

SP Energy Networks

**Knockodhar Wind Farm
132kV Grid Connection
Routeing and Consultation
Report**

Final report

Prepared by LUC

May 2021



**SP ENERGY
NETWORKS**

SP Energy Networks

Knockodhar Wind Farm 132kV Grid Connection Routeing and Consultation Report

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Chapter 1

Introduction

Purpose of this Report

1.1 This document has been prepared by LUC on behalf of SP Energy Networks (SPEN). It relates to the identification and appraisal of route options for a new 132 kilovolt (kV) overhead line (OHL) supported on wood poles, from the Knockodhar Wind Farm (WF)¹ substation to the proposed extension to the existing 132kV substation at Mark Hill (hereafter referred to as the 'Knockodhar 132kV Connection Project'). The location of the Knockodhar 132kV Connection Project is shown on **Figure 1.1**.

1.2 All figures submitted with this report illustrate the proposed Mark Hill Substation extension which is subject of a separate consenting process. The design, technical requirements and merits of the substation extension are not considered in this report. The proposed Knockodhar 132kV Connection Project will link into the proposed substation extension from the south through the use of an underground cable.

1.3 This report presents the methodology adopted for routeing the Knockodhar 132kV Connection Project, and the findings of the routeing study, culminating with the description of the 'preferred route' for the OHL connection. This report also sets out the process for the consultation which will be undertaken. This process is designed to gather feedback from stakeholders, including the public, to inform the subsequent stages of the Knockodhar 132kV Connection Project.

The Need for the Knockodhar Wind Farm 132kV Grid Connection

1.4 A request for a connection to the transmission grid has been received by SPEN via NGET from the developer of Knockodhar WF (120MW). Following consideration of the network in this area by SPEN, the proposed point of connection from the wind farm substation is to the Mark Hill collector substation via a 132kV OHL.

¹ Currently at Scoping stage, Energy Consent Unit reference ECU00002153

SPENs Statutory and Licence Duties

1.5 As a transmission licence holder for southern Scotland, SPEN² is required under Section 9(2) of the Electricity Act 1989 to:

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

1.6 SPEN is required in terms of its statutory and licence obligations to provide for new electricity generators wishing to connect to the transmission system in its licence area. SPEN is also obliged to make its transmission system available for these purposes and to ensure that the system is fit for purpose through appropriate reinforcements to accommodate the contracted capacity.

1.7 Schedule 9 of the Electricity Act 1989 imposes a further statutory duty on SPEN to take account of the following factors in formulating proposals for the installation of overhead transmission lines:

- *“(a) to have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features or special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and*
- *(b) to do what it reasonably can to mitigate any effects which the proposals would have on the natural beauty of the countryside or any such flora, fauna, features, sites, buildings or objects.”*

1.8 SPEN's 'Schedule 9 Statement' sets out how it will meet the duty placed upon it under Schedule 9. The Statement also refers to the application of best practice methods to assess the environmental impacts of proposals and to identify appropriate mitigation measures.

1.9 As a result of the above, SPEN is required to identify electrical connections that meet the technical requirements of the electricity system, which are economically viable, and cause on balance, the least disturbance to both the environment and the people who live, work and enjoy recreation within it.

The Development and Consenting Process

1.10 The Project comprises three key phases:

- Phase One: Routeing and Consultation.
- Phase Two: Environmental Appraisal.
- Phase Three: Application for Consent.

Phase One: Routeing and Consultation

1.11 This report relates to Phase One, which comprises a review of environmental, technical and economic considerations and the application of established step-by-step routeing principles to identify and appraise potential route options to establish a 'preferred' route for the OHL.

1.12 SPEN is committed to ongoing consultation with interested parties, including statutory and non-statutory consultees and local communities. Whilst there is no statutory requirement to consult during the early routeing stages, SPEN nonetheless considers it good practice to introduce consultation at this stage.

1.13 Responses to the consultation process will be evaluated and the 'proposed' route confirmed for progression to the next stage.

Phase Two: Environmental Appraisal

1.14 The Knockodhar 132kV Connection Project could be considered an EIA development under Schedule 2 of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. However, due to its nature, size and location with regard to the selection criteria for screening Schedule 2 development presented as Schedule 3 (Regulation 7(2)(a)) of the Regulations, an Environmental Impact Assessment may not be required.

