

# Proposed 132kV Grid Connection to Benbrack Wind Farm



## Routeing Consultation Report







# **BENBRACK WIND FARM GRID CONNECTION**

## **Routeing Consultation Report**

February 2020

## QUALITY MANAGEMENT

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## Glossary

Term	Definition
ALCA	Ayrshire Landscape Character Assessment
AOD	Above Ordnance Datum
ASA	Archaeologically Sensitive Area
BGS	British Geological Survey
D&G	Dumfries and Galloway
LCADG	Dumfries and Galloway Landscape Assessment
D&GWLCS	Dumfries and Galloway Windfarm Capacity Study
EIA	Environmental Impact Assessment
Electricity Works Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000
Electricity Act	The Electricity Act 1989
ES	Environmental Statement
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HER	Historic Environment Record
Holford Rules	Guidelines developed by the late Lord Holford in 1959 for routeing overhead lines
LCADG	Landscape Character Assessment for Dumfries and Galloway
OS	Ordnance Survey
DE Route	The 132 kV overhead line which the Benbrack Wind Farm will connect with
kV	Kilo-volt capacity of an electricity power line
LCT	Landscape Character Type
LCU	Landscape Character Unit
LDP	Local Development Plan
m	metres
MoD	Ministry of Defence
OHL	Overhead line: an electric line in the open air and above ground level
Preferred Route	The preferred route identified through this routeing study process, which is yet to be subject to non-statutory consultation
Proposed Route	The amended proposed route following non-statutory consultation. The route which will go forward to Environmental Impact Assessment
ROA	Route Option Area: area within which a number of feasible route options can be identified prior to appraisal
RSA	Regional Scenic Area: area identified by local authorities of regional importance for scenic quality. Names vary between local authorities
RSPB	Royal Society for the Protection of Birds
Section 37 (s37) application	An application for development consent under Section 37 of the Electricity Act 1989
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage



Term	Definition
SPEN	SP Energy Networks
SSSI	Site of Special Scientific Interest
TCPA	The Town & Country Planning (Scotland) Act 1997

## **1 INTRODUCTION**

### **1.1 BACKGROUND TO THE PROJECT**

- 1.1.1 SP Energy Networks (SPEN) has a legal duty under the Electricity Act 1989 to provide grid connections to new electricity generating developments and has been approached by the developers for Benbrack Wind Farm to provide a grid connection to the wider electricity transmission network. The wind farm is located between Dalmellington and Carsphairn in Dumfries and Galloway as illustrated in **Figure 1**.
- 1.1.2 In response to this, SPEN is proposing to construct a new 132kv wood pole overhead line (OHL) between the wind farm point of connection (at approximately NGR 253710,600266) and a defined point on the DE Route transmission line, herein known as the 'Proposed Development'.
- 1.1.3 This request will lead to an application for consent under Section 37 (s37) of the Electricity Act 1989.
- 1.1.4 As the licence holder, SPEN, is required under the Electricity Act 1989 "to develop and maintain an efficient, co-ordinated and economical system of electricity transmission."

### **1.2 PURPOSE OF THE ROUTEING REPORT**

- 1.2.1 The primary purpose of the routeing report is to identify a preferred route option to provide a grid connection to the DE Route OHL from Benbrack Wind Farm taking account of technical, environmental and economic considerations.
- 1.2.2 The report presents information on the approach taken in the identification of route options, appraisal methodology and the findings of the studies and appraisals, culminating in the selection of the preferred option.
- 1.2.3 This report is intended to inform consultees of the proposals and thus enable them to provide feedback and comment on the preferred option. The views and opinions of consultees are important to the development of route options and will feed into the subsequent selection of the proposed option which will be taken forward to the next stage in the process.

### **1.3 STRUCTURE OF THE ROUTEING REPORT**

- 1.3.1 The report has been structured to initially provide context and information on what the project will comprise, followed by the process which was followed to arrive at the preferred option. The report has been spilt into the following sections.
- Section 2: Legal Framework
  - Section 3: Project Description
  - Section 4: Approach to Routeing
  - Section 5: Identification of Route Options
  - Section 6: Appraisal of Route Options
  - Section 7: Consultation Process and Next Steps

## **2 LEGAL FRAMEWORK**

- 2.1.1 There are a number of legal provisions which apply to the development of electricity transmission and distribution lines and associated infrastructure. The key provisions are as follows:
- The Electricity Act 1989 (the 'Electricity Act') is the principal legislation which applies in the UK;
  - The Town & Country Planning (Scotland) Act 1997 (the 'TCPA') as amended; and



- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the 'Electricity Works Regulations').

## **2.2 SCOTTISH POWER TRANSMISSION'S STATUTORY DUTIES**

2.2.1 Scottish Power Transmission's licensed businesses are authorised to transmit and distribute electricity within its network areas under the Electricity Act. As such, Scottish Power Transmission has a statutory obligation to carry out the duties outlined within the Electricity Act.

2.2.2 Section 9 of the Electricity Act states that it shall be the duty of a license holder "to develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and to facilitate competition in the supply and generation of electricity".

2.2.3 Schedule 9 of the Electricity Act requires Scottish Power Transmission to take account of specific factors in formulating any relevant proposals. It states that the licence holder:

*"(a) shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and*

*(b) shall do what he reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."*

## **2.3 CONSENTING REQUIREMENTS**

2.3.1 Section 37 (s37) of the Electricity Act requires that, with the exception of certain specific examples, all electricity lines exceeding 20kV will require consent to be granted by the Scottish Ministers. This 'Section 37 consent' gives approval to install, and keep installed, an overhead electricity line. Section 57 of the TCPA provides that "*Planning permission may also be deemed to be granted in the case of development with government authorisation*". In certain circumstances, deemed planning permission may include works that are 'ancillary' or necessary to the operation of the OHL such as cable sealing end compounds.

2.3.2 In some instances, there may also be the need for separate planning permission where development does not form part of a s37 application. For example, separate planning permission may be required for 'ancillary development' such as a substation. Where consent for development is sought, an application must be made to the relevant planning authority, under the TCPA, before such works are able to be carried out.

2.3.3 Finally, some forms of development, including underground cables, are classed as 'permitted development' under the Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (as amended). Developments classified as permitted development may automatically be granted planning permission, by statutory order, and do not require submission of a planning application to the local planning authority.

2.3.4 At the same time as applying for s37 consent, SPEN will request deemed planning permission under Section 57 of the TCPA from Dumfries and Galloway Council as the planning authority for the OHL and all ancillary elements.

## **2.4 THE ELECTRICITY WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017**

2.4.1 The Electricity Works Regulations require that, before consent is granted for certain developments, an Environmental Impact Assessment (EIA) must be undertaken. The EIA Regulations set out the types of development that are always subject to an EIA (Schedule 1 developments) and other developments which may require an EIA if they exceed certain thresholds and are likely to give rise to significant environmental effects (Schedule 2 developments). The Proposed Development currently falls under two Schedule 2 definitions:

*(2) an electric line installed above ground*

*(a) with a voltage of 132 kilovolts or more; and (c) the purpose of which installation is to connect the electric line to a generating station the construction or operation of which requires consent under section 36 of the Electricity Act 1989.*

2.4.2 Regulation 7(1)(a) of the EIA Regulations requires that both the criteria set out in Schedule 3 and available results of any relevant assessment be taken into account to determine whether a Schedule 2 development requires EIA, or whether it may be screened from EIA. The Schedule 3 criteria include:

- Characteristics of the development;
- Location of the development; and

2.4.3 Characteristics of the potential impact, including the effectiveness of proposed mitigation

2.4.4 Due to the nature and scale of the development as well as the current understanding of the design, SPEN will look to demonstrate that the development will not be an EIA development. To this end, SPEN will request an EIA Screening Opinion from Scottish Ministers.

## **3 PROJECT DESCRIPTION**

### **3.1 CONNECTION REQUIREMENTS**

3.1.1 A new 132Kv wood pole OHL is required between the Benbrack Wind Farm point of connection and a suitable point on the DE Route transmission line to accommodate the connection requirements of Benbrack Wind Farm.

### **3.2 DESIGN**

3.2.1 SPEN's policy, in line with statutory license requirements is to seek a continuous OHL solution for all transmission connections and only where there are exceptional constraints are underground cables considered an acceptable design option. Such constraints can be found in urban areas and in rural areas of the highest scenic and amenity value. Whilst underground cables have visual benefits, there are associated technical and environmental and economic disadvantages including:

- the physical extent of land required;
- the fault repair time;
- difficulties associated with general maintenance;
- increased cost;
- greater ground disturbance from excavating trenches;
- the restriction of development and planting within the underground transmission cable corridor;
- requirements for cable sealing end compounds or platforms at each end of each section of underground cable; and
- the fact that underground cabling is a less efficient means of transporting electricity.

- 3.2.2 On this basis, the key design assumption is that this will be a continuous OHL connection throughout. Should the appraisal identify any areas where a proposed OHL is likely to give rise to unacceptable effects, alternative options (such as underground cables and alternative routes) will be considered.
- 3.2.3 The OHL is proposed as a 132kV connection to be supported by trident wood poles. It will connect to the existing DE Route which runs between New Cumnock substation and Dalshangan sealing end compound, at the T-in point identified in **Figure 1**. From here a 132kV OHL will be installed to Benbrack Wind Farm point of connection. Benbrack Wind Farm is approximately 2km at its nearest point from the DE Route.

#### WOOD POLES

- 3.2.4 The trident wood poles would carry a single circuit operating at 132kV and the design specification would be in line with *EN 50308 132kV Single Circuit Overhead Lines on Wood Poles a UK Electricity Industry Design Standard*. Wood poles are fabricated from pressure impregnated softwood, treated with a preservative to prevent damage to structural integrity.
- 3.2.5 There are two configurations of trident wood pole; a 'single' pole and an 'H' pole. H-poles are used for 'extreme environments' (above 200m) as they are subject to greater ice and wind loadings, whereas single-poles are used in less extreme environments at lower altitudes. **Figure 2** illustrates the main different pole types. Given the study area concerned which is mostly above 200m it is anticipated that the H-pole configuration is most likely to be used throughout.
- 3.2.6 There are three types of pole and can be either a single or H-pole configuration:
- Intermediate: where the pole is part of a straight-line section;
  - Angle: where the OHL changes direction. Single-poles can support changes in direction up to a maximum of 30 degrees and H-poles up to 70 degrees. All angle structures require to be back stayed; and
  - Terminal: where the OHL terminates into a substation or on to an underground cable section via a cable sealing end.
- 3.2.7 Typical heights for the trident wood poles including insulators are approximately 13m above-ground height, with a range between 10m and 22m
- 3.2.8 The trident wood poles would support three conductors (wires) in a horizontal flat formation.
- 3.2.9 Typical spans between trident wood poles at elevations above 200m are 50–75m for Single-poles and 90-110m for the H-pole configuration; however, they will vary depending on factors such as the size of the conductor, the size of the structures, terrain, ice and wind loadings etc.

#### DE ROUTE T-IN

- 3.2.10 A suitable tower to accommodate the connection, subject to some potential modifications has been identified on the DE Route.
- 3.2.11 To connect to the DE Route an H-pole structure would be located in close proximity to the DE Route tower allowing conductors to connect directly in to the line.

### 3.3 CONSTRUCTION

#### OVERHEAD LINE – WOOD POLE

- 3.3.1 The OHL construction would comprise of the following stages:

- Establishment of temporary infrastructure including construction compound(s) and other areas of temporary hard standing such as lay down areas. There may be a requirement to construct bellmouths to the public highway where narrow farm tracks are utilised.
- Provision of access to the pole locations. Access for wood pole construction would use low ground-pressure vehicles such as an argocat, tractor or quad bike; and a tracked excavator. Access may include the use of trackway to minimise the impact on soils, especially in peaty areas and temporary watercourse crossings may be required.
- Construction of pole foundations. Pole excavations are typically 3m by 2m deep. The excavated material would be sorted into appropriate layers and backfilled to maintain the original soil horizons. No concrete is anticipated to be required.
- Wood poles erected. The excavator(s) would hoist the assembled structure into position and once the structure has been braced in position the trench would be backfilled.
- Stringing of conductors. The conductors would be winched to/pulled from section poles; these poles therefore require access for heavy vehicles to transport the conductor drums and large winches. Where the OHL crosses a road a scaffold tunnel would be used to protect the vehicles from the works. Existing distribution lines would be either switched off, deviated or protected using 'live line' scaffolds.
- Reinstatement of pole sites and removal and reinstatement of temporary infrastructure sites.

3.3.2 The sealing end compound would be excavated and constructed.

3.3.3 Disturbance to local residents and landowners would be minimised as far as possible through the application of proven construction methodologies.

## **4 APPROACH TO ROUTEING**

### **4.1 SPEN'S ROUTEING APPROACH**

4.1.1 The Government, Ofgem and the electricity industry, including SPEN, have reviewed their positions on OHLs. They remain of the view that the need to balance economic, technical and environmental factors, as a result of statutory duties and licence obligations, continues to support an OHL approach in most cases.

4.1.2 It is therefore SPEN's view that wherever practical an OHL approach is taken when planning and designing new transmission lines. However, SPEN accepts that there are specific circumstances in which an undergrounding approach should be considered.

4.1.3 In 2015, SPEN published a summary document outlining the approach taken to routeing transmission infrastructure (Major Electrical Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment, SPEN 2015). This document is available at [https://www.spenergynetworks.co.uk/userfiles/file/SPEN\\_Approach\\_to\\_Routeing\\_FINAL\\_20150527.pdf](https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_FINAL_20150527.pdf)

### **4.2 ROUTEING OBJECTIVE**

4.2.1 This study follows established best practice in OHL routeing first codified as the 'Holford Rules' (see **Appendix A**) in combination with the SPEN routeing methodology 2015 guidance.

4.2.2 Under the Electricity Act, SPEN is required to consider environmental, technical and economic considerations, and to reach a balance between them. This means that the proposed route would be the one, selected after an appraisal of a number of route options, which balances technical feasibility and economic viability with the least disturbance to people and the environment. Following engagement with relevant stakeholders, including local communities, professional judgement is used to establish the balance.

4.2.3 In accordance with the Electricity Act, the project routing objective is:

“To identify a technically feasible and economically viable route for an overhead transmission line that meets the technical requirements of the electricity network and causes, on balance, the least disturbance to the environment and the people who live, work and recreate with in it.”

4.2.4 SPEN’s routing objective is to identify a technically feasible and economically viable OHL route, between specified points, which causes the least disturbance to people and the environment.

### 4.3 ESTABLISHED PRACTICE FOR OVERHEAD LINE ROUTEING

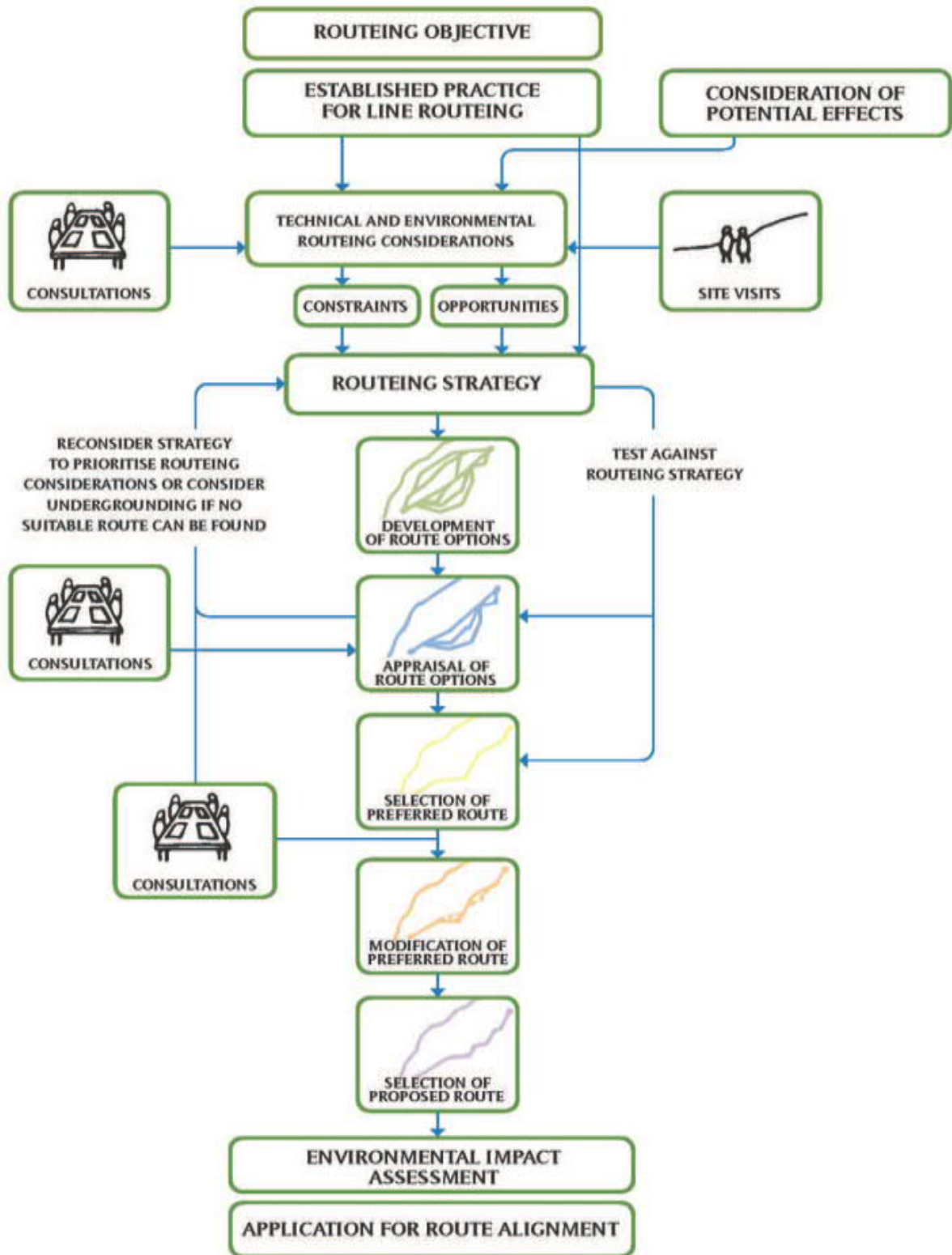
4.3.1 SPEN’s approach to routing an OHL is based on the premise that the major effect of an OHL is visual and that the degree of visual intrusion can be reduced by careful routing. A reduction in visual intrusion can be achieved by routing the line to fit the topography, by using topography and trees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

4.3.2 It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routing OHLs, ‘The Holford Rules’, should continue to be employed as the basis for routing high voltage OHLs. 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 Holford 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.

4.3.3 The Holford Rules and the NGC and SHETL clarification notes are included in **Appendix A**. These guidelines for the routing of new high voltage overhead transmission lines form the basis for routing the Proposed Development. Key principles of the Holford Rules include avoiding prominent ridges and skylines, following broad wooded valleys, avoiding settlements and residential properties and maximising opportunities for ‘backclothing’ infrastructure.

4.3.4 The approach is an iterative, systematic evaluation of route alternatives with professional judgement used to establish explicitly the balance between factors. Consultation is an integral part of the routing strategy process. The approach to routing overhead transmission lines is summarised in the below Chart 1.

Chart 1: SPEN Approach to Routing



## 4.4 OVERVIEW OF ROUTEING PROCESS

### STUDY AREA

- 4.4.1 A study area is first defined, which is large enough to accommodate all likely route options, taking account of the technical requirements (i.e. connection points) and factors such as topography. Baseline mapping of the routeing considerations outlined below then enables routeing constraints and opportunities to be identified.

### ENVIRONMENTAL CONSIDERATIONS

- 4.4.2 Statutory duties imposed by Section 38 and Schedule 9 of the Electricity Act require licence holders to seek to preserve features of natural and cultural heritage interest, and mitigate where possible, any adverse effects which a development may have on such features. The construction and operation of an overhead transmission line will have potential effects on people and the environment, including potential effects on (in no hierarchical order):
- Landscape, views and visual amenity;
  - Ecology and nature conservation;
  - Cultural heritage;
  - Forestry and woodland;
  - Planning allocations and major applications;
  - Noise;
  - Traffic (access for construction);
  - Land Use (agriculture);
  - Socio-Economics (tourism and recreation); and
  - Geology and hydrogeology.
- 4.4.3 Some effects can be avoided or limited through careful routeing. Other effects are best mitigated through local deviations of the route, the refining of pole locations and/or specific construction practices. These are reviewed as part of the environmental appraisal process.
- 4.4.4 Following this, the potential constraints and opportunities for a project can be identified and used to formulate a site-specific routeing strategy.

### ECONOMIC CONSIDERATIONS

- 4.4.5 In compliance with Schedule 9 of the Electricity Act, the routeing objective requires the proposed connection to be economical. It is understood that this is interpreted by SPEN as meaning that as far as possible, and all other things being equal, the connections should be as direct as possible and the route should avoid areas where technical difficulty or compensatory schemes would render the connection uneconomical.

### TECHNICAL CONSIDERATIONS

- 4.4.6 Technical considerations potentially include existing infrastructure (in this case the wind farm and existing OHLs), altitude and slope angle, and physical constraints such as large water bodies.
- 4.4.7 These technical considerations are not considered as being absolute constraints but are a guide to routeing. The approach taken is to identify preferred environmental options informed by a staged review of technical issues.

