecleoch wind farm, with the eastern boundary of the route defined by a 350 m buffer distance from the nearest of the turbines.

To the north of Arecleoch wind farm, a 275 kV OHL lies within route option 1, which runs south west to north east, towards Barrhill.

Route Option 2

Route option 2 lies between the existing Arecleoch wind farm and the proposed Chirmorie wind farm, with the eastern boundary of the route defined by a 350 m buffer distance from the nearest of the Arecleoch turbines and the western boundary defined by a 350 m buffer distance from the nearest of the proposed Chirmorie turbines.

Further north, variation 2a includes the Arecleoch wind farm grid connection OHL, which runs south west to north east, towards Barrhill. Variation 2a is therefore preferred over 2b, as it follows the same alignment as the existing Arecleoch wind farm grid connection and would therefore require a lesser amount of new land take.

Route Option 3

Route option 3 lies between the proposed Chirmorie wind farm and the consented Kilgallioch wind farm, with the eastern boundary of the route defined by a 350 m buffer distance from the nearest of the proposed Chirmorie turbines and the western boundary defined by a 350 m buffer distance from the nearest of the Kilgallioch turbines.

The minor road also lies within the route, in the vicinity of Chirmorie. Further north, the route is characterised by plantation forestry, with the railway line located immediately to the west. The route also contains part of the proposed Altercannoch wind farm site.

4.9.3 Section C: Barrhill to Mark Hill substation

Route Option 1

The 275 kV OHL lies within route option 1 in this section, on the approach to Barrhill. Route option 1 crosses the railway line the A714 road in this section, and also contains numerous minor roads leading to properties at Craigbrae, Ballaird, Glenduisk and Ballochmorrie.

Further north, the approach to Mark Hill substation is characterised by plantation woodland on Craiggannochie Hill.

Route Option 2

Route option 2 crosses the railway line and the A714 road in Section C, and contains a number of residential properties as well as the Queensland and Barrhill Holiday Parks, where it is understood that a new private dwelling is proposed.

Further north, the existing 275 kV OHL lies in the western part of route option 2, on the approach to Mark Hill substation.

Route Option 3

Route option 3 lies within the proposed Altercannoch wind farm site in the southern part of Section C, with its eastern boundary defined by a 350 m buffer distance from the nearest of the proposed turbines.

North of the wind farm site, the route crosses the B7027 then the A714 and contains a number of residential dwellings in this area.

On the approach to Mark Hill substation, the route is characterised by patches of plantation forestry and by the existing Arecleoch grid connection OHL on Craiggannochie Hill. There is also a network of minor roads leading to residential dwellings at Balluskie and Knockytinnal, and further north into the Mark Hill wind farm site.