1.15 Following confirmation of the Proposed Route, to determine whether the Knockodhar 132kV Connection Project is EIA Development, and therefore an EIA is required, SPEN will submit a request for a screening opinion to the Scottish Ministers in accordance with Regulation 8(1) of the Regulations. The request will be accompanied by the relevant information in accordance with Regulation 8(2) and 8(3) and will take into account the selection criteria in Schedule 3 and the findings of the work undertaken to date as part of the routeing process.

1.16 Should the Scottish Ministers determine that the Knockodhar 132kV Connection Project is not EIA development and that subsequent provisions of the EIA Regulations do not apply, SPEN will undertake an environmental appraisal in relation to key topics (to be agreed

² SPEN owns and operates the electricity transmission and distribution networks in central and southern Scotland through its wholly-owned subsidiaries SP Transmission plc (SPT) and SP Distribution plc (SPD). SP Transmission plc is

the holder of a transmission licence. The references below to SPEN in the context of statutory and licence duties and the application for section 37 consent below should be read as applying to SP Transmission plc

with consultees) and prepare a supporting Environmental Report to accompany the S37 application .

Phase Three: Application for Consent

1.17 Following completion of the Environmental Report, SPEN will apply to Scottish Ministers for consent under Section 37 of the Electricity Act 1989 ('the Electricity Act'), as amended, to install, and keep installed, the proposed OHL identified above. In conjunction with the Section 37 application, SPEN will apply for deemed planning permission for the OHL under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, as amended. The Environmental Report (or Environmental Impact Assessment Report if the Ministers deem the project to be EIA development) will accompany the application.

Stakeholder Engagement

1.18 Stakeholder engagement, including public involvement, is an important component of the Scottish planning and consenting system. Legislation and government guidance aim to ensure that the public, local communities, statutory and other consultees and interested parties have an opportunity to have their views taken into account throughout the planning process.

1.19 Striking the right balance can be challenging, and in seeking to achieve this SPEN recognises the importance of consulting effectively on proposals and of being transparent about the decisions reached. SPEN is keen to engage with key stakeholders including local communities and others who may have an interest in the Knockodhar 132kV Connection Project. This engagement process begins at the early stages of development of a project and continues into construction once consent has been granted.

1.20 SPEN's approach to stakeholder engagement for major electrical infrastructure projects is outlined in Chapter 5 of the document 'Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment' SPEN aims to ensure effective, inclusive and meaningful engagement with the public, local communities statutory and other consultees and interested parties through four key engagement steps:

- Information gathering to inform the routeing stage;
- Consultation on specific requirements;
- Obtaining feedback on the preferred route; and
- The Environmental Appraisal stage.

1.21 In addition, and as noted above, SPEN as a holder of a transmission licence, has a duty under Section 38 and Schedule 9 of the Electricity Act 1989, when formulating proposals for new electricity lines and other transmission development, to have regard to the effect of work on

communities, in addition to the desirability of the preservation of amenity, the natural environment, cultural heritage, landscape and visual quality.

1.22 Due to current COVID-19 restrictions regarding face to face interactions, the public consultation and stakeholder engagement will take place online using an online consultation hub developed by LUC. Further details in relation to the consultation process are provided in **Chapter 7**.

The Structure of the Report

1.23 This report comprises of the following chapters:

- **Chapter 1:** Introduction
- **Chapter 2:** Project Description
- **Chapter 3:** Approach to Routeing
- **Chapter 4:** Identification of Route Options
- **Chapter 5:** Appraisal of Route Options
- **Chapter 6:** Appraisal Findings
- **Chapter 7:** The Consultation Process and Next Steps