## **4.5 IDENTIFICATION AND APPRAISAL OF ROUTE OPTIONS**

- 4.5.1 Following identification of the study area a number of possible 'route options' for the Proposed Development are identified. This process involves the avoidance where possible of areas of high 'amenity' value. These areas generally include areas of natural and cultural heritage value designated at a national, European or international level as these are afforded the highest levels of policy protection. The study area also includes consideration of matters such as altitude and slope gradients, over which technical limitations would mean a route was unachievable.
- 4.5.2 The route options are then appraised against environmental and technical criteria, including the length of the proposed route option. As each route option is developed, its effect on the routing considerations is recorded. At this stage, a route option may be rejected, modified or studied in more detail. In conjunction with the collection of relevant data and the evaluation of route options, the routing considerations may be re-appraised and updated as more information becomes available. Route options may then be rejected or modified, or new route options developed.
- 4.5.3 This stage is iterative based on the findings of the appraisal and consultation responses and may result in modification to the routing strategy and/or the route options which then require reappraising.

## **4.6 SELECTION OF PREFERRED ROUTE**

- 4.6.1 The comparative appraisal of route options leads to identification of an 'emerging preferred route' which is subjected to a technical review to confirm that the emerging preferred route is technically feasible. At this stage the emerging preferred route is subjected to a review of potential cumulative effects with other proposed connections within the study area, as outlined below. Following the cumulative review, with associated revisiting or modification of routes as necessary, the 'preferred route' is selected.
- 4.6.2 The preferred route is the option which is considered technically feasible and economically viable whilst causing the least disturbance to the environment and to people. This is then taken forward for stakeholder and public consultation. The preferred route is subjected to further consideration in response to public consultation and may be modified further in the light of these consultations. Modifications may result in further consultation if necessary.
- 4.6.3 The preferred route, modified to take into account consultations and the consideration of specific local issues, is then confirmed as the 'proposed route'. The proposed route is subjected to further environmental survey, detailed design and subsequent environmental appraisal, resulting in the further modifications required to avoid and/or minimise effects on the environment.

### **CUMULATIVE REVIEW**

- 4.6.4 The routing process also gives cognisance to the other OHL connections, which share the project study area and have progressed their routing study<sup>1</sup>. There are no OHL connections which share the project study area. There is a 132kV Grid Connection to Lorg Wind Farm Project; a new 132kv wood pole OHL between the wind farm and the DE Route transmission line. The T-in point for this project is around 4km south of the Benbrack T-in and is therefore not considered to be part of the same study area.
- 4.6.5 Further details in relation to the routing of these projects can be found online at [https://www.spenergynetworks.co.uk/pages/benbrack\\_wind\\_farm\\_grid\\_connection.aspx](https://www.spenergynetworks.co.uk/pages/benbrack_wind_farm_grid_connection.aspx).

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<sup>1</sup> These are not considered as 'committed development' for the purposes of routing as they are currently not the subject of valid planning applications.



- 4.6.6 Following the identification of an emerging preferred route for the Benbrack OHL connection, a technical and environmental cumulative appraisal is undertaken of the emerging preferred OHL routes together to ensure that, in combination, the routes continue to meet the routeing objective and SPEN's statutory duties.
- 4.6.7 Following the environmental and technical review, and balancing the findings of both, it is considered if potential cumulative effects are likely to be significant. If cumulative effects are considered likely to be significant, a review will be undertaken of the second best performing route for each connection in combination with the other routes. The findings of that assessment will inform SPEN's decision on which (if any) project's identified preferred route should be changed. The outcome of the cumulative review comprises the 'preferred route' for each connection upon which stakeholder consultation is undertaken.

## **5 IDENTIFICATION OF ROUTE OPTIONS**

### **5.1 ROUTEING STRATEGY**

- 5.1.1 The preferred route should in principle be the shortest route which avoids steep gradients and wind turbine technical constraints, and either avoids or minimises potential impacts to environmental factors; heritage assets being a key driver as the site is located within an Archaeologically Sensitive Area (ASA).
- 5.1.2 To limit adverse effects on the landscape, routes should, wherever possible, follow the grain of the landscape, avoiding high ground and ridgelines and generally following valleys so that the OHLs and poles are seen against a hill or forest backdrop. For the Benbrack connection, preliminary appraisal suggests that the landscape is both simple and open, with few features around which to design the routeing. Particular consideration will therefore be given to the visual relationship between the OHL and the wind farm access track and the potential for 'stacking' of poles from key views.
- 5.1.3 The approach taken is to first identify an optimal location (or locations) for the T-in to the DE Route and to then identify and appraise routes which connect the wind farm connection point to this location. Should these routes highlight environmental or technical issues that cannot reasonably be overcome, then alternative T-in locations will be considered.

### **5.2 STUDY AREA**

- 5.2.1 A Strategic Search Area, 5km from the proposed Benbrack Wind Farm connection point, was used as a starting point for the identification of route options, which broadly covered an area encompassing Benbrack Wind Farm substation, the DE Route and the immediate surrounding area. See **Figure 1**.
- 5.2.2 The Strategic Search Area was refined to identify the broad area within which feasible route options could be located; the Route Option Area (ROA). A study area was determined around the ROA to encompass the applicable environmental considerations for the Proposed Development.
- 5.2.3 The key factor defining the study area was heritage assets as the site is located within an ASA. In addition to the heritage assets, consideration is also given to the visual relationship between the OHL and the wind farm access track and the potential for 'stacking' of poles from key views.
- 5.2.4 The study area is shown on **Figure 1**. An overview of the study area characteristics is provided below.

## CHARACTERISTICS OF THE STUDY AREA

- 5.2.5 The Strategic Search Area is characterised by a mountainous region to the north and east, the valleys follow a southerly/south-westerly direction joining with the lowland valley of Loch Muck and Loch Doon to the west. The central region comprises undulating topography. Galloway Forest Park, composed of undulating mountainous regions with forestry, falls within the Strategic Search Area and is interjected by lowland valleys and burns.
- 5.2.6 The ROA comprises valleys and lowland areas with elevations mostly below 300m above ordnance datum (AOD). The lowest point of the ROA is 200m AOD, adjacent the Green Well of Scotland, located to the south-east. The highest point within the ROA is Benbrack, at 448m AOD, falling in a south-westerly direction towards the Lamford Burn to approximately 250m AOD.
- 5.2.7 There are several small burns, scattered throughout the ROA including Lamford Burn, Meadowhead Burn, Small Burn, Goat Burn, Muck Burn, Polgavin Burn and Polnaskie Burn.
- 5.2.8 The area is sparsely populated with no settlements occurring within the ROA.

## 5.3 PLANNING POLICY CONTEXT

### NATIONAL PLANNING POLICY

#### NATIONAL PLANNING FRAMEWORK 3 (NPF3) 2014

- 5.3.1 The NPF3<sup>2</sup> sets out the spatial strategy for Scotland's development. There is a commitment to increase renewable energy generation by 2020. In order to facilitate this and enhance the development of onshore wind in rural areas, electricity grid enhancements will need to take place across Scotland. The improvement of the high voltage electricity transmission network of or in excess of 132 kilovolts is listed as a National Development.

#### SCOTTISH PLANNING POLICY (SPP) 2014

- 5.3.2 The SPP<sup>3</sup> was published in 2014 and reflects the Scottish Ministers' priorities for operation of the planning system and for the development and use of land.
- 5.3.3 Paragraph 155 states that "Development plans should seek to ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations".
- 5.3.4 Under paragraph 156, the policy states that strategic development plans should support national priorities of the construction of improvement of strategic energy infrastructure, including "*generation, storage, transmission and distribution networks. They should address cross-boundary issues, promoting an approach to electricity and heat that supports the transition to a low carbon economy*".

### LOCAL PLANNING POLICY

- 5.3.5 The Local Development Plans (LDP) covering the study area are the Dumfries and Galloway LDP (DGLDP) (adopted September 2014)<sup>4</sup> and associated Supplementary Guidance<sup>5</sup> and the East Ayrshire LDP (EALDP) (adopted April 2017)<sup>6</sup>.

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<sup>2</sup> The National Planning Framework (2014) Available [online] at: <<http://www.gov.scot/Publications/2014/06/3539>>

<sup>3</sup> Scottish Planning Policy (2014) Available [online] at: <<https://beta.gov.scot/publications/scottish-planning-policy/pages/2/>>

<sup>4</sup> The Dumfries and Galloway Local Development Plan (2014), Available [online] at: <http://www.dumgal.gov.uk/ldp>

- 5.3.6 The LDPs set the spatial strategy in which to guide the future use and development of land in towns, villages and the rural area. It also provides a snapshot of where development should happen and where it should not. The LDPs sets out this strategy through planning policies, which outline the criteria by which proposals acceptability will be considered. The policies are structured around the themes of economic development, housing, historic environment, natural environment, community services and facilities, infrastructure and transport. The LDPs recognise the importance of delivering supporting infrastructure and that provision of infrastructure is fundamental to the deliverability of development proposals and ensuring that infrastructure and service improvement requirements can be met.
- 5.3.7 Table 5.1 highlights policies of the DGLDP and EALDP relevant to topic areas considered in the routeing study.

**Table 5.1: Policies from the LDPs which are relevant to this project**

LDP and Policy	Topic Areas
DGLDP OP1: Development considerations	Landscape and Visual Amenity, Cultural Heritage and Ecology, Ornithology and Geology
DGLDP HE3: Archaeology	Cultural Heritage and Archaeology
DGLDP HE4: Archaeologically Sensitive Areas	Cultural Heritage and Archaeology
DGLDP NE2: Regional Scenic Areas	Landscape
DGLDP NE4: Species of International Importance	Biodiversity and Geodiversity
DGLDP NE5: Sites of National Importance for Biodiversity and Geodiversity	Biodiversity and Geodiversity
DGLDP NE7: Trees and Development	Ecology, Ornithology and Geology
DGLDP NE 11: Supporting the Water Environment	Water Environment
DGLDP NE12: Protection of Water Margins	Water Environment
DGLDP OP1: Development considerations	Landscape and Visual Amenity, Cultural Heritage and Ecology, Ornithology and Geology
EALDP OP1: Overarching Policy	Policy matters relevant to all development
EALDP RE1: Renewable Energy Developments	Land Use
EALDP RE5: Financial Guarantees	Financial
EALDP INF4: Green Infrastructure	Design
EALDP WM1 : Sustainable Waste Management	Waste
EALDP ENV2 : Scheduled Monuments and Archaeological Resources	Cultural Heritage
EALDP ENV6 : Nature Conservation	Ecology

<sup>5</sup> Dumfries and Galloway Council Local Development Plan Supplementary Guidance (2015): Part 1 Wind Energy Development: Development Management Considerations.

<sup>6</sup> The East Ayrshire Local Development Plan (2014), Available [online] at: <https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/LocalAndStatutoryDevelopmentPlans/East-Ayrshire-Local-Development-Plan-2017.aspx>

LDP and Policy	Topic Areas
EALDP ENV7 : Wild Land and Sensitive Landscape Areas	Landscape and Visual
EALDP ENV8 : Protecting and Enhancing the Landscape	Landscape
EALDP ENV9 : Trees, Woodland and Forestry	Ecology
EALDP ENV12 : Water, Air and Light and Noise Pollution	Water

## 5.4 TECHNICAL CONSIDERATIONS

5.4.1 The key technical considerations identified within the ROA are related to constructability; slope of the ground and construction access.

5.4.2 The technical requirements for wood pole OHLs become more onerous with altitude because of issues such as wind loading and icing risk. Altitudes below 200m are generally considered 'normal environments', and above 200m 'extreme environments' where a H-pole design is appropriate. As previously discussed, the majority of the ROA is above 200m AOD.

5.4.3 Hill slopes in the area are generally relatively gentle and there are no gradients of 22 degrees or steeper within the ROA.

5.4.4 The proximity of the OHL to the wind turbines associated with the wind farm has also been taken into consideration. There are two constraints to be considered as detailed in Energy Networks Association's document Separation between Wind Turbines and Overhead Lines<sup>7</sup> and summarised as follows:

- OHLs cannot be located within topple distance of a wind turbine which equates to the wind turbine height to blade tip plus 10% or height to blade tip plus the electrical safety distance which is 2.3m for 132 kV OHLs.
- The downwind wake effect of wind turbines can cause increased levels of movement of the OHL conductors which in extreme cases could lead to conductor clashing. The effects are negligible at a distance of 3 times the rotor diameter of the wind turbine, although there is some flexibility in this depending on the intervening topography.

## 5.5 ENVIRONMENTAL CONSIDERATIONS

5.5.1 Environmental considerations were determined through gathering of baseline information for the study area. Baseline information was obtained from a number of sources as detailed in **Appendix B** and summarised below.

- Designated or sensitive sites from Scottish Natural Heritage (SNH), Scottish Forestry, Historic Environment Scotland, Sustrans and Scottish Environmental Protection Agency (SEPA);
- LDP documentation and maps;
- Landscape character assessments published by SNH;
- Ordnance Survey (OS) mapping (1:50,000 and 1:25,000) and aerial photography (Google Earth Pro, Google Streetview, Bing maps);
- Local Authority Planning application websites;
- Dumfries and Galloway Wind Farm Landscape Capacity Study (2016);
- Publically available environmental statements and studies for Benbrack Wind Farm, Longburn Wind Farm, Lorg Wind Farm, Blackcraig Margree Connection, Loch Urr Wind Farm Kendoon to Tongland Reinforcement, Quantans Hill and Windy Rig Wind Farm; and

<sup>7</sup> Energy Networks Association (2012): Engineering Recommendation L44, Separation between Wind Turbines and Overhead Lines Principals of Good Practice

- Other local information through internet searches.

5.5.2 To inform the baseline information a structured site visit was undertaken on 25th November 2018. An overview of the baseline information for relevant environmental aspects is provided below.

5.5.3 The environmental considerations relevant to the Proposed Development are illustrated on **Figures 3 to 8**.

## LANDSCAPE

### LANDSCAPE AND LANDSCAPE-RELATED DESIGNATIONS

5.5.4 There are no national landscape or related designations within the ROA.

5.5.5 The local landscape designations in the ROA include the Galloway Hills Regional Scenic Area (RSA) and an Ayrshire Sensitive Landscape Area.

5.5.6 The Galloway Hills RSA, designated by Dumfries and Galloway Council and covered by DGLDP Policy NE2, covers a large part of Dumfries and Galloway, centred on the hills of The Merrick and the Rhinns of Kells but extending to include the large tract of upland and valley landscapes that extend from the Ayrshire boundary almost to the coast by Kirkcubright. The western face of Benbrack forms part of the easternmost edge of the RSA.

5.5.7 West of the A713 the land north of the East Ayrshire local authority boundary is designated a Sensitive Landscape Area in the EALDP, covered by Policy ENV7. However, the forested hillside above and to the east of the A713, including Campbells Hill is undesignated.

### TOPOGRAPHY

5.5.8 The ROA covers the western and southern flanks of Benbrack, a gently rounded hill with a broad flat summit at approximately 450m AOD.

5.5.9 Benbrack is the central summit of a complex of three hills bounded to the north by the Muck Water, to the west by the Doon valley, to the east by the Brownhill Burn and the Water of Deugh and to the south by the Lamford Burn. Campbells Hill, to the north at over 450m AOD, and Benbrack effectively form a single ridge running parallel to the Doon valley with a shallow bealach at approximately 410m AOD separating the two summits. The Polnaskie Burn flows southwest from this bealach to Loch Muck, in a shallow valley. From Benbrack, the ridge extends south falling to approximately 320m AOD at the head of the Lamford Burn with a spur east with a subsidiary summit (Dodd Hill) at 400m AOD. The DE Route, which runs along the Doon valley above the A713 lies at approximately 250m AOD where it crosses the Lamford Burn rising to approximately 300m AOD where it crosses the Polnaskie Burn.

5.5.10 The wind farm connection point at the proposed substation lies at approximately 380m AOD on the south flank of the spur from Benbrack to Dodd Hill.

### LANDSCAPE CHARACTER

5.5.11 The landscape character of Scotland has been classified and assessed in a series of studies coordinated by SNH. The landscape of the ROA is described in the Landscape Character Assessment for Dumfries and Galloway<sup>8</sup> (LCADG). The area immediately to the north is described in the Ayrshire Landscape Character Assessment<sup>9</sup> (ALCA).

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<sup>8</sup> Land Use Consultants (1998). Dumfries and Galloway landscape assessment. Scottish Natural Heritage Review No 94.

<sup>9</sup> Land Use Consultants (1998). Ayrshire landscape assessment. Scottish Natural Heritage Review No 111

- 5.5.12 The LCADG classifies the landscape of the region into four regional character areas and 21 distinct landscape character types (LCTs), some with a subcategory covering the presence of extensive forestry. In classifying these landscape types the LCADG identifies 104 discrete Landscape Character Units (LCUs), areas within the different LCTs.
- 5.5.13 The ALCA classifies the landscape of the region into eight regional character areas and 22 distinct LCTs, some with a subcategory covering the presence of extensive forestry. The ALCA does not identify any discrete LCUs within any of the LCTs.
- 5.5.14 In the LCADG, the ROA lies in the Southern Uplands regional character area, described as “a landscape of uplands and dales that extends eastwards from the valley of the River Dee, consisting of characteristically smooth, conical peaks with extensive foothills and plateaux. Forestry and upland sheep farming are principal land uses, except in the dales where more cattle are grazed, arable crops and grass silage grown within walled and hedged enclosures.”
- 5.5.15 The Proposed Development is considered to have the potential to affect three LCTs:
- Southern Uplands (Lamford LCU) in which the ROA sits;
  - Upper Dale (Upper Glenkens LCU) the valley immediately south of the ROA; and
  - Foothills (Unnamed LCU in LCADG and ALCA), the head of the Glenkens immediately north of the ROA.
- 5.5.16 The LCTs were originally mapped at a scale of 1:250,000, giving ‘broad-brush’ boundaries. For the purposes of this report, the landscape character was considered at a finer level during a site survey. The revised character area boundaries arising from this field-work are shown on **Figure 3**.

#### **LANDSCAPE SENSITIVITY AND CAPACITY**

- 5.5.17 Landscape sensitivity refers to the degree to which the landscape is sensitive to the change brought about by the introduction of development, and thus how likely it is that a given change would lead to a significant effect on landscape character. Judgements on the sensitivity of a given landscape are based on a combination of its susceptibility to change brought about by the development and the values accorded to the landscape<sup>10</sup>.
- 5.5.18 Landscape sensitivity is development-specific: in other words, it is a function of the type of development (its particular form and characteristics), how this affects the landscape directly (physical changes) and how this affects it indirectly (perceptual effects on how the character<sup>11</sup> of the landscape is appreciated).
- 5.5.19 Key factors that contribute to the sensitivity of landscape include: underlying physical aspects such as landform and scale; human aspects such as land use and land cover; and perceptual aspects, particularly the degree of wildness and perceived naturalness. These factors, which draw on the principles of the Holford Rules, are taken into account both in the laying down of route options and in the appraisal.

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<sup>10</sup> Guidelines for Landscape & Visual Impact Assessment, Landscape Institute & IEMA, 3rd Edition 2013

<sup>11</sup> Landscape character is defined by SNH (Landscape Character Assessment Guidance for England and Scotland, The Countryside Agency and Scottish Natural Heritage, 2002) as “the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how these are perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.”

5.5.20 A high-level appraisal of the LCUs considered to have the potential to be affected by the Proposed Development was carried out. This draws on field observations as part of this study and the LCADG, supplemented by the findings of the Dumfries and Galloway Windfarm Landscape Capacity Study<sup>12</sup> (DGWLCS).

5.5.21 **Appendix C** summarises the key attributes of the LCTs potentially affected by the Proposed Development. A summary of the landscape sensitivity of the relevant LCTs is outlined in Table 5.2 below.

**Table 5.2: Summary of LCT Sensitivities**

LCT	Sensitivity
Upper Dale Valley	Low to Medium
Southern Uplands	Medium to Low
Foothills	Low

#### VISUAL AMENITY

5.5.22 There are two main types of sensitive visual receptors in the study area:

- Residential receptors – scattered individual properties;
- Recreational receptors – people using the countryside for outdoor recreation; and
- Transport receptors – users of major and minor roads.

5.5.23 The nature of the views available in the study area is predominately determined by a combination of topography and forestry cover. There are open panoramic views available from the higher ground. In the lower ground, views are mostly focussed along the valley and are relatively open, although in places filtered by scrub and woodland. In places, dense forestry cover leads to limited visibility and enclosed views, however this is a constantly changing situation as forestry parcels are felled and replanted.

5.5.24 Within the study area there are no defined settlements and three residential receptors which could be potentially affected by the Proposed Development; Eriff by Loch Muck, and the two houses on the minor road at Lamford.

5.5.25 The potential recreational receptors within the study area are users of the Carsphairn Forest and Knockengoroch core path, and mountain bike trails, and users of the Water of Deugh trail.

5.5.26 The main road through the ROA is the A713 (Ayr to Castle Douglas). The A713 is the main route through the Glenkens and is promoted as the Galloway Tourist Route.

#### CULTURAL HERITAGE

5.5.27 A 2km buffer was applied to the ROA to take into consideration both the potential direct impacts and indirect, effects on setting, impacts on cultural heritage assets in the vicinity of the Proposed Development. The cultural heritage features within 2km of the ROA are illustrated on **Figure 4**.

5.5.28 There are no designated heritage assets within the ROA, however The King's Cairn, and Brown Hill Burn Cairn (SM1046) Schedule Monument is located within 2km of the ROA. The distances of these designated sites from the ROA, as well as the intervening topography make the likelihood of setting impacts minimal.

<sup>12</sup> Dumfries and Galloway Wind Farm Landscape Capacity Study (2016), Revised and Updated Study Report – EEI Committee, Carol Anderson Landscape Associates.

- 5.5.29 There are 47 sites listed within the Historic Environment Record (HER) or found during the site walkover survey within the ROA and a further 29 HER sites within 500m of the ROA.
- 5.5.30 Within the 2km buffer there is one Archaeologically Sensitive Area (ASA); the Water of Deugh ASA. This ASA extends northwards into the ROA across the southern slopes of Benbrack. It encompasses a large area of land lacking any previous development from commercial forestry plantation, and includes numerous archaeological sites recorded on the HER.
- 5.5.31 At the northern edge of the ASA, a number of previously unrecorded Prehistoric sites were identified during the site walkover survey, including a possible round house, several cairns and a cup marked stone. Routeing in this area would require the need for appropriate archaeological mitigation measures to avoid and preserve the known assets and to manage the potential for encountering any further hitherto unknown assets.

#### ECOLOGY, ORNITHOLOGY AND PEAT

- 5.5.32 The ecological features within the ROA described below and illustrated on **Figure 5**.
- 5.5.33 The designated sites search distances used as part of this report are in accordance with CIEEM guidelines (CIEEM, 2013) as shown below:
- Sites with international designations (e.g. Special Areas of Conservation (SAC). Special Protection Areas (SPA) and Ramsar sites) were identified within a 10km radius;
  - SPA and Ramsar sites were identified within a 20km radius when designated for geese;
  - Sites with a national designation were identified within a 2km radius; and
  - Species and ecological features, these were identified within the ROA only due to the linear nature of the Proposed Development.

#### ***Designated Sites***

- 5.5.34 There are no National Nature Reserves, SPAs or Ramsar sites within 10km of the ROA, or 20km for those designated for geese.
- 5.5.35 There is one SAC, the Merrick Kells SAC, within 10km of the ROA. The qualifying features of this SAC include freshwater habitats, upland habitats and otters. The Proposed Development is considered unlikely to impact on the qualifying features of the designation given the SAC is 7.23km distance from the ROA and the nature of the works taking place.
- 5.5.36 There is one Site of Special Scientific Interest (SSSI) within 2km of the ROA. The Loch Doon SSSI is located 1.5km west of the ROA and is designated for the last 'naturally occurring' population of Arctic charr in south-west Scotland.

#### ***Habitats and Species***

- 5.5.37 Ecological designations are shown on **Figure 5**. Sensitive habitats within the ROA include points of ground water dependent terrestrial ecosystems. Due consideration through the route appraisal process should be given to the avoidance of such habitats as well as mitigation e.g. a peat management plan in respect of access track construction.
- 5.5.38 Protected species within the ROA include:
- Red squirrel: Red squirrel priority woodland is extensive surrounding the ROA with a very small proportion encroaching within the north-west corner of the ROA.
  - Otter: The water courses within the ROA were not considered suitable for otter resting sites. Meadowhead burn in the south-west has potential for commuting/foraging otter.
  - Pine marten: The habitat within the ROA is unsuitable for places of shelter but the species may use the ROA for foraging.



- Badger: Suitable habitat present but limited in extent. Historical badger sett recorded during surveys in support of Benbrack wind farm ES (2013) at the east end of the ROA.
- Bats. Suitable habitat present, limited in extent
- Water vole: Suitable habitat present, limited in extent.

**5.5.39** The route appraisal process should consider, as much as possible, avoidance of habitats identified as most suitable for protected species e.g. mature broad-leaved woodland or buildings providing bat roosting and foraging habitat, larger water courses providing otter and fish habitat and mature coniferous forestry providing red squirrel habitat. Where avoidance is not possible then the risk would be managed by undertaking preconstruction surveys and subsequently applying mitigation where required.

**5.5.40** Watercourses running through the ROA are unsuitable for migratory salmonids due their location upstream of an impassable barrier; Kendoon Dam. Resident brown trout is likely to be the only salmonid present.

**5.5.41** Birds of conservation importance within the ROA include:

- Black grouse: black grouse leks were identified during surveys undertaken in support of the Benbrack wind farm Environmental Statement (ES) (2013) and suitable habitat for the species exists within the ROA.
- Red kite: although not recorded during previous surveys undertaken in support of Benbrack ES (2013), reintroduced populations of this species in Dumfries and Galloway have increased and the species should be considered.
- Goshawk: flights have been recorded during previous surveys although there is unlikely to be suitable nesting habitat within the ROA.
- Hen harrier: flights have been recorded during previous surveys but there is unlikely to be suitable nesting habitat in the ROA.
- Curlew: this species was noted in very low densities during surveys in support of the Benbrack ES (2013). The ROA has suitable breeding habitat for this species.

**5.5.42** In respect of birds of conservation concern the greatest sensitivities are likely to be potential disturbance to/ displacement of black grouse lek sites and wader nest sites, namely curlew. With regard to black grouse, avoidance of historic lek sites including an appropriate standoff for disturbance should be undertaken. Preconstruction surveys to locate additional lek sites followed by subsequent mitigation e.g. seasonal restrictions on construction activities within the area of a confirmed lek, would further manage this risk. Curlew may present in very low numbers. Where possible route selection should avoid optimum habitat for this species and where this is not possible preconstruction nest checks and subsequent mitigation e.g. a buffer around identified nest sites would be undertaken.

**5.5.43** A variety of other bird species of conservation concern have been recorded during previous surveys within the ROA including Schedule 1 raptors. It is considered unlikely that any of these species breed within the ROA. There is potential for forest raptors i.e. goshawk and red kite to nest in plantations within disturbance distance of the ROA although there was no evidence of this during surveys undertaken in support of the Benbrack wind farm ES. The proposed Breeding Bird Survey program (BBSP) will inform on any changes in these species status.

**5.5.44** Flight activity survey in support of the Benbrack wind farm ES recorded flight activity for several species of conservation concern e.g. hen harrier, peregrine and merlin but in very low numbers. If the proposed BBSP reveals any dramatic changes in these species status then further flight activity surveys may be required but based on the low level of activity previously recorded, it is unlikely that the Proposed Development will impact on important populations of species of conservation concern through collision risk.

## Hydrology, Hydrogeology and Peat

### **Peat and GWDTE**

5.5.45 Peat deposits have been identified by consulting the following sources:

- The SNH Carbon and Peatland Map<sup>13</sup> is a GIS vector dataset covering Scotland. This map has been derived using a matrix of soil carbon categories (derived from Soil Survey of Scotland maps) and peatland habitat types (derives from Land Cover of Scotland 1988 map). This dataset categorises areas of carbon-rich soils, deep peat and priority peatland habitat in terms of importance. Therefore, it excludes areas of forestry for example.
- British Geological Survey (BGS) Superficial Deposits mapping<sup>14</sup> indicates superficial deposits within the study area. It is worth noting that BGS only reports peat depths greater than 1m.

5.5.46 Based on SNH mapping, four clusters of Class 1 SNH Peatland ('nationally important carbon-rich soils, deep peat and priority peatland habitat') are present within the ROA, along the Small and Polgain Burn, two in vicinity to Lamford Burn and one upstream of Lamford Burn.

5.5.47 BGS mapping confirms a large presence of Quaternary Peat superficial deposits across the ROA, predominantly on the headwaters of Small Burn, Lamford Burn, Goat Burn and Polgain Burn, surrounding Benbrack and Dodd Hill.

5.5.48 Data from both sources have been presented in **Figure 6**.

5.5.49 A National Vegetation Classification (NVC) systems survey identified a number of potential Groundwater Dependent Terrestrial Ecosystems (GWDTE). Based on the NVC results, a walkover survey was undertaken to confirm the potential groundwater dependency of SEPA's highlighted NVC communities<sup>15</sup>.

5.5.50 The survey results indicated that the majority of the habitats within the ROA are likely to be primarily fed by rainfall and surface water sources. However, a couple of habitats fed by springs were noted within the ROA. **Figure 6** gives an indication of the high priority peatland habitats and potential GWDTEs.

### **Water Supplies**

5.5.51 There are no public water supplies present within the ROA.

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<sup>13</sup> SNH (2016) Carbon and Peatland Map [online] Available at: <https://www.nature.scot/professional-advice/planning-and-development/natural-heritage-advice-planners-and-developers/planning-and-development-soils/carbon-and-peatland-2016> [Accessed in October 2019].

<sup>14</sup> BGS. Geindex Onshore. Superficial Deposits Map [online] Available at: <http://mapapps2.bgs.ac.uk/geoindex/home.html> [Accessed in October 2019].

<sup>15</sup> SEPA (2017). Land Use Planning System SEPA Guidance Note 21. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. [online] Available at: <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf> [Accessed July 2019].

5.5.52 Private water supply (PWS) information was sought from Dumfries and Galloway Council, who provided a list of identified supplies within the vicinity of the ROA. Based on the address list provided by the Council and following desktop review, the list was narrowed down to two sources, Lamford and Meadowhead. The South West Scotland Interconnector Phase 2 Water Supply Risk Assessment provided additional information of both the Lamford and Meadowhead PWS. These sources were indicated to fall within the ROA. Following the site visit, it was confirmed that Lamford coordinates were accurate, however, Meadowhead lies approximately 120m west of the ROA. **Figure 6** shows the location of the PWS and the SEPA recommended 250m buffers. It will not be possible to avoid the buffer via any route option as the T in point is within the buffer of the Lamford PWS. However, SPEN is confident that it will be able to mitigate any potential significant effects to the PWS.

### RECREATION AND TOURISM

5.5.53 A 2km buffer was applied to the ROA take into consideration potential effects on visual amenity of recreational users. The recreation and tourism features within 2km of the ROA, and illustrated on **Figure 7**, include:

- paths: a series of core paths including Carsphairn Forest and Knockengoroch and Water of Deugh;
- the Mountain Biking Carsphairn Forest, which has mountain biking trails;
- the Water of Deugh, upon which angling takes place; and
- the A713 Galloway Tourist Route.

### LAND USE

5.5.54 The land use features within the ROA, illustrated on **Figure 8**, includes:

- Agricultural land classification: land capability for agriculture classes 5.2 (improved grassland) and 6.2 (rough grazing);
- five small burns (and their tributaries) including the Goat Burn (south-east section of the ROA), Polgavin Burn (north-east section of the ROA), Polnaskie Burn (northern section of the ROA), Small burn (north-western section of the ROA), and Lamford Burn (southern section of the ROA).
- Valid planning applications including:
  - 11/0259/EB | Installation of overhead transmission line | Between Existing Tower N230 (OS Reference NX 591891) And Proposed Meiklehill Substation (OS Reference NS 521078) | Status: Decided | Decision: Approved with Conditions | Decision Issued Date: Mon 02 Feb 2015.
  - 13/0001/S36 | Erection of 50 wind turbines with a tip height of up to 149.5m, turbine hardstandings, connection compound, substation compound with control building, 6 permanent 100m high met masts and approximately 56.6 km of site and access roads (30.6 km new, 26.0 km upgraded). | South Kyle Windfarm East Ayrshire | Status: Appeal decided | Decision: Appeal Allowed subject to conditions | Decision Issued Date: Mon 10 Jul 2017.
- a Ministry of Defence (MoD) high priority low flying zone.

5.5.55 River flood risk has been considered in the route option appraisal. Although wood poles can be constructed within flood plains, there are potential risks associated with river erosion and subsequent ground instability which may make these options less favourable.

## 5.6 DEVELOPMENT OF ROUTE OPTIONS

- 5.6.1 Given the nature of overhead lines the primary environmental effects are likely to be landscape and visual effects. The best way to limit adverse effects on landscape and visual amenity is by careful line routeing, led by landscape architects, based on professional judgement and informed by fieldwork.
- 5.6.2 Holford Rules 1 and 2, as described above, form the basis for the landscape led identification of route options. In addition, Rules 4 and 5 of the Holford Rules identify that OHL infrastructure is judged to be more widely visible from surrounding areas when located on higher ground, for example ridges and skylines. Holford Rule 3 which states that, other things being equal, the most direct line should be chosen, with no sharp changes in direction, is also taken account of in identifying route options.

### IDENTIFICATION OF ROUTE OPTIONS

- 5.6.3 The nature of the topography and of the technical and environmental constraints in the study area between the Benbrack Wind Farm connection point and the DE Route informed the identification of three 'route options' as shown in **Figure 9**.
- 5.6.4 Each of the route options was given an alphabetic reference: A-C. All route options have the same connection points commencing at the consented Benbrack Wind Farm connection point and terminating at the existing DE Route. The route options and the strategic constraints are shown on **Figure 10**.

## 6 APPRAISAL OF ROUTE OPTIONS

### 6.1 APPRAISAL METHODOLOGY

- 6.1.1 The objective of the appraisal of the route options was to identify a preferred route for the Proposed Development, in a comparable, documented and transparent way to identify an overall preferred route option. As outlined in the Routeing Strategy, where the characteristics of the study area were such that they required to be balanced to enable the overarching Routeing Objective to be met, professional judgement, informed by both desk studies and field work, and reflecting the Holford Rules, was employed to identify the preferred route. This professional judgement was made on a case by case basis.
- 6.1.2 The process also sought to:
- continue to reflect the overall Routeing Objective and Routeing Strategy;
  - continue to reflect SPEN's Approach to Routeing and EIA document;
  - continue to reflect the Holford Rules for Routeing Overhead Transmission Lines;
  - draw out distinctions between the routes to enable the relative strengths and weaknesses of each to be identified.
- 6.1.3 The comparative appraisal of route options was undertaken in stages as set out below:
- (i) identification of appraisal criteria, together with their reasoning for inclusion;
  - (ii) application of appraisal criteria to each route option, following the appraisal methodology;
  - (iii) comparative appraisal of route options to identify a preferred route;
  - (iv) SPEN technical review, reflecting system design requirements;
  - (v) cumulative appraisal with other OHL connections within the study area.

## 6.2 APPRAISAL CRITERIA

6.2.1 Based on the established practice for the line routeing and the routeing considerations for the project, the route options were appraised using the following criteria, which continue to reflect the key considerations of the routeing methodology:

- Length of route;
- Landscape;
- Visual Amenity;
- Cultural Heritage;
- Ecology and Ornithology;
- Land Use;
- Forestry / Woodlands;
- Floor Zones and Waterbodies;
- Peat; and
- Private Water Supplies.

6.2.2 The reasoning for the use of these criteria and an outline of the methodology for appraising each route option is in the **Appendix D**.

## 6.3 APPRAISAL OF ROUTE OPTIONS

6.3.1 The detailed appraisal of the route is presented in **Appendix E**. Colour coding has been used to indicate the likelihood of significant effects.

	No likely significant effects identified
	Potential for some significant effects identified
	Higher risk of significant effects identified

6.3.2 Table 6.1 summarises the findings of the detailed appraisal for the route options. No weightings have been applied to each of the topics, it is a visual guide which is further informed by the text both within and accompanying the table.

**Table 6.1: Detailed appraisal of Route Options – Summary Results**

Criteria	Route Option A	Route Option B	Route Option C
Length of Route	Approximately 2040m	Approximately 2240m Note: route B is measured around the north side of the turbine shown on figure 10.	Approximately 1910m
Landscape	In the context of the DE Route lattice tower OHL and the Benbrack Wind Farm, the Proposed Development would cause a small change to the landscape character – a minor effect.		
Visual Amenity	The Proposed Development risks being visually intrusive on the cottage at Lamford – in the direct view and likely to be 'stacked' behind the angle tower.  Note: the difference in potential visual amenity effects between Route A and Routes B&C is smaller than suggested by the	The Proposed Development may be visually intrusive on the cottage and Lamford. However, the view is less direct and less likely to be 'stacked' behind the angle tower than Route A.  Note: the difference in potential visual amenity effects between Route A and Routes B&C is smaller than suggested by the simple three-step colour-coding used in this appraisal.	

Criteria	Route Option A	Route Option B	Route Option C
	simple three-step colour coding used in this appraisal.		
Cultural Heritage	The Proposed Development risks uncovering unknown archaeological remains within the ASA, given the number of upstanding archaeological assets in the vicinity.	The Proposed Development has the potential to have direct impacts on a known Prehistoric cairn, and possible unknown features associated with an asset of this type. The Proposed Development also risks uncovering unknown archaeological remains within the ASA, given the number of upstanding archaeological assets in the vicinity.	The Proposed Development has the potential to have direct impacts on a known Prehistoric cairn and possible unknown features associated with an asset of this type. It also has the potential to have direct impacts on a possible field system, although this has previously been impacted upon, and may have been removed in this area by the DE Route.  The Proposed Development also risks uncovering unknown archaeological remains within the ASA, given the number of upstanding archaeological assets in the vicinity.
Ecology and Ornithology	No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised area of good quality/species-rich blanket bog with important peat-forming bryophytes. Route extends within 100m of areas of identified springs and associated potential GWDTE. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.	No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. A potential otter holt and couch are outwith the distance where they pose a constraint. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised areas of good quality/species-rich blanket bog with important peat-forming bryophytes. Route is located within 250m of identified springs and associated potential GWDTE; however no springs or GWDTE have been identified within 100m. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.	No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. A potential otter holt and couch could be potentially impacted and are within the route option. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised areas of good quality/species-rich blanket bog with important peat-forming bryophytes. Route extends within 100m of area of identified springs and associated potential GWDTE. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.
Land Use	No likely significant effects identified		
Forestry /	No forestry will be impacted by	There is a small parcel of	There is a small parcel of

Criteria	Route Option A	Route Option B	Route Option C
Woodlands	Route A.	forestry near to the DE Route which Route B partially passes through. Potential for this woodland to be avoided through design.	forestry near to the DE route which Route C partially passes through. Potential for this woodland to be avoided through design.
Floor Zones and Waterbodies	None. No flood risk at DE connection.		
Hydrology, Hydrogeology and peat	No likely significant effects are expected as a result of the Proposed Development on the surface waterbodies, ground waterbodies and peat.  The Proposed Development has the potential to have some significant effects on the Lamford PWS. Although design can avoid any impacts on the pipe network, it cannot avoid the catchment area.	No likely significant effects are expected as a result of the Proposed Development on the surface waterbodies, ground waterbodies and peat.  The Proposed Development has the potential to have adverse impacts on the Lamford PWS. However, these impacts can be avoided through design.	No likely significant effects are expected as a result of the Proposed Development on the surface waterbodies, ground waterbodies and peat.  The Proposed Development has the potential to have adverse impacts on the Lamford PWS. However, these impacts can be avoided through design.

## 6.4 PREFERRED ROUTE

6.4.1 Taking account of environmental considerations only, Routes B and C are preferable to Route A (see Figure 10). Route Options B and C both have the potential, relative to option A, to minimise visual effects on residential receptors and effects on the wider landscape. Route C is a shorter more direct route to the T-in point than Route B as it avoids routeing the OHL north around the wind turbine. The more direct route is preferred in terms of the established practice for overhead line routeing. Route C will also avoid both of the PWS catchments identified on Figure 10 which means that Route C will have the least impact to PWS. Given it is the more direct route which avoids the PWS catchments, Route C is the emerging preferred route for the OHL.

### TECHNICAL REVIEW OF EMERGING PREFERRED ROUTE OPTION

6.4.2 Following the environmental appraisal of options, the emerging preferred route was reviewed by SPEN in relation to the system/network design requirements. This review was undertaken to ensure that, based on the level of detail available, the preferred route is within the technical parameters required to construct OHLs. This included consideration of altitude, topography, slope gradients, watercourse crossings, existing OHLs and other infrastructure.

6.4.3 On this basis the technical and subsequent environmental review confirmed the emerging preferred route could be progressed to the cumulative appraisal stage as outlined below.

### CUMULATIVE REVIEW OF EMERGING PREFERRED ROUTE OPTION

6.4.4 As set out in above, the routeing process takes cognisance of other OHL connections which share the project study area. The objective of this review was to ensure that, in combination, the preferred routes for each OHL connection continue to meet the routeing objective and SPEN's statutory duties.

6.4.5 The other OHL connections considered in the cumulative appraisal comprises the Lorg OHL connection. Due to the distance of the Lorg OHL connection the cumulative review found there is no potential for the Proposed Development to result in cumulative effects with the Lorg connection.

## 6.5 PLANNING POLICY COMPLIANCE

6.5.1 The preferred route broadly complies with national and local planning policy. The design of the route alignment will further seek to minimise potential environmental effects and further environmental studies will take cognisance of planning policy when devising appropriate management and mitigation measures.