1.24 This report is also supported by figures and appendices, as listed in the contents page above.

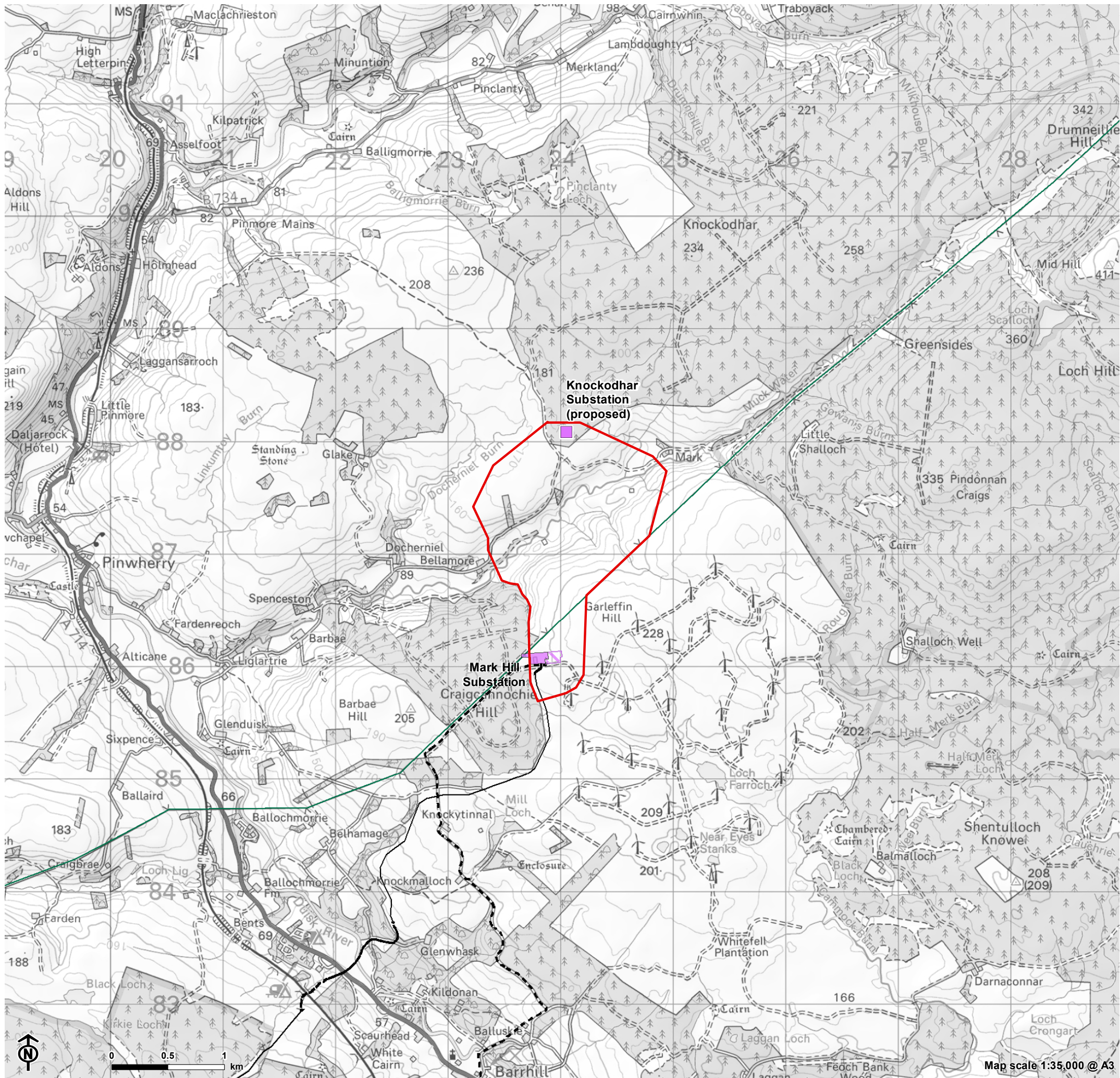


Figure 1.1: Location Plan

- Study area
- Substation
- Proposed Mark Hill Substation Extension
- Existing 275kV overhead line (OHL)
- Existing 132kV overhead line (OHL)
- 132kV UGC



Chapter 2

Project Description

Connection Requirements

2.1 A new 132kV overhead line is required to connect the Knockodhar Wind Farm into the Mark Hill substation. The proposed development is approximately 2.09km in length and will be supported on wood poles.

2.2 As part of the wider approach, a land right would be sought with each landowner for a corridor, typically 60m wide (30m either side of the centre of the OHL), to protect the resilience of the line from future development and from falling trees.

Overhead Line Infrastructure

2.3 With an overhead line of this nature, conductors (or wires) are suspended at a specified height above ground and supported by wooden poles, spaced at intervals.

2.4 Conductors can be made either of aluminium or steel strands. This connection will include one three-phase circuit with no earth wire and one of the phase conductors will incorporate a fibre optic cable for communication purposes. The fibre optic cable will be contained within the conductor.

2.5 Conductors are strung from insulators attached to the steelwork at the top of the poles and prevent the electric current from crossing to the relevant support.