## 7 CONSULTATION PROCESS AND NEXT STEPS

### 7.1 CONSULTATION ON PREFERRED ROUTE

7.1.1 SPEN will apply to Scottish Ministers for consent for the new 132kV OHL comprising the Benbrack Wind Farm connection under s37 of the Electricity Act for consent to install and keep installed the overhead electricity line. SPEN will also apply for deemed planning permission for the line and associated works under Section 57(2) of the TCPA. While there are no formal pre-application requirements for consultation in seeking s37 consent/deemed planning permission, SPEN is embracing best practice as outlined in the Scottish Government Energy Consents Unit's Best Practice Guidance (January 2013). This guidance encourages applicants to engage with stakeholders and the public in order to develop their proposals in advance of such applications being made.

7.1.2 Therefore, prior to the submission, SPEN is carrying out consultation with stakeholders and the public. The list of consultees included in this consultation is provided in **Appendix F**. Following the submission of application for Section 37 consent and deemed planning permission, the Scottish Government Energy Consents Unit will, on behalf of Scottish Ministers, carry out further consultation with the public and stakeholders, including Dumfries and Galloway Council.

7.1.3 SPEN attaches great importance to the effect that its works may have on the environment and local communities and is very keen to hear the views of local people. The consultation will run for four weeks from 24<sup>th</sup> February until the 23<sup>rd</sup> March.

7.1.4 The general public is encouraged to be involved in the process and Consultation materials will be made available online at:

[http://www.spenergynetworks.co.uk/pages/benbrack\\_wind\\_farm\\_grid\\_connection.aspx](http://www.spenergynetworks.co.uk/pages/benbrack_wind_farm_grid_connection.aspx)

and locally a copy will be placed in Carsphairn Village Hall and Dalmellington Area Centre.

7.1.5 This document is being provided to inform consultees of the initial proposals for the Benbrack grid connection and to provide a mechanism by which consultees can comment on the proposals.

### FOCUS OF THE CONSULTATION

7.1.6 This report presents the findings of Benbrack grid connection, the routeing process, resulting in the identification of a preferred route. The focus of the consultation will be to ask for people's views on:

- the preferred route;
- the alternative route options considered during the routeing process;
- any other issues, suggestions or feedback; particularly views on the local area, for example areas used for recreation, local environmental features, and any plans to build along the preferred route.



#### SOURCES OF FURTHER INFORMATION

7.1.7 If you would like to comment on any aspect of this Proposed Development, please contact:

Benbrack Grid Connection Team  
Land & Planning SP Energy Networks  
55 Fullarton Drive, Glasgow  
G32 8FA

7.1.8 Or alternatively, please email us at: [benbrackgc@spenergynetworks.co.uk](mailto:benbrackgc@spenergynetworks.co.uk)

7.1.9 SPEN would seek comment and responses on the 'Preferred Route' described within this Routing Consultation Report by **23<sup>rd</sup> March 2020**.

#### 7.2 NEXT STEPS

7.2.1 The responses received from the consultation process will be considered in combination with the findings of this report to enable SPEN to decide on the 'proposed' route to be progressed to the next stage.

7.2.2 The proposed route will then progress to a more detailed review to identify an OHL alignment, including individual pole positioning, which will, subject to successful screening from EIA, be informed by an environmental appraisal, detailed engineering ground surveys and discussions with landowners. This alignment, including all ancillary development will be included in the application for s37 Consent and deemed planning permission.

7.2.3 SPEN will consult fully with affected landowners and occupiers on all aspects of the Benbrack Wind Farm connection project and will give them an opportunity to comment on proposals as they progress.



# Appendices

## APPENDIX A – HOLFORD RULES

### THE HOLFORD RULES: GUIDELINES FOR THE ROUTEING OF NEW HIGH VOLTAGE OVERHEAD TRANSMISSION LINES (WITH NGC 1992 AND SHETL 2003 NOTES)

#### RULES 1-7

##### 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.**

##### NOTE ON RULE 1

a) Investigate the possibility of alternative routes, avoiding altogether, if possible major areas of highest amenity value. The consideration of alternative routes must be an integral feature of environmental statements. If there is an existing transmission line through a major area of highest amenity value and the surrounding land use has to some extent adjusted to its presence, particularly in the case of commercial forestry, then the effect of remaining on this route must be considered in terms of the effect of a new route avoiding the area.

b) Areas of highest amenity value require to be established on a project-by-project basis considering Schedule 9 to The Electricity Act 1989, Scottish Planning Policies, National Planning Policy Guidelines<sup>16</sup>, Circulars and Planning Advice Notes and the spatial extent of areas identified.

Examples of areas of highest amenity value which should be considered are:

- Special Area of Conservation (NPPG 14)
- Special Protection Area (NPPG 14)
- Ramsar Site (NPPG 14)
- National Scenic Areas (NPPG 14)
- National Parks (NPPG 14)
- National Nature Reserves (NPPG 14)
- Protected Coastal Zone Designations (NPPG 13)
- Sites of Special Scientific Interest (SSSI) (NPPG 14)
- Schedule of Ancient Monuments (NPPG 5)
- Listed Buildings (NPPG 18)
- Conservation Areas (NPPG 18)
- World Heritage Sites (a non-statutory designation) (NPPG 18)
- Historic Gardens and Designed Landscapes (a non-statutory designation) (NPPG 18)

##### 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 LINES CHANGE DIRECTION.**

##### NOTE ON RULE 2

*a) Small areas of highest amenity value not included in Rule 1 as a result of their spatial extent should be identified along with other areas of regional or local high amenity value identified from development plans.*

*b) Effects on the setting of historic buildings and other cultural heritage features should be minimised.*

*c) If there is an existing transmission line through an area of high amenity value and the surrounding land uses have to some extent adjusted to its presence, particularly in the case of commercial forestry, then the*

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<sup>16</sup> National Planning Policy Guideline series (NPPG) has been superseded by Scottish Planning Policy (SPP) published on 23 June 2014. The areas of highest amenity value are now included within SPP.

effect of remaining on this line must be considered in terms of the effect of a new route deviating around the area.

### Rule 3

**OTHER THINGS BEING EQUAL, CHOOSE THE MOST DIRECT LINE, WITH NO SHARP CHANGES OF DIRECTION AND THUS WITH FEW ANGLE TOWERS.**

#### NOTE ON RULE 3

a) Where possible choose inconspicuous locations for angle towers, terminal towers and sealing end compounds.

b) Too few angles on flat landscape can also lead to visual intrusion through very long straight lines of towers, particularly when seen nearly along the line.

### Rule 4

**CHOOSE TREE AND HILL BACKGROUNDS IN PREFERENCE TO SKY BACKGROUNDS, 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 TOWERS WILL BE REDUCED, AND VIEWS OF THE LINE WILL BE BROKEN BY TREES.**

#### NOTES ON RULES 4 AND 5

a) Utilise background and foreground features to reduce the apparent height and domination of towers from main viewpoints.

b) Minimise the exposure of numbers of towers on prominent ridges and skylines.

c) *Where possible follow open space and run alongside, not through woodland or commercial forestry, and consider opportunities for skirting edges of copses and woods. Where there is no reasonable alternative to cutting through woodland or commercial forestry, the Forestry Commission Guidelines should be followed (Forest Landscape Design Guidelines, second edition, The Forestry Commission 1994 and Forest Design Planning – A Guide to Good Practice, Simon Bell/The Forest Authority 1998).*

d) Protect existing vegetation, including woodland and hedgerows, and safeguard visual and ecological links with the surrounding landscape.

### Rule 6

**IN COUNTRY WHICH IS FLAT AND SPARSELY PLANTED, KEEP THE HIGH VOLTAGE LINES AS FAR AS POSSIBLE INDEPENDENT OF SMALLER LINES, CONVERGING ROUTES, DISTRIBUTION POLES AND OTHER MASTS, WIRES AND CABLES, SO AS TO AVOID A CONCATENATION OR 'WIRESCAPE'.**

#### NOTE ON RULE 6

a) In all locations minimise confusing appearance.

b) Arrange wherever practicable that parallel or closely related routes are planned with tower types, spans and conductors forming a coherent appearance. Where routes need to diverge, allow where practicable, sufficient separation to limit the effects on properties and features between lines.

### Rule 7

**APPROACH URBAN AREAS THROUGH INDUSTRIAL ZONES, WHERE THEY EXIST; AND WHEN PLEASANT RESIDENTIAL AND RECREATIONAL LAND INTERVENES BETWEEN THE APPROACH LINE AND THE SUBSTATION, GO CAREFULLY INTO THE COMPARATIVE COSTS OF UNDERGROUNDING, FOR LINES OTHER THAN THOSE OF THE HIGHEST VOLTAGE.**

## **NOTE ON RULE 7**

- a) When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development.
- b) Alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development.
- c) When siting substations take account of the effects of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation.

## **EXPLANATORY NOTE ON RULE 7**

*The assumption made in Rule 7 is that the highest voltage line is overhead.*

## **SUPPLEMENTARY NOTES**

### **a) Residential Areas**

Avoid routeing close to residential areas as far as possible on grounds of general amenity.

### **b) Designations of Regional and Local Importance**

Where possible choose routes which cause the least disturbance to Areas of Great Landscape Value and other similar designations of Regional or Local Importance.

### **c) Alternative Lattice Steel Tower Designs**

In addition to adopting appropriate routeing, evaluate where appropriate the use of alternative lattice steel tower designs available where these would be advantageous visually, and where the extra cost can be justified [Note: SHETL have reviewed the visual and landscape arguments for the use of lattice steel towers in Scotland and summarised these in a document titled *Overhead Transmission Line Tower Study 2004*].

## **FURTHER NOTES ON CLARIFICATION TO THE HOLFORD RULES**

### **LINE ROUTEING AND PEOPLE**

The Holford Rules focused on landscape amenity issues for the most part. However, line routeing practice has given greater importance to people, residential areas etc. The following notes are intended to reflect this.

- a) Avoid routeing close to residential areas as far as possible on grounds of general amenity.
- b) In rural areas avoid as far as possible dominating isolated houses, farms or other small-scale settlements.
- c) Minimise the visual effect perceived by users of roads and public rights of way, paying particular attention to the effects of recreational, tourist and other well-used routes.

### **SUPPLEMENTARY NOTES ON THE SITING OF SUBSTATIONS**

- a) Respect areas of high amenity value (see Rule 1) and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area.
- b) Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas.
- c) Use space effectively to limit the area required for development, minimizing the effects on existing land use and rights of way.
- d) Alternative designs of substations may also be considered, e.g. 'enclosed', rather than 'open', where additional cost can be justified.
- e) Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints.
- f) When siting substations take account of the effects of line connections that will need to be made.

## APPENDIX A

### INTERPRETATION OF THE HOLFORD RULES 1 AND 2 AND THE NOTES TO RULE 2 REGARDING THE SETTING OF A SCHEDULED ANCIENT MONUMENT OR A LISTED BUILDING

#### 1 Interpretation of The Holford Rules 1 and 2

##### 1.1 Introduction

Rules 1 refers to avoiding major areas of highest amenity value, Rule 2 refers to avoiding smaller areas of high amenity value. These rules therefore require identification of areas of amenity value in terms of highest and high, implying a hierarchy, and the extent of their size(s) or area(s) in terms of major and smaller areas.

The NGC Notes to these Rules identify at Rule 1(b) areas of highest amenity value and at Rule 2(a) and (b) of high amenity value that existed in England circa 1992.

##### 1.2 Designations

Since 1949 a framework of statutory measures has been developed to safeguard areas of high landscape value and nature conservation interest. In addition to national designations, European Community Directives on nature conservation, most notably through Special Areas of Conservation under the Habitats and Species Directive (92/43/EC) and Special Protection Areas under the Conservation of Wild Birds Directive (79/409/EEC) have been implemented. Governments have also designated a number of Ramsar sites under the Ramsar Convention on Wetlands of International Importance (CM6464). Scottish Office circulars 13/1991 and 6/1995 are relevant sources of information and guidance. In addition, a wide range of non-statutory landscape and nature conservation designations affect Scotland.

##### 1.3 Amenity

The term 'Amenity' is not defined in The Holford Rules but has generally been interpreted as designated areas of scenic, landscape, nature conservation, scientific, architectural or historical interest.

This interpretation is supported by paragraph 3 of the Schedule 9 to the Electricity Act 1989 (The Act). Paragraph 3 (1)(a) requires that in formulating any relevant proposals the licence holder must have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings including structures and objects of architectural, historic or archaeological interest. Paragraph 3 (1)(b) requires the licence holder to do what he reasonably can do to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any flora, fauna, features, sites, buildings or objects.

##### 1.4 Hierarchy of Amenity Value

Rules 1 and 2 imply a hierarchy of amenity value from highest to high.

Schedule 9 to the Act gives no indication of hierarchy of value and there is no suggestion of a hierarchy of value in either NPPG 5: Archaeology and Planning, NPPG 13: Coastal Planning, NPPG 14: Natural Heritage or NPPG 18: Planning and the Historic Environment. Nevertheless, designations give an indication of the level of importance of the interest to be safeguarded.

##### 1.5 Major and Smaller Areas

Rules 1 and 2 imply consideration of the spatial extent of the area of amenity in the application of Rules 1 and 2.

##### 1.6 Conclusion

Given that both the spatial extent in terms of major and smaller and the amenity value in terms of highest and high that must be considered in applying Rules 1 and 2, that no value in these terms is

provided by either Schedule 9 to the Act, relevant Scottish Planning Policies or National Planning Policy Guidelines, then these must be established on a project-by-project basis. Designations can be useful in giving an indication of the level of importance and thus value of the interest safeguarded. The note to The Holford Rules can thus only give examples of the designations which may be considered to be of the highest amenity value.

## **2 The setting of a Scheduled Ancient Monument or a Listed Building**

The NGC note to Rule 2 refers to the setting of historic buildings and other cultural heritage features. NPPG 5: Archaeology and Planning refers to the setting of scheduled ancient monuments and NPPG 18: Planning and the Historic Environment refers to the setting of Listed Buildings. None of these documents define setting.

## **APPENDIX B**

### **ENVIRONMENTAL AND PLANNING DESIGNATIONS – EXAMPLES OF DESIGNATIONS TO BE TAKEN INTO ACCOUNT IN THE ROUTEING OF NEW HIGH VOLTAGE TRANSMISSION LINES**

#### **MAJOR AREAS OF HIGHEST AMENITY VALUE**

1 In Scotland relevant national or international designations for major areas of highest amenity value include the following identified from Scottish Planning Policies and National Planning Policy Guidelines<sup>17</sup>.

Special Areas of Conservation	(NPPG 14)
Special Protection Areas	(NPPG 14)
Ramsar Sites	(NPPG 14)
National Scenic Areas	(NPPG 14)
National Parks	(NPPG 14)
National Nature Reserves	(NPPG 14)
Protected Coastal Zone Designations	(NPPG 13)
Sites of Special Scientific Interest	(NPPG 14)
Scheduled Ancient Monuments	(NPPG 5)
Listed Buildings	(NPPG 18)
Conservation Areas	(NPPG 18)
World Heritage Sites	(NPPG 18)
Historic Gardens and Designed Landscapes	(NPPG 18)

#### **Other Smaller Areas of High Amenity Value**

2 There are other designations identified in development plans of local planning authorities which include areas of high amenity value:-

- Areas of Great Landscape Value
- Regional Scenic Areas
- Regional Parks
- Country Parks

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<sup>17</sup> See footnotes under Holford Rule 1 (note on Rule 1) for references update.



The nature of the landscape in these areas is such that some parts may also be sensitive to intrusion by high voltage overhead transmission lines but it is likely that less weight would be given to these areas than to National Scenic Areas and National Parks.

### **Flora and Fauna**

- 3 Legislation sets out the procedure for designation of areas relating to flora, fauna and to geographical and physiogeographical features. Designations relevant to the routing of transmission lines will include Special Area of Conservation, Special Protection Area, Sites of Special Scientific Interest, National Nature Reserves, Ramsar Sites and may also include local designations such as Local Nature Reserve.
- 4 Area of Historic, Archaeological or Architectural Value  
Certain designations covering more limited areas are of relevance to the protection of views and the settings of towns, villages, buildings of historic, archaeological or architectural value. These designations include features which may be of exceptional interest. Of particular importance in this connection are:-
  - Schedule of Ancient Monuments
  - Listed Buildings, especially Grade A and Grade B
  - Conservation Areas
  - Gardens and Designed Landscapes included in the Inventory of Gardens and Designed Landscapes of Scotland

### **Green Belts**

- 5 Generally the purposes of Green Belts are not directly concerned with the quality of the landscape.

## APPENDIX B – ENVIRONMENTAL DATA SOURCES

Feature	Data Source
Ancient Woodland Inventory	SNH
Archaeologically Sensitive Areas	Dumfries and Galloway (D&G) Council
Battlefields	Historic Environment Scotland
Conservation Areas	Historic Environment Scotland
Core Paths	D&G Council
Cycle Routes	Sustrans
Existing Transmission Infrastructure	SPEN
Flood Risk Zones	SEPA
Woodlands / Forests	FCS
Historic Environment Records	D&G Council
Gardens and Designed Landscapes	Historic Environment Scotland
Non-Inventory Gardens and Designed Landscapes	D&G Council
Important Bird Areas	SNH
Landfills	D&G Council
Landscape Character Types	SNH
Listed Buildings	Historic Environment Scotland
Local Nature Reserves	D&G Council
Mineral Extraction	D&G Council
National Nature Reserves	SNH
National Routes	Sustrans
National Scenic Areas	SNH
Peat Superficial Deposits	BGS
Peatland Priority Habitats	SNH
Ramsar Sites	SNH
Regional Routes	Sustrans
Residential Properties	Ordnance Survey AddressBase Plus
Consented and valid planning applications, and local plan allocations	D&G Council
RSPB Reserves	SNH
Scheduled Monuments	Historic Environment Scotland
Scottish Wildlife Sites	D&G Council
Sites of Special Scientific Interest	SNH
Special Area of Conservation	SNH
Special Landscape Areas	SNH
Special Protection Areas	SNH
Waterbodies	SEPA
Wild Land Areas	SNH
World Heritage Sites	Historic Environment Scotland

## APPENDIX C – KEY ATTRIBUTES OF LANDSCAPE CHARACTER TYPES

### *Upper Dale Valley*

- 7.2.4 This LCT occurs as two Landscape Units within Dumfries and Galloway. One of these Landscape Units is located within the Study Area and it is identified as ‘Upper Glenkens’. The Upper Glenkens LCU consists of the broad valley trending north-west to south-east and followed variously by the Carsphairn Lane, the Water of Deugh and the Water of Ken, from east of Loch Doon to St John’s Town of Dalry.
- 7.2.5 The LCADG identifies this LCT as having the following key characteristics:
- wide ‘V’-shaped valley, enclosed by high peaks and moorland;
  - open with long views;
  - improved valley pastures becoming rougher up the valley sides;
  - riparian woodlands along the main river and up tributary channels;
  - medium to large scale forestry plantations on the valley sides and extending over horizons from higher ground;
  - mining settlements and remnants of industrial activity e.g. mine ruins and bings.
- 7.2.6 The LCADG Summary Guidelines of relevance to the Proposed Development include the following:
- integrate new planting with valley woodlands;
  - support the restoration of drystone dykes as important features in this open landscape;
  - medium scale wind power development may be suitable in areas where landform can minimise intrusion and cultural history provides an appropriate context.
- 7.2.7 The LCADG states that: “proposals should...seek to ensure that the siting and design does not allow interruption of skylines from key viewpoints and that topography is used to provide backclothing and foreground screening. Long views down the valley as well as views across the valley should be protected from skyline obstructions.”
- 7.2.8 The un-forested parts of this LCU have an open character, with long views. The eye is generally drawn along the valley with the peaks and moorland acting more as backdrop than focal point in most conditions, although in places views across to the Rhinns of Kells or to the distinctive form of Cairnsmore of Carsphairn are important. The landscape is clearly managed, mainly improved grazing, merging into semi-improved and moorland on the higher slopes.
- 7.2.9 Landscape quality varies across the LCU with the lower reaches of the Water of Deugh as it merges into the narrow ribbon of Kendoon Loch and the Glenhoul Glen (below the Kendoon dam) being noticeably more attractive landscapes than the open valley above Carsphairn. The landscape of the area is clearly valued, recognised both in the RSA designation and as the setting to the A713 Galloway Tourist Route, a route promoted for its scenic qualities.
- 7.2.10 Considering the existing infrastructure; the recognised landscape value and sensitivity; and the small-scale intrusion of the Proposed Development, the landscape sensitivity is considered to be medium overall, but **low to medium** to the in the area potentially affected by the Proposed Development.

### *Southern Uplands*

- 7.2.11 The Southern Upland LCT occurs as 11 Landscape Units in Dumfries and Galloway. One of these Landscape Units is located within the Study Area and it is identified as ‘Lamford’.
- 7.2.12 Key Characteristics of the LCT are described as:
- Large, smooth dome/conical shaped hills, predominantly grass covered;

- Open and exposed character except within incised valleys;
- Distinctive dark brown/purple colour of heather on some higher areas;
- Pockets of woodland in incised valleys;
- Stone dykes occasionally define lower limit;
- The legacy of lead and other mining activity.

7.2.13 The LCADG identifies the main landscape issues that need to be considered for this LCT to be:

- loss or deterioration of heather moorland;
- large scale forestry expansion;
- demands for wind farms and radio-mast developments.

7.2.14 The LCADG stated that, in relation to windfarms they should: “avoid breaking the skyline, avoid locations which are most visible from the main valleys and their roads, and be sited so as to follow their contours where possible.”

7.2.15 The Dumfries and Galloway Windfarm Capacity Study (D&GWLCS) found that, in regard to turbines below 30m in height to blade tip: “The majority of landscapes within Dumfries and Galloway can accommodate turbines of this size providing they are appropriately sited.”

7.2.16 Overall, this is a large scale almost unpopulated landscape of rounded hills, generally between 200 and 500m AOD. The un-forested areas are generally very open and exposed, whilst the forested ones can be quite enclosed. Parts of the lower slopes where the Southern Uplands merge into the Upper Dale are semi-improved pasture and well drained but most of the un-forested area is open moorland with an exposed remote quality. The value attributed to the higher and more open parts of this landscape is evidenced by its inclusion in the Galloway Hills RSA, and Cairnsmore of Carsphairn, the summit to the north of Quantans Hill, is a popular Corbett<sup>18</sup> – a destination summit.

7.2.17 There is a distinct degree of wild land character in the higher open areas, diminishing towards the edges, and a sense of timelessness. In the open areas, an OHL would potentially introduce an awkward scale contrast and would disrupt the sense of remoteness and naturalness, particularly if routed through the higher parts of the area. As such landscape sensitivity is normally considered to be high. However, the character of Lamford LCU will be substantially altered by the development of the Benbrack Wind Farm. This will noticeably reduce if not entirely eliminate the degree of wild land character and the sense of remoteness and naturalness. This will reduce the landscape sensitivity of the area for the Proposed Development to **medium-low**.

### ***Foothills***

7.2.18 This LCT occurs as eight Landscape Units within Dumfries and Galloway. One of these Landscape Units is located within the Study Area and it is unnamed.

7.2.19 The LCADG identifies this LCT as having the following key characteristics:

- Generally undulating land between 170 and 250 metres; with rounded peaks;
- Foothills dissected by incised valleys;
- Semi-improved pasture enclosed in medium – large fields by stone walls. Grazed by sheep & cattle. Some rough pasture and heath on higher ground;
- Trees in sheltered pockets with some copses on top of hills;
- Many scattered farmsteads and small settlements;
- Network of minor roads; and
- Numerous archaeological sites particularly iron age defensive and Roman monuments.

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<sup>18</sup> Summit between 2500 and 3000 feet

- 7.2.20 In discussing wind farms, the LCADG includes guidance that can be relevant to the routeing of OHLs, viz. “In foothills landscape type, 'wild land' values and experience can be very important locally and wind towers may compromise this. The more extensive foothill landscapes are likely to hold greater potential for visual containment within plateaux, depressions and valleys where their influence could be limited within the Foothills landscape type i.e. not perceptible from valley or other lowland areas. Siting below hills and ridges should also seek to achieve maximum backclothing effect from hill roads and isolated settlements/ farmsteads”.
- 7.2.21 The D&GWLCS appears to have reclassified the area of Foothills at the head of Loch Doon as part of the adjacent ‘Southern Uplands with Forest’ although this is not actually referenced in the study and may be an oversight.
- 7.2.22 The Proposed Development would be a small-scale intrusion, located between the Benbrack wind farm and the DE Route. Given the proposed and existing development, the landscape sensitivity of the Foothills to the Proposed Development is considered to be **low**.

## **APPENDIX D – APPRAISAL Criteria**

The methodology for appraising the options for each environmental topic is detailed in the following sections.

### **Landscape**

The landscape appraisal took into account the landscape character and sensitivity of the different LCUs affected, the degree to which the route options and potential alignments within the route option could be considered to fit the grain and form of the landscape, and the degree to which the options conformed to the Holford Rules, particularly rules 4 and 5 (rules 1 to 3 were considered in the identification of route options). Considered was give not only to the route itself but to the potential requirements for construction access tracks.

Because landscape was a key factor in designing the route options, the differences between them is relatively limited. The appraisal therefore takes a qualitative, discursive approach, drawing out the key differences between the route options.

### **Visual Amenity**

Consideration was given to the potential visibility of the OHL from the sensitive receptors as set out in Section 5 – residential receptors, and particularly settlements; transport receptors, and particularly tourist routes (the A713) and; recreational receptors.

As part of this, the degree to which an OHL would actually be perceptible was taken into account. Studies have been undertaken by a number of landscape practitioners<sup>19</sup>. These suggest that wood poles may be perceived in most circumstances up to a distance of about 1.5 km, and that poles are not generally perceived beyond 6 km. The degree to which poles are perceived depends on whether they are seen against a backdrop or against the sky, the age of the line (new poles are dark and tend to blend in well, whilst older poles weather to a light silver-grey and can be more visible in the middle distances), and the design of the pole (H-poles tend to be more noticeable than single poles).

Taking this into account, and taking account of screening provided by woodland and built form, the appraisal identified the receptors sufficiently close to the route to be considered to be at risk of significant adverse effects on visual amenity. This was undertaken through a combination of desk study and fieldwork.

### **Cultural Heritage**

The proximity of the route options to cultural heritage assets (as identified in Section 5.3) was investigated. Assets of national importance were identified either within the route or within a 2km buffer of the route; other Historic Environment Records were identified where located either partially or fully within the route.

For the nationally designated sites, setting effects were considered taking account of the type and aspect of the feature and its citation.

Where no assets were located within the route and 2km buffer, or where there were assets which are avoidable and have no setting issues, it was concluded that there was unlikely to be any significant effects.

Potential for significant effects which may be avoidable are identified where the route cannot avoid a broad designation (such as the Archaeologically Sensitive Area, which does not relate to a specific feature); or where there is the potential for setting effects for a feature outwith the main route (i.e. within the 2km buffer); or a Historic Environment Record feature could not be entirely avoided but can be traversed.

A higher risk of significant effects are likely where the route was in close proximity to a feature and setting effects were likely.

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<sup>19</sup> D Horn, I McAulay and M Turnbull (May 2010) High Voltage Wood Pole Transmission and Distribution Main Interconnector Lines in Rural Landscapes: Perceptibility

## **Ecology, Ornithology and Peat**

Existing data collated from wind farm and OHL developments within the surrounding area were consulted to form the initial basis of the route appraisal. Furthermore, satellite imagery available for the area was reviewed to inform of habitats likely to be present as part of a high level study. Lastly, high-level walkover surveys were undertaken by suitably qualified ecologists and ornithologists in order to ground-truth habitats across all route options and further identify any potential ecological constraints from a high level.

The known presence of protected and priority species identified through existing data was used to inform the route appraisal. The presence of habitat suitable to support protected or otherwise notable species within route options was also considered, including areas of designated priority (e.g. red squirrel priority habitat).

With regards to birds, flight pattern data and known nest sites of target ornithological species were plotted against all route options. Route options were also assessed for their suitability to support bird activity, including black grouse leks and raptor nest sites, with consideration to known species within the wider area.

The presence of sensitive habitats, including bog and marshy grassland, and those likely to support GWDTs was also factored into the route appraisal. A desk study to identify areas of conservation interest within the wider area was also undertaken, with locally and nationally designated sites reviewed up to 2 km from route options, and European designated sites reviewed up to 10 km from route options. Qualifying features of each designated site were noted, and influenced the route appraisal where appropriate.

A relative comparison of each route option was then completed in order to qualify preference between each option. A high-level evaluation of each receptor present/potentially present was completed in order to inform the comparison, which included consideration of designated value (e.g. red squirrel priority woodland), rarity and susceptibility to impact from OHL development, amongst other factors.

A more detailed assessment of the potential impacts on sensitive habitats and species of conservation concern within the preferred route option with regards to both collision risk and disturbance during construction and operational phases will be undertaken as part of the Environmental Impact Assessment of the proposed route.

## **Peat**

The appraisal focusses on the Class 1 and 2 peatland habitat from the SNH maps and the BGS peat data. However as the peat data is at a coarse level, there is still the potential for peat to be present across all routes. Peat depth surveys will be undertaken to more accurately determine the presence of peat once a proposed route has been identified. Peat therefore has not been used as a main factor to differentiate between route options, although it has been considered. Where there are small pockets of Class 1 or 2 peat or BGS peat which cannot be avoided, this has been noted as potential to have significant effects. Where there are extensive areas of peat which is unavoidable, this is noted as having a higher potential for significant effects.

## **PWS**

The South West Scotland Interconnector Phase 2 Water Supply Risk Assessment identified two PWS (Lamford and Meadowhead) within the ROA. The assessment included indicative catchment areas. A walkover survey confirmed the location of the PWS. The ability to avoid the PWS catchments has been used as a main factor to differentiate between route options.

## **Recreation and Tourism**

The effects on recreation and tourism have been appraised within the visual amenity topic as the effects relate to the visual experience of the recreational user. No direct effects have been identified and temporary diversions during construction would be managed through the construction environmental management process.

## Land use

The land use topic covers a number of different features as follows:

- **Existing and Committed Development:** There are no dwellings or other occupied premises within the route option area; this includes an indicative 100m buffer as a trigger for consideration. Electric and magnetic fields do not form part of the appraisal.
- **Valid Planning Applications:** There are no valid planning applications within the ROA.
- **Land Use and Agriculture:** The predominant land uses have been considered. The effects will be greatest on grazing moorland.
- **Forestry:** There is only a small amount of woodland within the route area which is avoidable and therefore this is considered to have no likely significant effects.
- **Flooding:** There is no surface water and/or river flood risk within the route option area.



**Benbrack Grid Connection**

	No likely significant effects identified
	Potential for some significant effects
	Higher risk of significant effects

Route Option Appraisal

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
<b>Approximate Length (km)</b>		Approximately 2040m	Approximately 2240m Note: Route B is measured around the north side of the turbine shown on the route appraisal figure.	Approximately 1910m
<b>Landscape</b>	Regional Scenic Areas	Slightly over half the length of the route lies within the D&G Regional Scenic Area	Slightly over half the length of the route lies within the D&G Regional Scenic Area	Slightly over half the length of the route lies within the D&G Regional Scenic Area
	Landscape	Route lies entirely in the Lamford Unit of the Southern Uplands Landscape Character Type. Overall, this is a large scale almost unpopulated landscape of rounded hills, with a distinct degree of wild land character in the higher open areas and a sense of timelessness. As such landscape sensitivity is normally considered to be high. However, the character of Lamford LCU will be substantially altered by the	Route lies entirely in the Lamford Unit of the Southern Uplands Landscape Character Type. Overall, this is a large scale almost unpopulated landscape of rounded hills, with a distinct degree of wild land character in the higher open areas and a sense of timelessness. As such landscape sensitivity is normally considered to be high. However, the character of Lamford LCU will be substantially altered by the	Route lies entirely in the Lamford Unit of the Southern Uplands Landscape Character Type. Overall, this is a large scale almost unpopulated landscape of rounded hills, with a distinct degree of wild land character in the higher open areas and a sense of timelessness. As such landscape sensitivity is normally considered to be high. However, the character of Lamford LCU will be substantially altered by the

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		development of the Benbrack Wind Farm. This will noticeably reduce the degree of wild land character, reducing the landscape sensitivity of the area to the specific OHL development under consideration to medium-low.	development of the Benbrack Wind Farm. This will noticeably reduce the degree of wild land character, reducing the landscape sensitivity of the area to the specific OHL development under consideration to medium-low.	development of the Benbrack Wind Farm. This will noticeably reduce the degree of wild land character, reducing the landscape sensitivity of the area to the specific OHL development under consideration to medium-low.
Appraisal		In the context of the DE Route lattice tower OHL and the Benbrack Wind Farm, the Proposed Development would cause a small change to the landscape character – a minor effect.	In the context of the DE Route lattice tower OHL and the Benbrack Wind Farm, the Proposed Development would cause a small change to the landscape character – a minor effect.	In the context of the DE Route lattice tower OHL and the Benbrack Wind Farm, the Proposed Development would cause a small change to the landscape character – a minor effect.
<b>Visual amenity</b>	Visual Amenity: Residential The residential properties mentioned are not a full inventory of those that may be affected, they highlight the likely to be most affected	The Proposed Development is likely to be noticeable from the two residential properties on the minor road to the west of the Site.	The Proposed Development is likely to be noticeable from the two residential properties on the minor road to the west of the Site.	The Proposed Development is likely to be noticeable from the two residential properties on the minor road to the west of the Site.
	Visual Amenity: Recreation and Tourism: key	There is a local recreational trail in the woodland to the east of the Proposed Development,	There is a local recreational trail in the woodland to the east of the Proposed Development,	There is a local recreational trail in the woodland to the east of the Proposed Development,

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
	viewpoints promoted (viewpoints, tourist attractions and recreational areas)	accessed along the minor road to the west and south. However, this appears to be relatively lightly used.	accessed along the minor road to the west and south. However, this appears to be relatively lightly used.	accessed along the minor road to the west and south. However, this appears to be relatively lightly used.
Appraisal		The Proposed Development risks being visually intrusive on the cottage at Lamford – in the direct view and likely to be ‘stacked’ behind the angle tower. Note: the difference in potential visual amenity effects between Route A and Routes B&C is smaller than suggested by the simple three-step colour-coding used in this appraisal	The Proposed Development may be visually intrusive on the cottage at Lamford. However, the view is less direct and less likely to be ‘stacked’ behind the angle tower than Route A. Note: the difference in potential visual amenity effects between Route A and Routes B&C is smaller than suggested by the simple three-step colour-coding used in this appraisal	The Proposed Development may be visually intrusive on the cottage at Lamford. However, the view is less direct and less likely to be ‘stacked’ behind the angle tower than Route A. Note: the difference in potential visual amenity effects between Route A and Routes B&C is smaller than suggested by the simple three-step colour-coding used in this appraisal
<b>Cultural Heritage</b>	Scheduled Monuments	There is a single Scheduled Monument consisting of two cairns; the King’s Cairn, and Brown Hill Burn Cairn (SM1046), to the north-east of the route option. Neither are visible from the route option due to the intervening topography of Dodd Hill.	There is a single Scheduled Monument consisting of two cairns; the King’s Cairn, and Brown Hill Burn Cairn (SM1046), to the north-east of the route option. Neither are visible from the route option due to the intervening topography of Dodd Hill.	There is a single Scheduled Monument consisting of two cairns; the King’s Cairn, and Brown Hill Burn Cairn (SM1046), to the north-east of the route option. Neither are visible from the route option due to the intervening topography of Dodd Hill.
	Listed Buildings	None within 2 km	None within 2 km	None within 2 km
	Archaeologically Sensitive Areas (ASA)	The route passes through the ASA of the Water of Deugh. It encompasses a large area of land lacking any previous development from commercial	The route passes through the ASA of the Water of Deugh. It encompasses a large area of land lacking any previous development from commercial	The route passes through the ASA of the Water of Deugh. It encompasses a large area of land lacking any previous development from commercial

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		forestry plantation, and includes numerous archaeological sites recorded on the Historic Environment Record.	forestry plantation, and includes numerous archaeological sites recorded on the Historic Environment Record.	forestry plantation, and includes numerous archaeological sites recorded on the Historic Environment Record.
	Non-Designated Heritage Asset of Potential National Importance	None within 2 km	None within 2 km	None within 2 km
	Non-Designated Heritage Asset recorded within HER	None within route option	None within route option	The western edge of the route passes through the edge of a possible field system noted on the HER.
	Non-Designated Heritage Asset recorded during walkover survey	There is a single modern heritage asset noted within the route option, this comprises a large concrete drain cover.	There is a single heritage asset within the route option, consisting of a small grass covered cairn of potential prehistoric origin.	There is a single heritage asset within the route option, consisting of a small grass covered cairn of potential prehistoric origin.
Appraisal		The Proposed Development risks uncovering unknown archaeological remains within the ASA, given the number of upstanding archaeological assets in the vicinity.	The Proposed Development has the potential to have direct impacts on a known Prehistoric cairn, and possible unknown features associated with an asset of this type. The Proposed Development also risks uncovering unknown archaeological remains within the ASA, given the number of upstanding archaeological assets in the vicinity.	The Proposed Development has the potential to have direct impacts on a known Prehistoric cairn and possible unknown features associated with an asset of this type. It also has the potential to have direct impacts on a possible field system, although this has previously been impacted upon, and may have been removed in this area by the DE Route.  The Proposed Development also risks uncovering unknown archaeological remains within the

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
				ASA, given the number of upstanding archaeological assets in the vicinity.
<b>Ecology and ornithology</b>	Ornithology	Ornithological surveys undertaken by WSP (2019) recorded no black grouse or high densities of other species of increased conservation importance such as curlew.	Ornithological surveys undertaken by WSP (2019) recorded no black grouse or high densities of other species of increased conservation importance such as curlew.	Ornithological surveys undertaken by WSP (2019) recorded no black grouse or high densities of other species of increased conservation importance such as curlew.
	Red Squirrel Priority Woodland	The route does not encroach on Red Squirrel Priority Woodland.	The route does not encroach on Red Squirrel Priority Woodland.	The route does not encroach on Red Squirrel Priority Woodland.
	Otter activity	Potential otter holt and couch identified during Protected Species Survey undertaken by WSP (2019); holt approximately 250m from Route A, couch approximately 200m from Route A. Suitable otter foraging and commuting habitat also present.	Potential otter holt and couch identified during Protected Species Survey undertaken by WSP (2019); both within Route B. Suitable otter foraging and commuting habitat also present.	Potential otter holt and couch identified during Protected Species Survey undertaken by WSP (2019); holt approximately 40m from Route C, couch approximately 120m from Route C. Suitable otter foraging and commuting habitat also present.
	Bat activity	Bat surveys in support of Benbrack Wind Farm ES (AMEC, 2013) recorded low bat activity largely restricted to plantation edge around the periphery of the Site. Limited habitat for bats was identified in terms of places of shelter and the route would not impact on the main feature noted as suitable habitat during the extended Phase 1 survey (WSP, 2018); farm buildings and farm	Bat surveys in support of Benbrack Wind Farm ES (AMEC, 2013) recorded low bat activity largely restricted to plantation edge around the periphery of the Site. Limited habitat for bats was identified in terms of places of shelter and the route would not impact on the main feature noted as suitable habitat during the extended Phase 1 survey (WSP, 2018); farm buildings and farm	Bat surveys in support of Benbrack Wind Farm ES (AMEC, 2013) recorded low bat activity largely restricted to plantation edge around the periphery of the Site. Limited habitat for bats was identified in terms of places of shelter and the route would not impact on the main feature noted as suitable habitat during the extended Phase 1 survey (WSP, 2018); farm buildings and farm

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		<p>house in the southwest of the route option area.</p> <p>This route could potentially affect foraging bats commuting between buildings and a small plantation at its southwest end, otherwise this route passes through open, elevated land of lower suitability for foraging bats.</p>	<p>house in the southwest of the route option area.</p> <p>This route could potentially affect foraging bats commuting between buildings and a small plantation at its southwest end and given the closer proximity of Route B (and C) to the plantation in comparison with Route A, the impacts could be greater. Otherwise this route passes through open, elevated land of lower suitability for foraging bats.</p>	<p>house in the southwest of the route option area.</p> <p>This route could potentially affect foraging bats commuting between buildings and a small plantation at its southwest end and given the closer proximity of Route C (and B) to the plantation in comparison with Route A, the impacts could be greater. Otherwise this route passes through open, elevated land of lower suitability for foraging bats.</p>
	Priority habitat / GWDTE	<p>NVC Surveys undertaken by WSP (2019) identified widespread bog habitat with visible peat shelves of &gt;0.5m, with other heath and mire communities interspersed. The majority of blanket bog has likely been degraded by extensive drainage ditches; grazing has also had an influence, with enclosed fields close to Lamford Farm in the south showing communities likely derived from bog but now degraded to a short sward. Localised areas within this route option present heath and mire communities of relatively good condition and value, including species-rich blanket bog</p>	<p>NVC Surveys undertaken by WSP (2019) identified widespread bog habitat with visible peat shelves of &gt;0.5m, with other heath and mire communities interspersed. The majority of blanket bog has likely been degraded by extensive drainage ditches; grazing has also had an influence, with enclosed fields close to Lamford Farm in the south showing communities likely derived from bog but now degraded to a short sward. Localised areas within this route option present heath and mire communities of relatively good condition and value, including species-rich blanket bog</p>	<p>NVC Surveys undertaken by WSP (2019) identified widespread bog habitat with visible peat shelves of &gt;0.5m, with other heath and mire communities interspersed. The majority of blanket bog has likely been degraded by extensive drainage ditches; grazing has also had an influence, with enclosed fields close to Lamford Farm in the south showing communities likely derived from bog but now degraded to a short sward. Localised areas within this route option present heath and mire communities of relatively good condition and value, including species-rich blanket bog</p>