Wood Pole Structure

2.6 The proposed OHL will be constructed using the Trident 'H' wood pole design with galvanised steelwork on top supporting aluminium conductors on insulators. Opportunities to use single poles will be taken where possible, subject to further technical assessment.

2.7 The proposed design is described below, and examples of typical wood pole designs are shown on **Figure 2.1**.

2.8 Wood poles can be used for single circuit lines operating at 132kV. Wood poles are fabricated from pressure impregnated softwood, treated with a preservative to prevent damage to structural integrity.

2.9 There are three types of wood pole structure, in terms of appearance:

- *Intermediate*: where the pole structure is part of a straight-line section;

- *Angle*: where there is a horizontal or vertical deviation in line direction of a specified number of degrees; and
- *Terminal*: where the overhead line terminates into a substation or on to an underground cable section via a separate cable sealing end compound or platform.

2.10 The maximum allowable angle deviations on single wood pole designs is 30 degrees, with deviations up to 75 degrees being permitted on 'H' poles. **Figure 2.1** illustrates both the single and H pole variants of the intermediate and angle poles.

Wood Pole Heights and Span Lengths

2.11 The 132kV OHL will be supported on trident wood poles. The typical height of trident poles above ground (including steel work and insulators) varies from 11m to 16m. In terms of the technical specification, the wood pole length range for trident poles is 10 m – 22 m. Once foundation depth (2.5 m) is subtracted and insulator height (1.6 m) included, the potential range of heights above ground is 9.1 m – 21.1 m.

2.12 The section of OHL between wood poles is known as the 'span', with the distance between them known as the 'span length'. Span lengths between wood poles average between 80m to 100m but can be increased if there is a requirement to span a larger distance due to the presence of a feature in the landscape such as a river or loch.

2.13 Wood poles are used to regulate the statutory clearances required for conductor height, which is determined the voltage of the OHLs (the higher the voltage, the greater the safety clearance that will be required) and the span length between wood poles.

Wood Pole Colouring

2.14 Wood poles are dark brown in colour when first erected and weather to a silver/grey after a period of about five years.

2.15 The wood pole top cross-arms are galvanised steel and support the aluminium conductors on stacks of grey insulator discs. Both the steelwork and aluminium will weather and darken after a few years.

Construction Process

2.16 The construction of OHLs can sometimes require temporary infrastructure such as temporary accesses to pole locations. All have limited maintenance requirements, and all are subject to well-established procedures for dismantling/ decommissioning.

Wood Pole Construction

2.17 The construction of the OHL will follow a well-established sequence of activities as outlined below:

- preparation of accesses;
- excavation of foundations;
- delivery of poles;
- erection of poles;
- delivery of conductor drums and stringing equipment;
- insulators and conductor erection and tensioning;
- clearance and reinstatement.

2.18 Prior to constructing the OHL, temporary working areas around each pole location will be required for foundation excavation and pole erection. Any vegetation that requires removal will be removed or lopped.

2.19 The erection of the wood poles will require a small excavation to allow the pole brace block and/or steel foundation braces to be positioned in place. A typical pole excavation will be 3m² by 2m deep. The excavated material will be sorted and stored and used for backfilling purposes. No concrete is required.

2.20 Poles are erected in sections, i.e. between angle support poles and/or terminal support poles. The insulator fittings, and wood poles forming the pole support, will be assembled local to the pole site and lifted into position utilising a tracked excavator which excavates the foundations. The pole foundation holes will then be backfilled, and the pole stay wire supports attached to the ground in preparation for conductor stringing, erection and tensioning.

Access

2.21 Temporary accesses to all pole locations will be taken from the existing main road network wherever feasible, with the use of selected unclassified roads also likely to be required. The use of existing tracks and watercourse crossings will be maximised, with the upgrading of these where necessary.

2.22 The initial preference when taking temporary access is to use low ground pressure vehicles and plant. Where access is required to be taken through any sensitive areas identified during the EIA process, other less intrusive methods such as temporary steel matting, or timber roadways may be employed.

2.23 The use of temporary stone tracks is normally minimal for wood pole connections. However, if required, all temporary tracks will be removed after commissioning with land being restored to its former condition.

Temporary Working

2.24 Temporary working areas will be required for the duration of the construction works. Temporary vehicular

access is required to every pole location. Wood pole locations will have a working area of approximately 30m x 15m and could also extend to accommodate conductor pulling if required.

2.25 In some cases, the shape or size of the working area will be determined by nearby environmental or land use constraints, identified during the EIA process / prior to construction. Each working area will be taped off to delineate the area for environmental protection reasons.