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		<p>with important peat-forming bryophytes.</p> <p>Much of the habitats are likely to be rainwater and surface water fed. Whilst NVC communities potentially reflective of GWDTE were identified within the route option area, the topology, geology and extensive peat layer here indicates these communities are unlikely GWDTE. Within a 100m buffer of the route option, a couple of springs and associated potential GWDTE have been identified which could be impacted depending on the infrastructure and construction methods proposed here. This route option is the closest to identified springs/potential GWDTE.</p>	<p>with important peat-forming bryophytes.</p> <p>Much of the habitats are likely to be rainwater and surface water fed. Whilst NVC communities potentially reflective of GWDTE were identified within the route option area, the topology, geology and extensive peat layer here indicates these communities are unlikely GWDTE. Within a 100m buffer of the route option, a couple of springs and associated potential GWDTE have been identified which could be impacted depending on the infrastructure and construction methods proposed here.</p>	<p>with important peat-forming bryophytes.</p> <p>Much of the habitats are likely to be rainwater and surface water fed. Whilst NVC communities potentially reflective of GWDTE were identified within the route option area, the topology, geology and extensive peat layer here indicates these communities are unlikely GWDTE. Within a 250m buffer of the route option, a couple of springs and associated potential GWDTE have been identified which could be impacted depending on the infrastructure and construction methods proposed here.</p>
	Badger activity	<p>Badgers are active across the wider landscape. The route is a significant distance from confirmed and potential badger setts identified during Protected Species Surveys undertaken by WSP (2019).</p>	<p>Badgers are active across the wider landscape. The route is a significant distance from confirmed and potential badger setts identified during Protected Species Surveys undertaken by WSP (2019).</p>	<p>Badgers are active across the wider landscape. The route is a significant distance from confirmed and potential badger setts identified during Protected Species Surveys undertaken by WSP (2019).</p>
	Pine marten activity	<p>This species was not recorded during surveys in support of Benbrack Wind Farm ES (AMEC,</p>	<p>This species was not recorded during surveys in support of Benbrack Wind Farm ES (AMEC,</p>	<p>This species was not recorded during surveys in support of Benbrack Wind Farm ES (AMEC,</p>

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		2013) or WSP surveys for the Proposed Development (2019). The WSP extended Phase 1 habitat survey makes the assessment that habitat is unsuitable within the route option area for places of rest for the species but suitable habitat for places of rest are present within forestry just outside the route option area. The route option area (and the specific route option under consideration here) provide suitable foraging habitat for the species.	2013) or WSP surveys for the Proposed Development (2019). The WSP extended Phase 1 habitat survey makes the assessment that habitat is unsuitable within the route option area for places of rest for the species but suitable habitat for places of rest are present within forestry just outside the route option area. The route option area (and the specific route option under consideration here) provide suitable foraging habitat for the species.	2013) or WSP surveys for the Proposed Development (2019). The WSP extended Phase 1 habitat survey makes the assessment that habitat is unsuitable within the route option area for places of rest for the species but suitable habitat for places of rest are present within forestry just outside the route option area. The route option area (and the specific route option under consideration here) provide suitable foraging habitat for the species.
	Water vole activity	There was no evidence of water vole during surveys undertaken in support of Benbrack Wind Farm ES (AMEC, 2013) or WSP surveys for the Proposed Development (2019).	There was no evidence of water vole during surveys undertaken in support of Benbrack Wind Farm ES (AMEC, 2013) or WSP surveys for the Proposed Development (2019).	There was no evidence of water vole during surveys undertaken in support of Benbrack Wind Farm ES (AMEC, 2013) or WSP surveys for the Proposed Development (2019).
	Salmonids	A Fisheries Habitat Survey (Galloway Fisheries Trust, on behalf of AMEC, 2013) in support of Benbrack Wind Farm ES concluded that no access was possible for migratory salmonids to water courses within the study area due to their location upstream of Kendoon Dam. The only salmonid species likely to be present is resident brown trout in	A Fisheries Habitat Survey (Galloway Fisheries Trust, on behalf of AMEC, 2013) in support of Benbrack Wind Farm ES concluded that no access was possible for migratory salmonids to water courses within the study area due to their location upstream of Kendoon Dam. The only salmonid species likely to be present is resident brown trout in	A Fisheries Habitat Survey (Galloway Fisheries Trust, on behalf of AMEC, 2013) in support of Benbrack Wind Farm ES concluded that no access was possible for migratory salmonids to water courses within the study area due to their location upstream of Kendoon Dam. The only salmonid species likely to be present is resident brown trout in



Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		low numbers. The route could affect watercourses populated by brown trout.	low numbers. The route could affect watercourses populated by brown trout.	low numbers. The route could affect watercourses populated by brown trout.
Appraisal		No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised area of good quality/species-rich blanket bog with important peat-forming bryophytes. Route extends within 100m of areas of identified springs and associated potential GWDTE. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.	No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. A potential otter holt and couch are outwith the distance where they pose a constraint. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised areas of good quality/species-rich blanket bog with important peat-forming bryophytes. Route is located within 250m of identified springs and associated potential GWDTE; however no springs or GWDTE have been identified within 100m. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.	No high densities of ornithological species of increased conservation importance identified. Potential and confirmed badger setts are outwith the distance where they pose a constraint. A potential otter holt and couch could be potentially impacted and are within the route option. The route could have limited effects on commuting/foraging pine marten, otter and bats. Route extends through localised areas of good quality/species-rich blanket bog with important peat-forming bryophytes. Route extends within 100m of area of identified springs and associated potential GWDTE. The route could have impacts on resident brown trout, but no other salmonoids are likely to be present.
Land Use	Existing and Committed Development.	None	None	None

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
	Valid Planning Applications	None	None	None
	Predominant land use	Rough grazing on moorland	Rough grazing on moorland	Rough grazing on moorland
Appraisal		No likely significant effects identified	No likely significant effects identified	No likely significant effect identified
<b>Forestry / Woodlands</b>		No forestry will be impacted by Route A	There is a small parcel of forestry near to the DE route which Route B partially passes through. Potential for this woodland to be avoided through design.	There is a small parcel of forestry near to the DE route which Route C partially passes through. Potential for this woodland to be avoided through design.
<b>Hydrology, Hydrogeology and Peat</b>	<b>Flood Zones and Surface Waterbodies</b>	No surface water and/or river flood risk within the Proposed Development* A tributary of the Carsphairn Lane and Goat Burn are located within the Proposed Route A.	No surface water and/or river flood risk within the Proposed Development* Carsphairn Lane and its tributary are located within the Proposed Route B.	No surface water and/or river flood risk within the Proposed Development* Carsphairn Lane is located within the Proposed Route C.
	<b>Ground Waterbodies and GWDTE</b>	The Proposed Route A falls within the Galloway Ground Waterbody. Please refer to the Ecology Section for details on GWDTE.	The Proposed Route B falls within the Galloway Ground Waterbody. Please refer to the Ecology Section for details on GWDTE.	The Proposed Route C falls within the Galloway Ground Waterbody. Please refer to the Ecology Section for details on GWDTE.
	<b>Peat</b>	Based on SNH Carbon and Peatland Map and BGS data peat superficial deposits are encountered to the middle and south of the Proposed Route A. However, it is considered the potential impact of the Proposed Development in the peat will be not significant.	Based on SNH Carbon and Peatland Map and BGS data peat superficial deposits are encountered across the middle and to the north of the Proposed Route B. However, it is considered the potential impact of the Proposed Development in the peat will be	Based on SNH Carbon and Peatland Map and BGS data peat superficial deposits are encountered across the middle of the Proposed Route C. However, it is considered the potential impact of the Proposed Development in the peat will be

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
			not significant.	not significant.
	<b>Private Water Supplies</b>	<p>The South West Scotland Interconnector Phase 2 Water Supply Risk Assessment provides information of both the Lamford and Meadowhead private water supplies (PWS). Property owners have confirmed that the supply is a groundwater spring. The source and holding tank have been confirmed through site verification. Owners have also confirmed that supply line runs in a straight line between tank and the property. The Proposed Route A will be able to avoid the Meadowhead PWS, its catchment area and 250m buffer.</p> <p>The Proposed Route A will not be able to avoid the Lamford private water supply (PWS) catchment nor the 250m buffer.</p> <p>The Lamford PWS pipe network can be avoided through design. Therefore, the Proposed Route A can be designed to avoid significant effects.</p>	<p>The South West Scotland Interconnector Phase 2 Water Supply Risk Assessment provides information of both the Lamford and Meadowhead private water supplies (PWS). The Proposed Route B will be able to avoid the Meadowhead PWS catchment area. The Lamford 250m buffer cannot be avoided but the Lamford PWS and catchment area can be avoided through design.</p> <p>The Proposed Route B will need to cross either the supply catchment area within 250m of the source or the pipe network. However, routeing to the north and mitigation to protect the pipe network can avoid significant effects.</p>	<p>The South West Scotland Interconnector Phase 2 Water Supply Risk Assessment provides information of both the Lamford and Meadowhead private water supplies (PWS). The Proposed Route C will be able to avoid both the Meadowhead and Lamford PWS catchment areas and the Meadowhead 250m buffer and supply. The Lamford 250m buffer cannot be avoided but the Lamford PWS itself can be avoided through design.</p> <p>The Proposed Route C will need to cross the pipe network or within 250m of the source. However, routeing to the north and mitigation to protect the pipe network can avoid significant effects.</p>
<b>Appraisal</b>		No likely significant effects are expected as a result of the Proposed Development on the	No likely significant effects are expected as a result of the Proposed Development on the	No likely significant effects are expected as a result of the Proposed Development on the

Criterion	Sub-Criteria	Appraisal – Route A	Appraisal – Route B	Appraisal – Route C
		<p>surface waterbodies, ground waterbodies and peat.</p> <p>The Proposed Development has the potential to have some significant effects on the Lamford PWS. Although design can avoid any impacts on the pipe network, it cannot avoid the catchment area.</p>	<p>surface waterbodies, ground waterbodies and peat.</p> <p>The Proposed Development has the potential to have adverse impacts on the Lamford PWS. However, these impacts can be avoided through design.</p>	<p>surface waterbodies, ground waterbodies and peat.</p> <p>The Proposed Development has the potential to have adverse impacts on the Lamford PWS. However, these impacts can be avoided through design.</p>

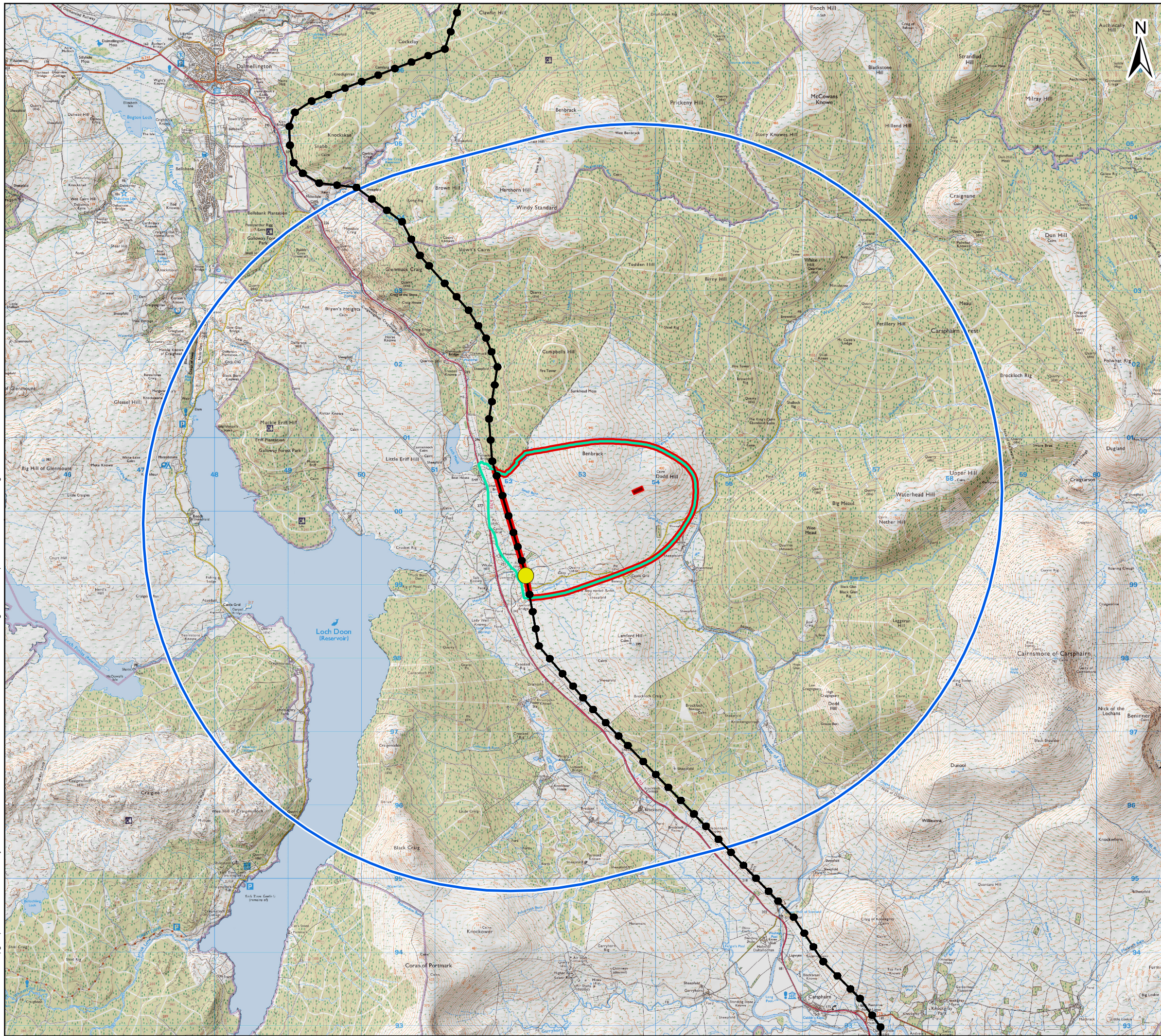
\*Note SEPA Flood Risk Map Accessed on 9<sup>th</sup> September 2019

## APPENDIX F – LIST OF CONSULTEES

<b>Consultees</b>	
<b>Statutory Consultees</b>	
Energy Consents Unit	Scottish Environment Protection Agency
Dumfries and Galloway Council	Scottish Natural Heritage
Historic Environment Scotland	
<b>Non Statutory Consultees</b>	
Association of Salmon Fishery Board	RSPB Scotland
The Coal Authority	Scottish Forestry
Defence Infrastructure Organisation (DIO)	Scottish Water
Marine Scotland	Scottish Wildlife Trust
<b>Other Consultees</b>	
British Horse Society	OFCOM
BT	RAF
Civil Aviation Authority - Airspace	Ramblers Association (Scotland)
Galloway Fisheries Trust	Red Squirrels in Scotland (Southwest Scotland)
Game and Wildlife Conservation Trust	Scottish Badgers
Health and Safety Executive	Scottish Outdoor Access Network (SOAN)
JNCC (for Geological Conservation Review)	Scottish Rights of Way and Access Society (ScotWays)
John Muir Trust	Sustrans Scotland
Mountaineering Council of Scotland	The Crown Estate
National Farmers Union	The Woodland Trust
National Trust for Scotland	Transport Scotland
NATS Safeguarding	Visit Scotland
<b>Local Community Councils</b>	
Carsphairn Community Council	Dalmellington Community Council



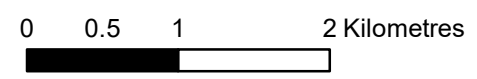
## APPENDIX G - FIGURES




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**Key**

- Route Option Area
- Initial Study Area
- Study Area
- DE Route
- T in point
- Wind Farm Substation





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Client: 

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Project: **Benbrack**

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Title: **Figure 1: Site Location**

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Date: 05/02/2020	Scale: 50,000 @ A3
Drawn: HT	Checked: PM
	Approved: CS

Trident Single Pole Intermediate (Foreground), Angle (Middle Ground)



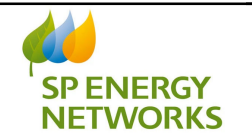
Trident 'H' Pole Angle



Trident 'H' Pole Terminal



Client:



Project:

Benbrack

Title:

Figure 2: Trident Wood Pole Types

Date: 05/02/2020

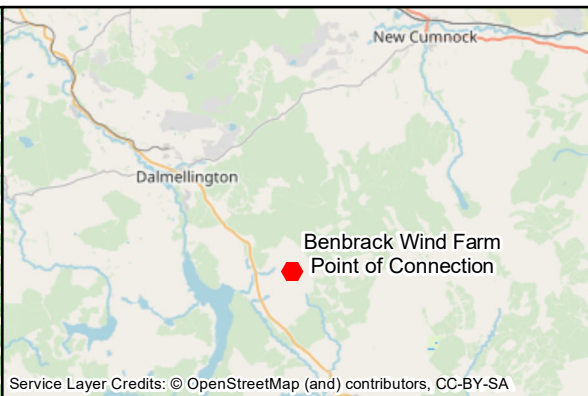
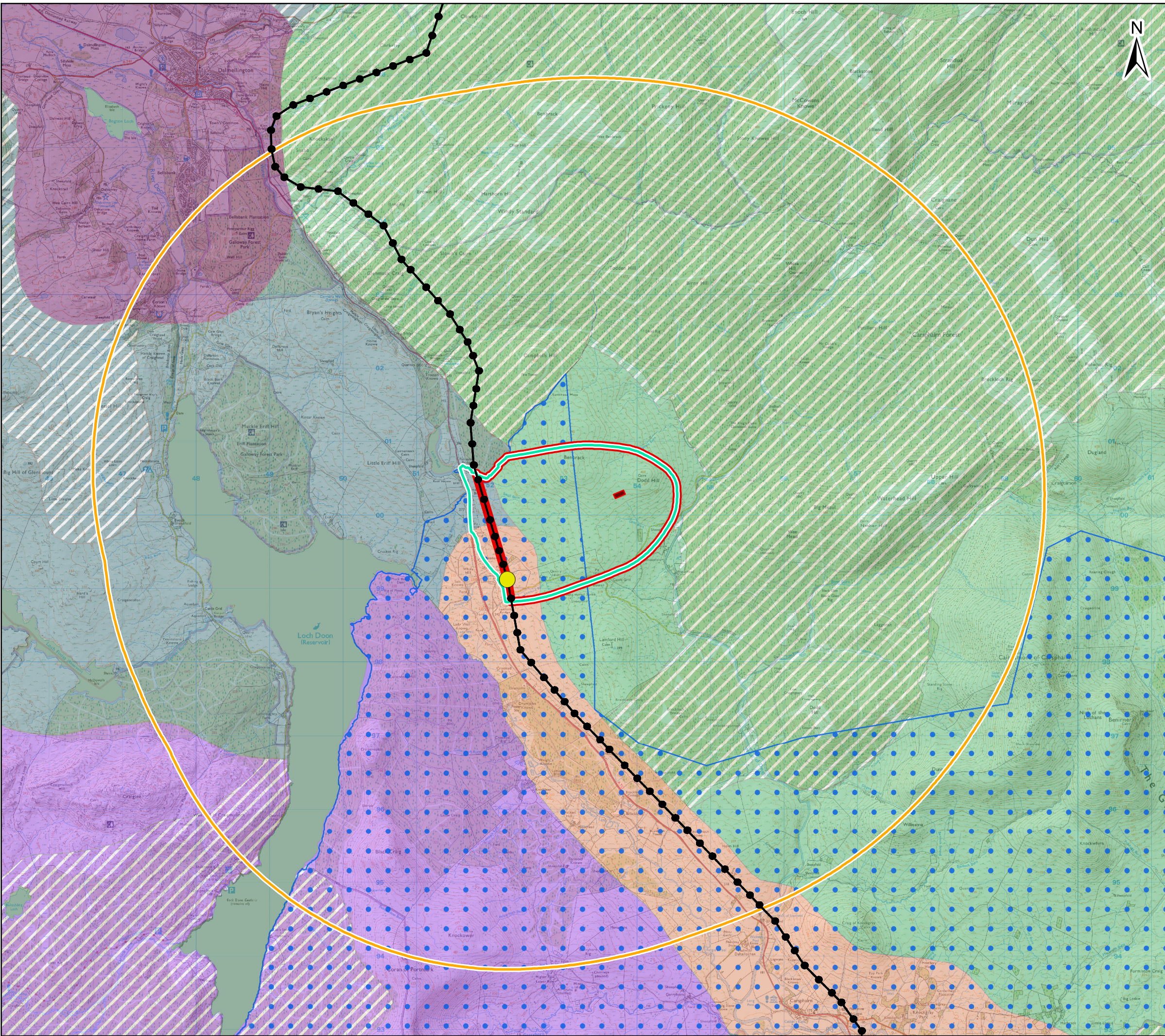
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Drawn: HT

Checked: PM

Approved: CS

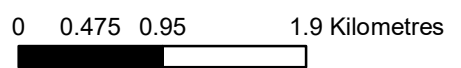




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- Key**
- Route Option Area
  - Study Area
  - Study Area 5km Buffer
  - DE Route
  - T in point
  - Wind Farm Substation
  - D&G Regional Scenic Area/East Ayrshire Special Landscape Area.