2.26 Following the completion of the construction works, the temporary working areas will be reinstated and restored to former conditions.

Construction Timescales

Construction and erection of a standard single pole generally takes approximately half a day depending on ground conditions and location, i.e. it may take more hours if the ground is softer. Angle poles and H-poles can take longer due to the need for 'stay wires' to stabilise the pole in the ground.

Operation and Maintenance

2.27 Whilst most OHL components are maintenance free, exposed elements which suffer from corrosion, wear, deterioration and fatigue may require inspection and periodic maintenance. OHL cables generally require refurbishment after approximately 40 years.

2.28 Any felled wayleave areas will also have to be managed to maintain the required clearances whilst the connection remains in service. Walkover surveys or flyovers will identify where there is a requirement to clear wayleaves of new growth.

Decommissioning

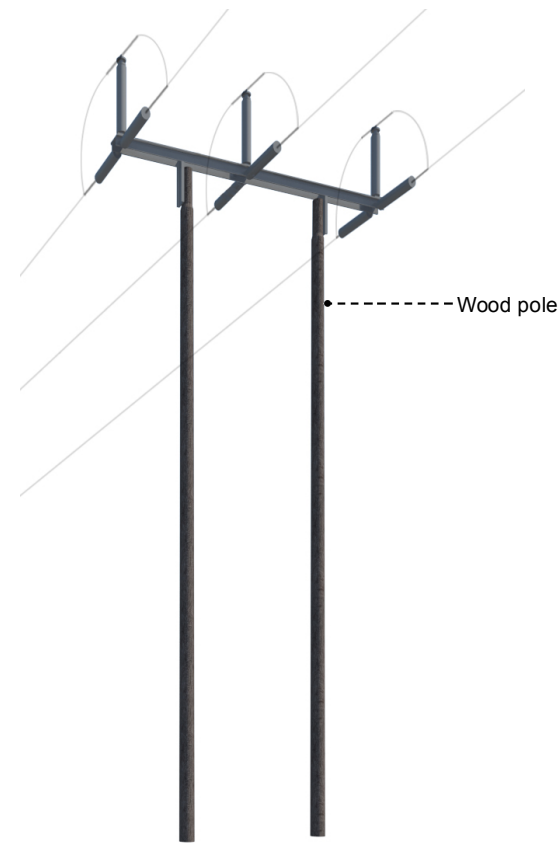
2.29 When the operational life of the proposed Knockodhar OHL comes to an end, it is possible that the line may be re-equipped with new conductors and insulators and refurbished. Alternatively, the OHL may be decommissioned fully.

2.30 Upon decommissioning of Knockodhar Wind Farm, the wood poles will be removed in their entirety, with components re-used where possible. All ground disturbance will be fully reinstated.

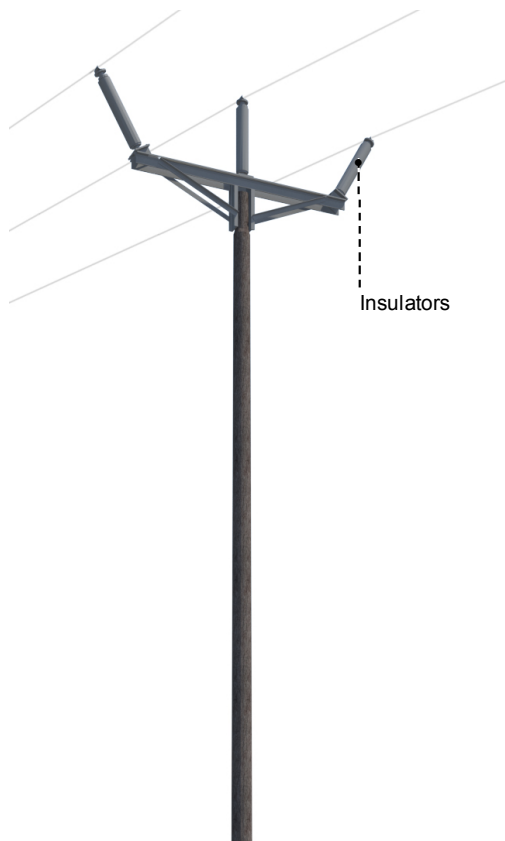
Figure 2.1: Typical Wood Pole Typical Wood Pole
(Component Parts of 132kV 'Trident' Design Wood Pole)



Component parts of 132kV 'Trident' design wood pole: Intermediate
(H pole)



Component parts of 132kV 'Trident' design wood pole: Angle (H pole)



Component parts of 132kV 'Trident' design wood pole: Intermediate



Component parts of 132kV 'Trident' design wood pole: Angle



Component parts of 132kV 'Trident' design wood pole: Terminal (H pole)

Chapter 3

Approach to Routeing

SPENs Overall Approach to Routeing

3.1 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.