- Landscape Character Area**
- Foothills
  - Foothills With Forest
  - Inland Loch
  - Rugged Granite Uplands
  - Rugged Granite Uplands with Forest
  - Southern Uplands
  - Southern Uplands with Forest
  - Upper Dale (Valley)
  - Upper River Valleys

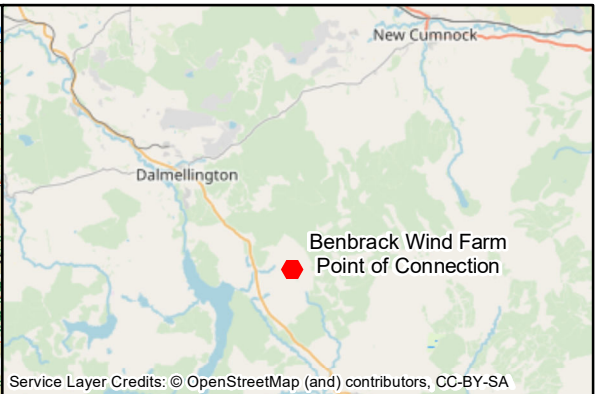
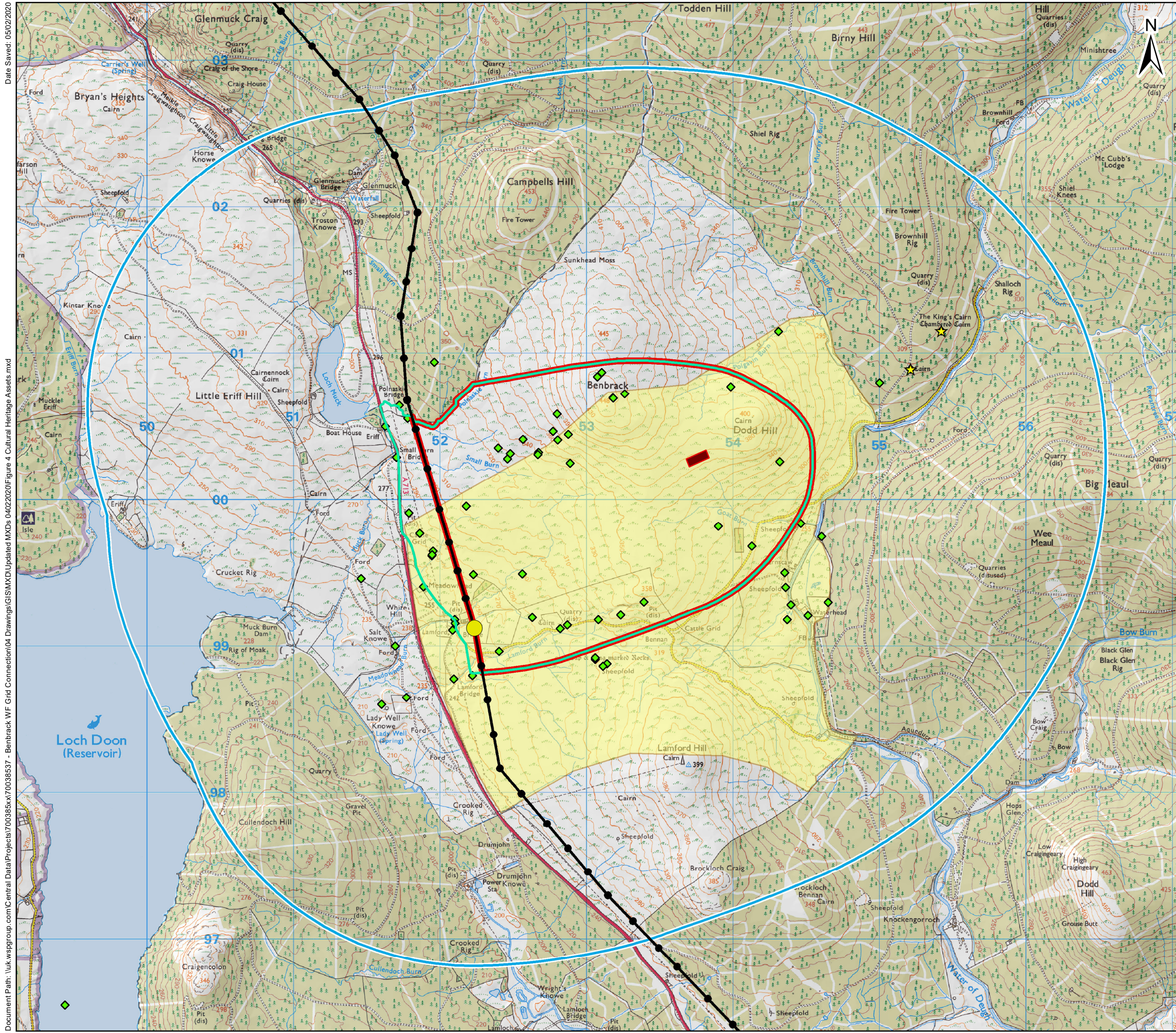


Client:

Project: Benbrack

Title: Figure 3: Landscape Character Types and Designations

Date: 05/02/2020 Scale: 50,000 @ A3  
 Drawn: HT Checked: PM Approved: CS



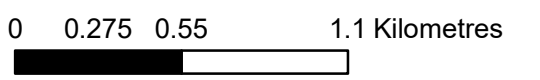
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

**Key**

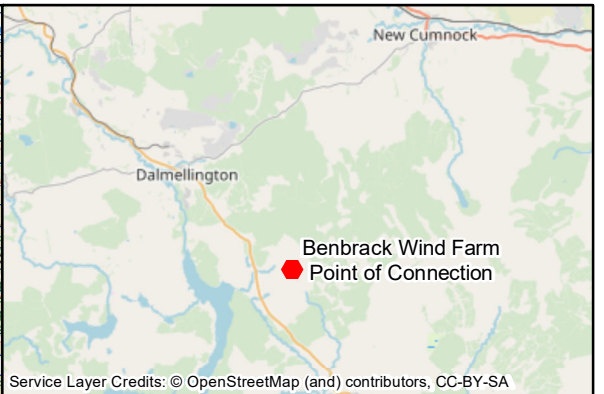
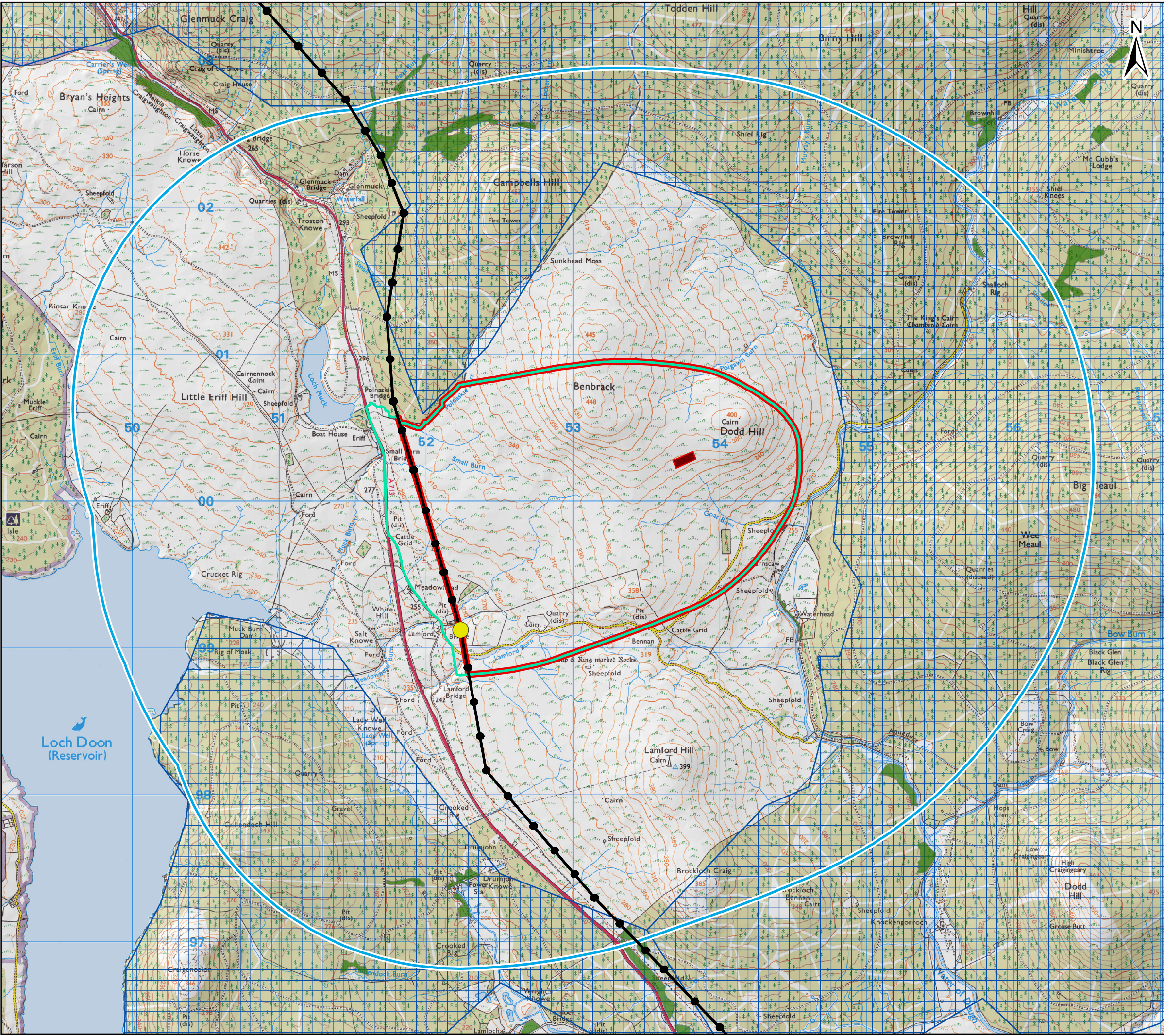
- Route Option Area
- Study Area
- Study Area 2km Buffer
- T in point
- Wind Farm Substation
- DE Route
- Archaeologically Sensitive Area
- Heritage Assets

**Listed Buildings**

- Category A
- Category B
- Category C



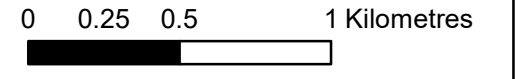
Client:			
Project:	Benbrack		
Title:	Figure 4: Cultural Heritage Assets		
Date:	05/02/2020	Scale:	25,000 @ A3
Drawn:	HT	Checked:	PM
		Approved:	CS



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**Key**

- Route Option Area
- Study Area 2km Buffer
- T in point
- Wind Farm Substation
- DE Route
- Native Woodland
- Nearly-Native Woodland
- Planted Ancient Woodland Site (PAWS)
- Red Squirrel Priority Woodland

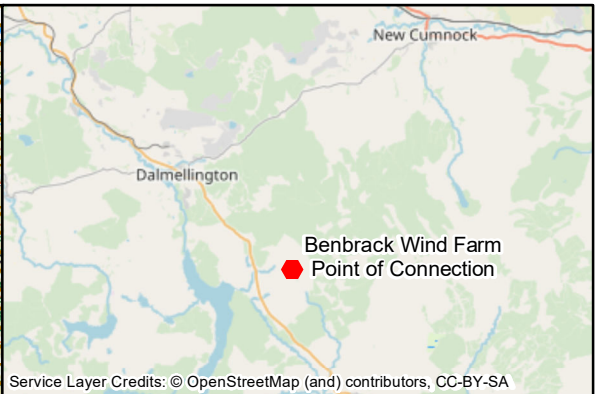
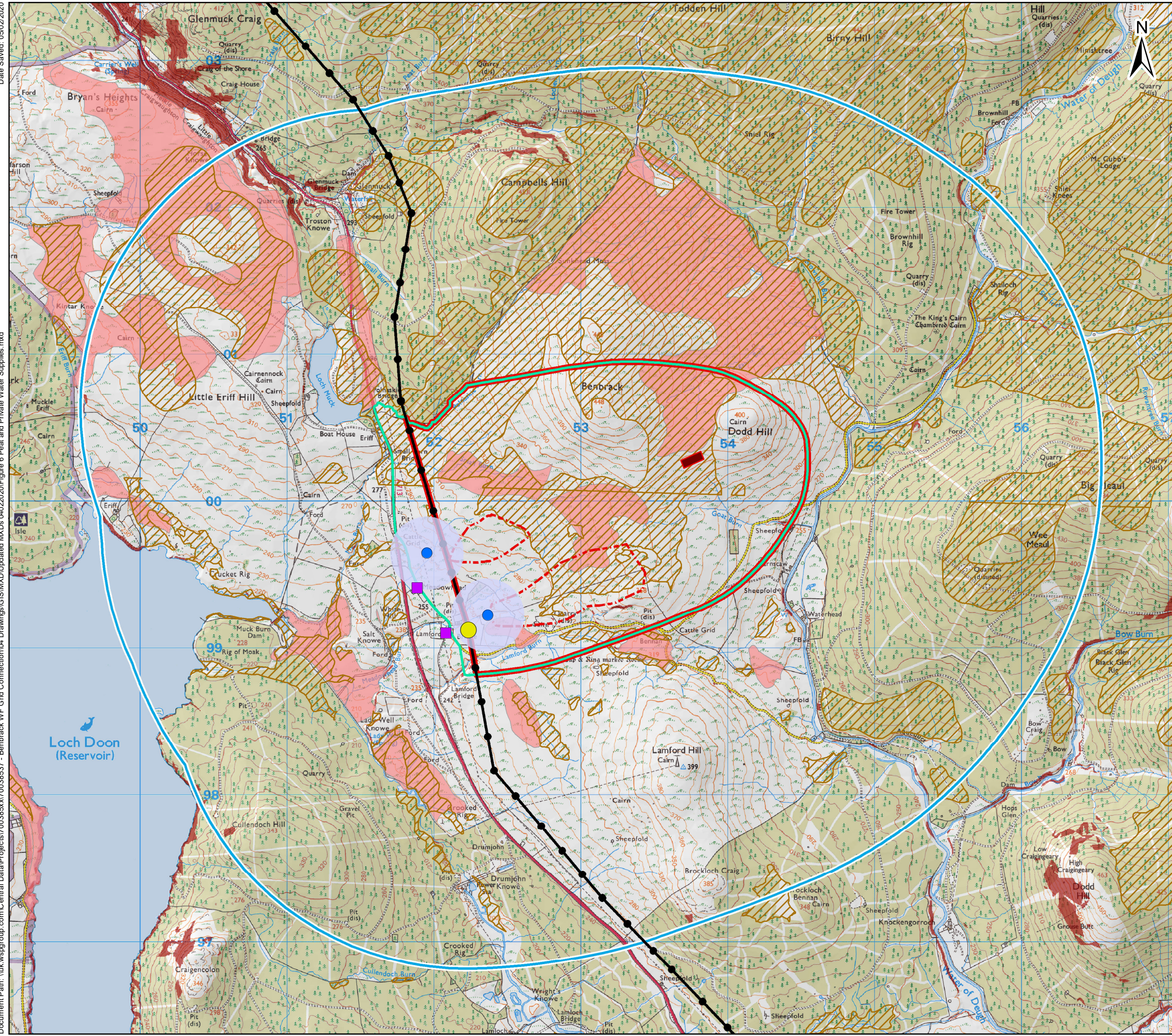


Client:

Project: Benbrack

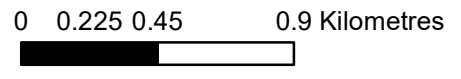
Title: Figure 5: Ecological Designations

Date: 05/02/2020 Scale: 25,000 @ A3  
 Drawn: HT Checked: PM Approved: CS



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- Key**
- Route Option Area
  - Study Area
  - Study Area 2km Buffer
  - T in point
  - Wind Farm Substation
  - DE Route
  - Private Water Supply - Property
  - Private Water Supply - Source
  - Private Water Supply Source 250m Buffer
  - Supply Catchment Area
  - Steep slope (>20 degrees)
  - BGS 1:50k Superficial Deposits Peat
  - Class 1: All vegetation cover is priority peatland habitats: All soils are carbon-rich soils and deep peat



Client:

Project:

Benbrack

Title:

Figure 6: Peat and Private Water Supplies

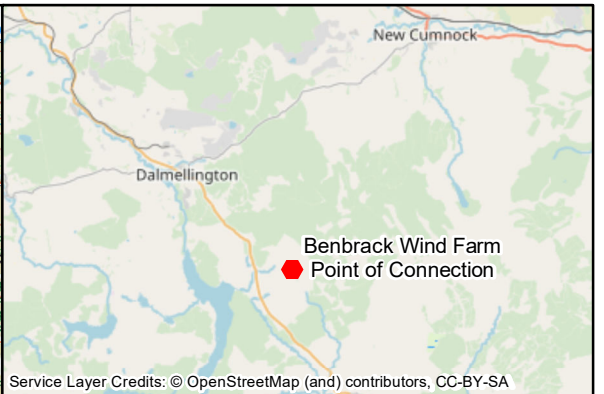
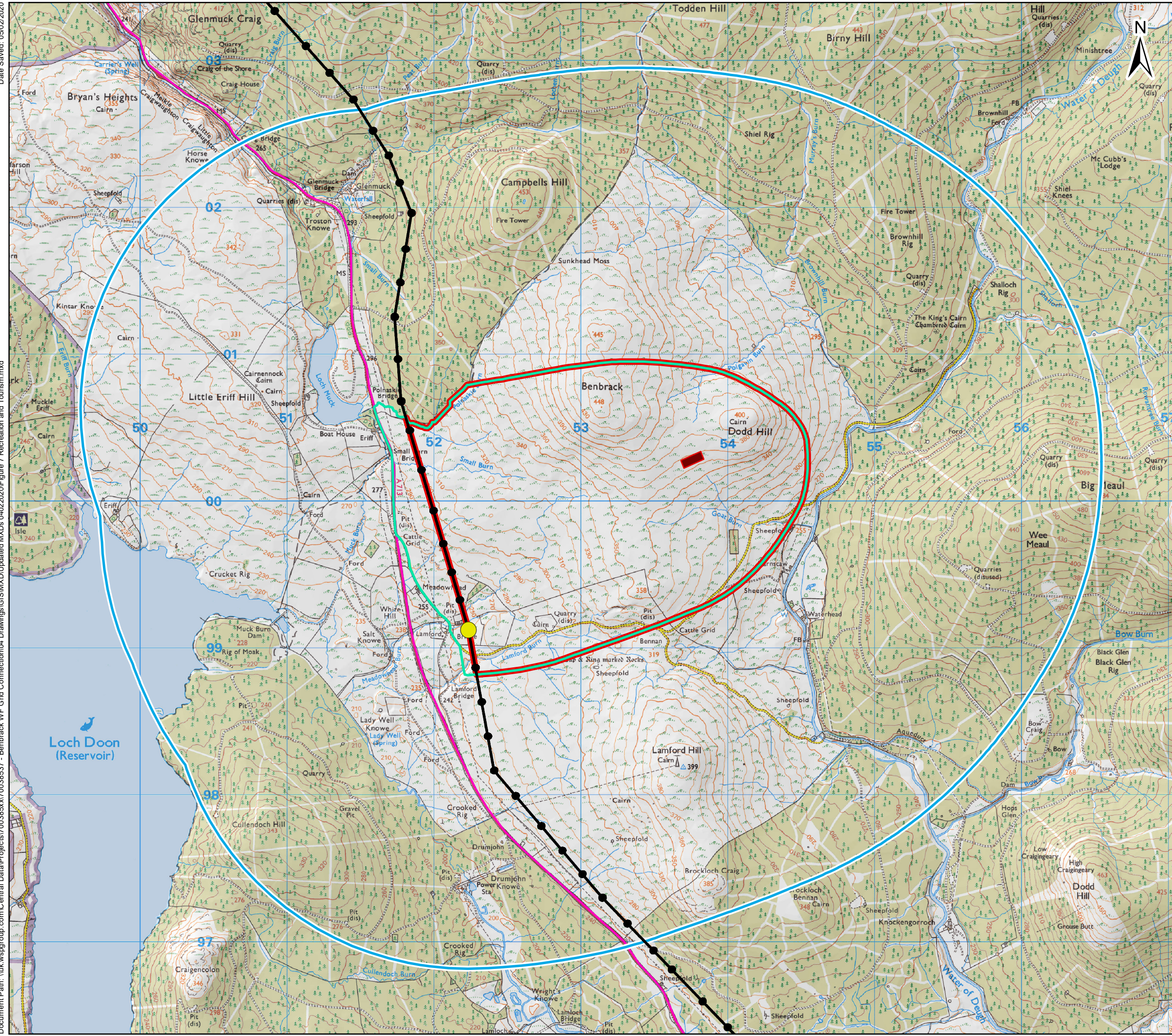
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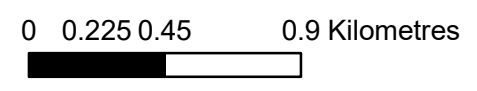
Approved: CS



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**Key**

- Route Option Area
- Study Area
- Study Area 2km Buffer
- T in point
- Wind Farm Substation
- DE Route
- Tourist Route

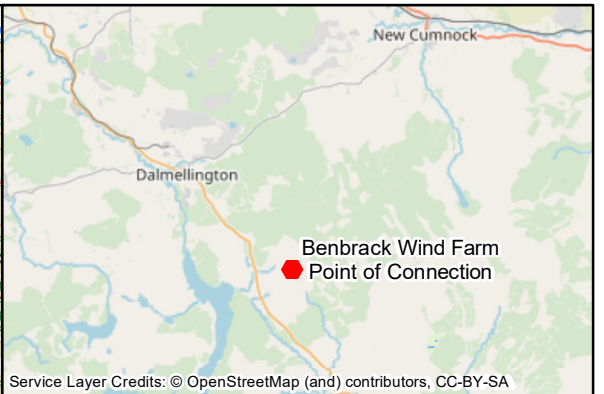
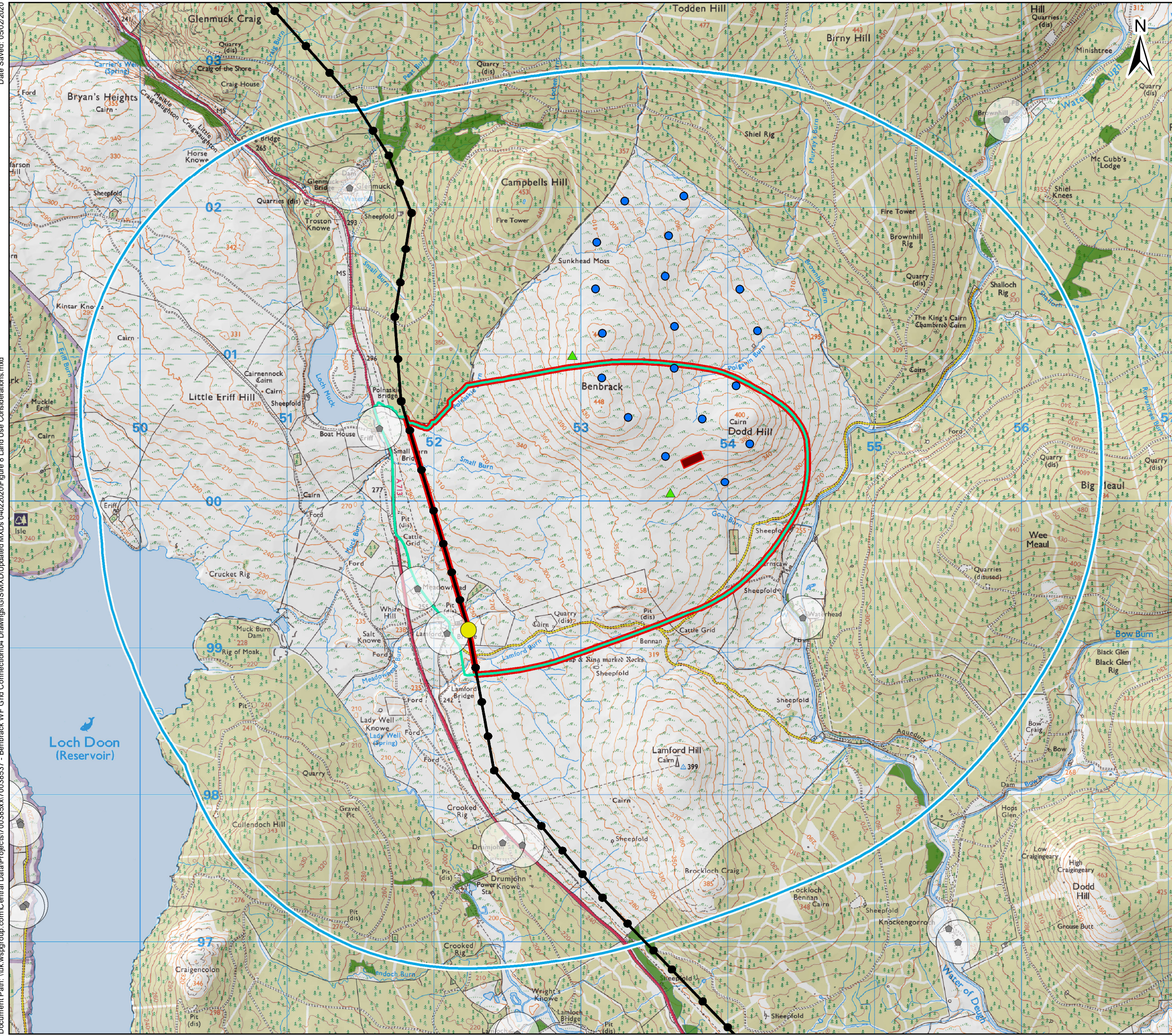


Client: SP ENERGY NETWORKS

Project: **Benbrack**

Title: **Figure 7: Recreation and Tourism**

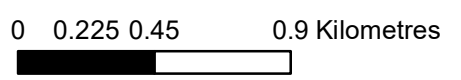
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 Drawn: HT Checked: PM Approved: CS



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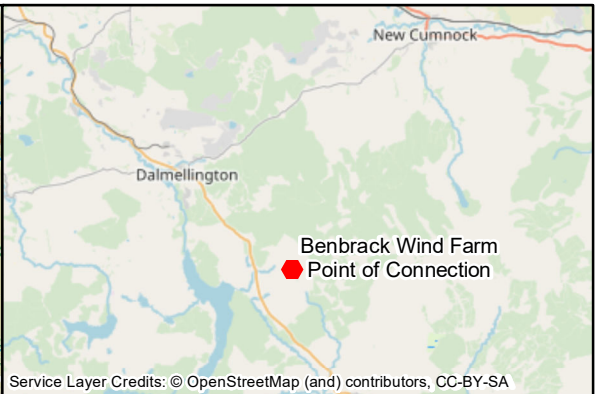
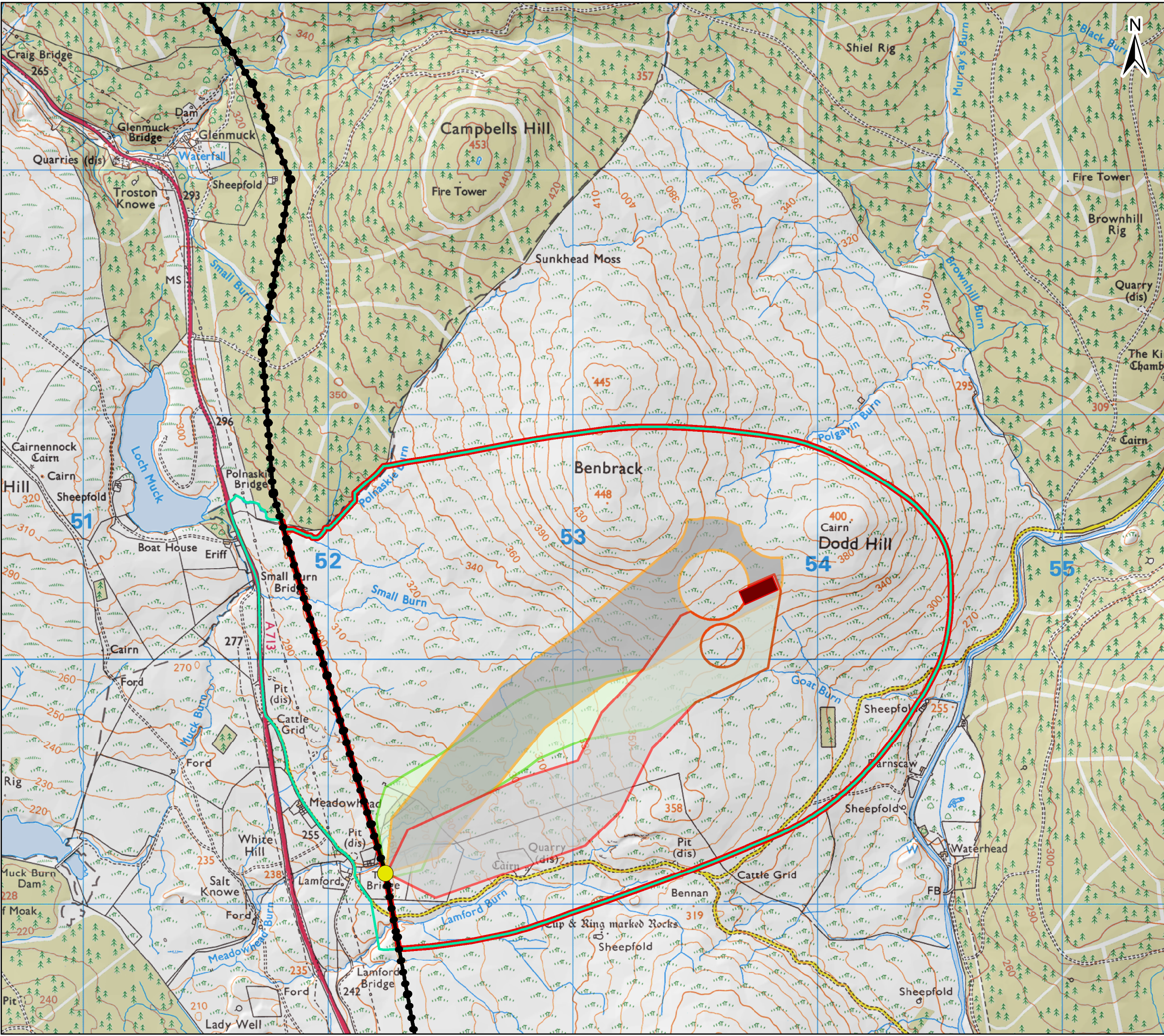
**Key**

- Route Option Area
- Study Area
- Study Area 2km Buffer
- T in point
- Wind Farm Substation
- DE Route
- Proposed Wind Turbine
- Proposed Anemometry Mast
- Residential Dwelling
- Residential Dwelling 150m buffer
- Native Woodland
- Nearly-Native Woodland
- Planted Ancient Woodland Site (PAWS)



Client:			
Project:	Benbrack		
Title:	Figure 8: Land Use Considerations		
Date:	05/02/2020	Scale:	25,000 @ A3
Drawn:	HT	Checked:	PM
		Approved:	CS

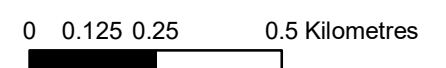
Date Saved: 06/02/2020  
Document Path: \\uk.wspgroup.com\Central Data\Projects\700385x\70038537 - Benbrack WF Grid Connection\4 Drawings\GIS\MXD\Updated MXDs 04022020\Figure 9 Preliminary Route Options.mxd



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**Key**

- Route Option Area
- Study Area
- T in point
- Wind Farm Substation
- DE Route
- Route A
- Route B
- Route C

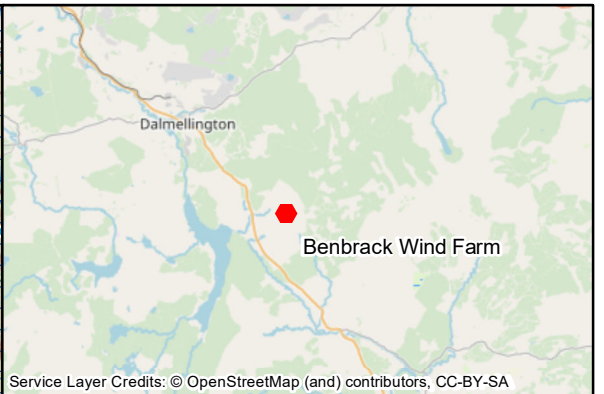
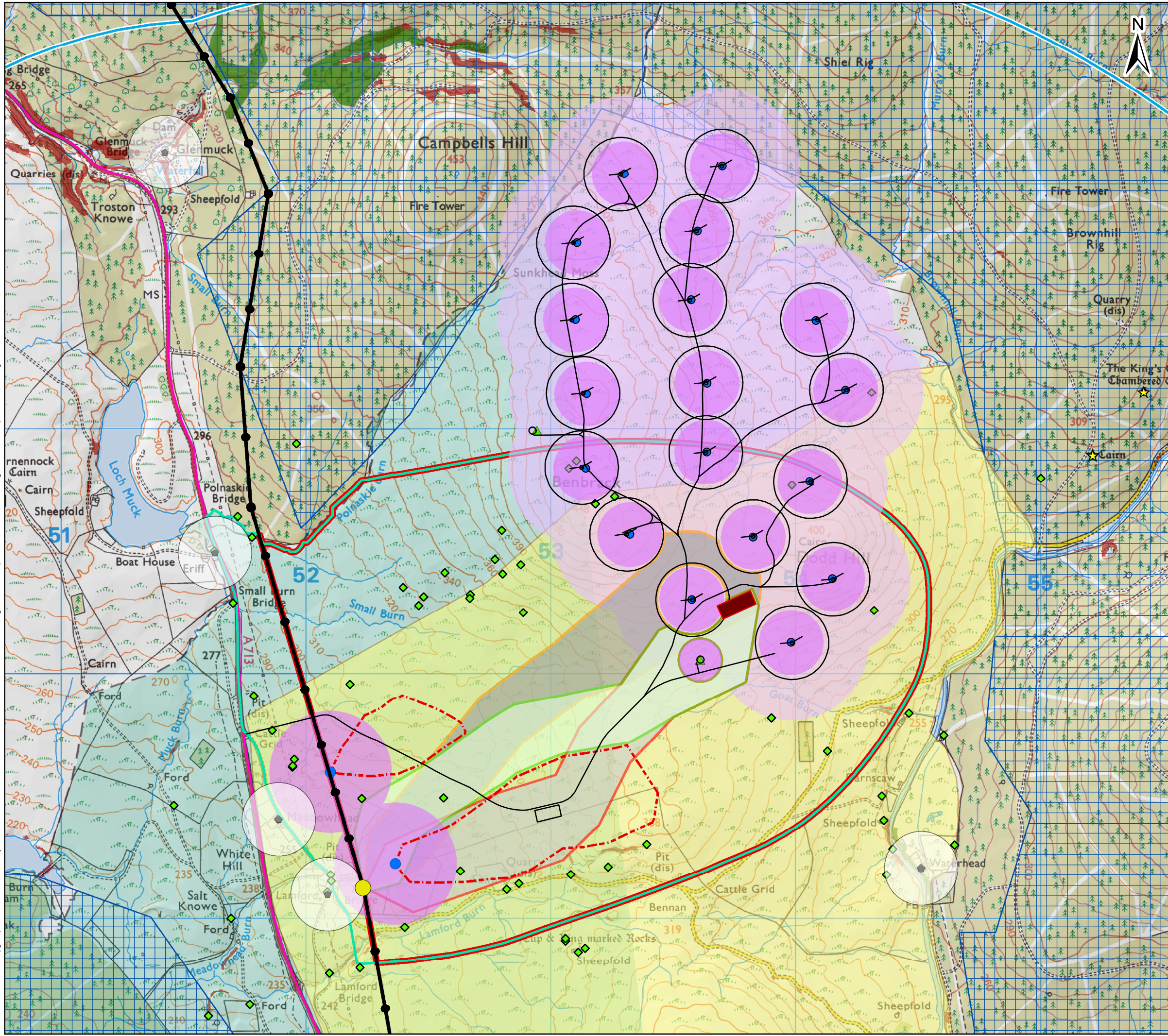


Client: **SP ENERGY NETWORKS**

Project: **Benbrack**

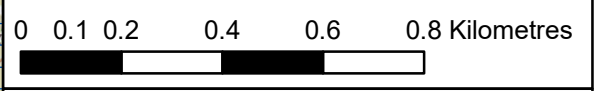
Title: **Figure 9: Route Options**

Date: 06/02/2020 Scale: 15,000 @ A3  
Drawn: HT Checked: PM Approved: CS



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- Key**
- Route Option Area
  - Study Area
  - Study Area 2km Buffer
  - T in point
  - Wind Farm Substation
  - DE Route
  - Benbrack Wind Farm Infrastructure
  - Proposed Wind Turbine
  - Proposed Anemometry Mast
  - Topple Distance Buffer - 132.3m
  - 3x Rotor Diameter Buffer - 318m
  - Met Mast Topple Distance
  - Private Water Supply - Source
  - Private Water Supply Source 250m Buffer
  - Supply Catchment Area
  - Route A
  - Route B
  - Route C
  - Tourist Route
  - Residential Dwelling
  - Residential Dwelling 150m buffer
  - Heritage Assets
  - Archaeologically Sensitive Area
  - D&G Regional Scenic Area/East Ayrshire Special Landscape Area.
  - Red Squirrel Priority Woodland
  - Native Woodland



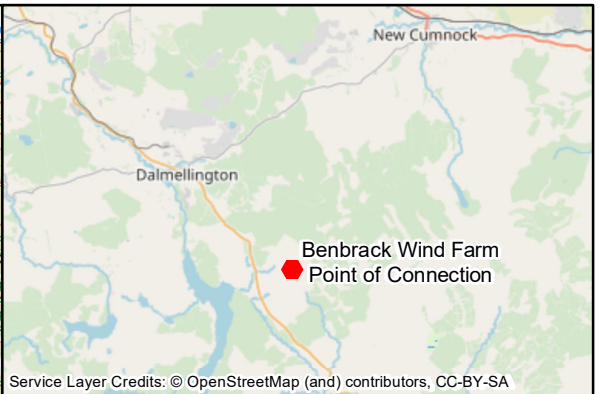
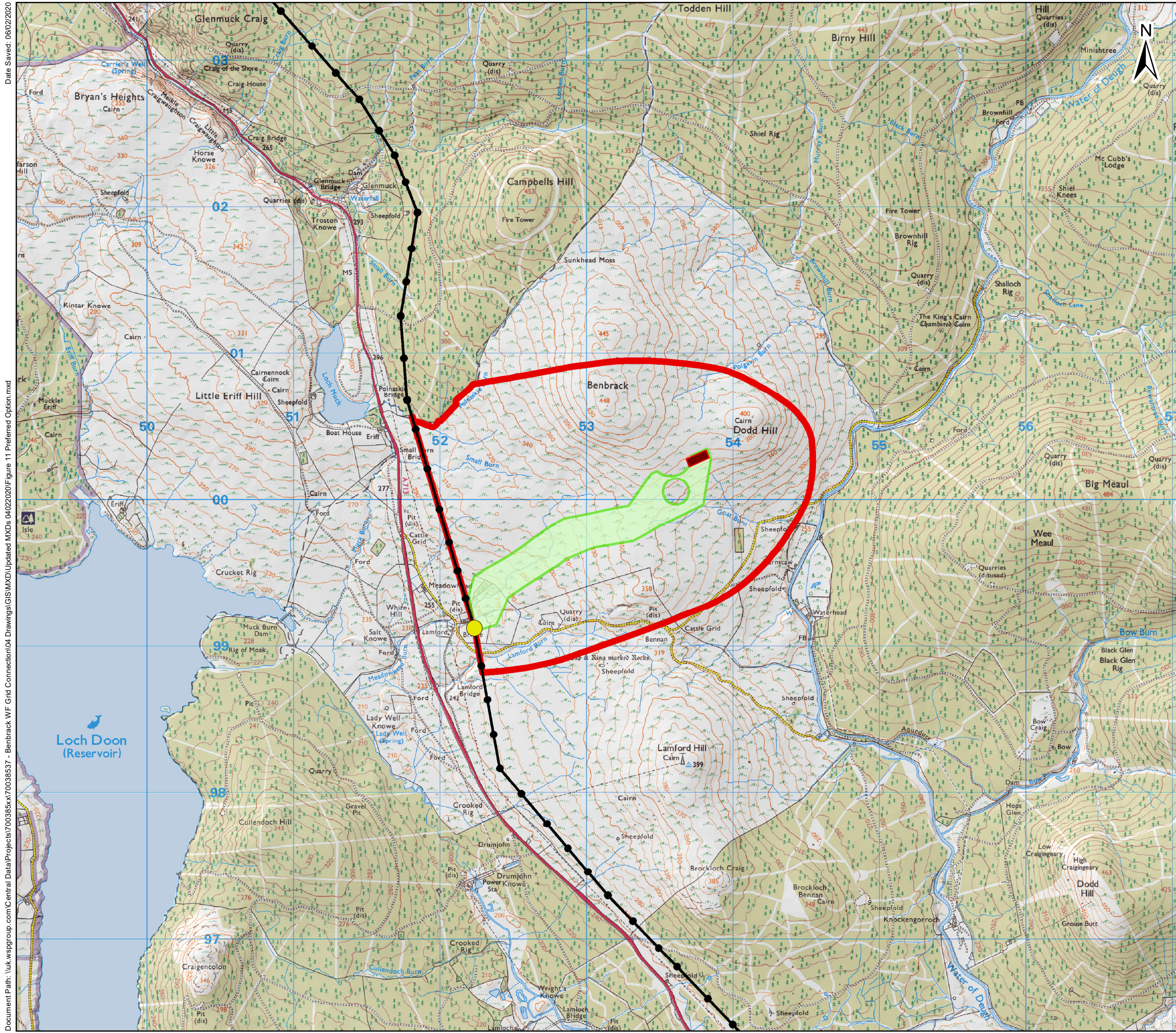
Client: SP ENERGY NETWORKS

Project: Benbrack

Title: Figure 10: Route options and strategic constraints

Date: 05/02/2020 Scale: 15,000 @ A3  
 Drawn: HT Checked: PM Approved: CS

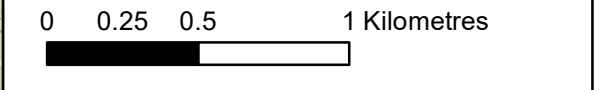





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**Key**

- Route Option Area
- T in point
- Wind Farm Substation
- DE Route
- Preferred Route





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Client:

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Project:

Benbrack

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Title:

Figure 11: Preferred Option

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Date:	06/02/2020	Scale:	25,000 @ A3
Drawn:	PM	Checked:	SR
		Approved:	BS