3.2 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.

3.3 In 2015, SPEN published a summary document outlining the approach taken to routeing transmission infrastructure (Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment, SPEN 2015). This document is available at:

www.spenergynetworks.co.uk/pages/community_consultation.

The Knockodhar Windfarm Grid Connection Routeing Objective

3.4 In accordance with SPEN's approach to routeing, the routeing objective for the Knockodhar 132kV Connection Project is:

"To identify a technically feasible and economically viable route for a continuous 132kV overhead line connection supported on wood poles from the proposed wind farm at Knockodhar to the existing substation at Mark Hill. The route should, on balance, cause the least disturbance to the environment and the people, who live, work and enjoy recreation within it."

Established Practice for Overhead Line Routeing

3.5 SPEN's overall approach is based on the premise that the main effect of an OHL is visual, as a result of its scale relative to objects in the vicinity such as buildings and trees, and that as there is no technical way of reducing this other than choice of support (wood poles in this case), and only limited ways of achieving screening through planting, the most effective way of causing least visual disturbance is by careful

routeing. In addition, a well routed OHL takes account of other environmental and technical considerations, even if the length is increased as a consequence.

3.6 It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing OHLs, 'The Holford Rules', should continue to be employed as the basis for routeing high voltage OHLs. The Holford Rules were reviewed circa 1992 by the National Grid Company (NGC) Plc. (now National Grid Electricity Transmission Plc (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Rules. A subsequent review of the Holford Rules (and NGC clarification notes) was undertaken by Scottish Hydro Electric Transmission Limited (SHETL) in 2003 to reflect Scottish circumstances.

3.7 The Holford Rules and the NGC and SHETL clarification notes are included in **Appendix A**. These guidelines for the routeing of new high voltage overhead transmission lines form the basis for routeing the Knockodhar Windfarm Grid Connection. 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.

3.8 For simplicity, the methodology is set out in a linear manner (as shown in **Figure 3.1**), with the findings of each step informing the next step, building up an ever-increasing level of understanding to inform the routeing process. However, it is important to note that this process remains iterative, with the steps subject to a technical review and consultation where necessary. This enables assumptions to be confirmed and ensures confidence in the findings, prior to the commencement of subsequent steps

Overview of Routeing Process

Study Area

3.9 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

3.10 Statutory duties imposed by Section 38 and Schedule 9 of the Electricity Act 1989 require licence holders to seek to preserve features of natural and cultural heritage interest, and to mitigate where possible, any effects which their proposals 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):

- visual amenity;
- landscape character;
- ecology and ornithology;
- hydrology, hydrogeology, geology and water resources;
- cultural heritage; and
- land uses including committed development and forestry.

3.11 Some effects can be avoided or limited through careful routeing. Other effects are best mitigated through local deviations of the route, the refining of wood pole locations and/or specific construction practices. These are reviewed as part of the environmental appraisal process.

Technical Considerations

3.12 Technical considerations which can influence routeing include the existing and proposed electricity transmission network (such as the existing Tralorg 33kV OHL/underground cable connection, 11kV, 132kV and 275kV interconnector YW route), slope gradient, waterbodies, and windfarms.

3.13 In addition to the Knockodhar 132kV Connection Project, SPEN are also currently progressing the routeing and consultation strategy for the Clauchrie 132kV Connection Project, where both projects will connect into the proposed Mark Hill substation extension. The connection points into the southern end of Mark Hill substation will be considered through the detailed design process.

Economic Considerations

3.14 In compliance with the duties imposed on SPEN in terms of Section 9 of the Electricity Act 1989, the proposed route must be 'economically viable'. This is interpreted by SPEN as meaning that as far as is reasonably practicable, and all other concerns being equal, the line should be as direct as possible and the route should avoid areas where technical difficulty or compensatory requirements would render the scheme unviable on economic grounds

Identification and Appraisal of Route Options

3.15 Following identification of the study area a number of possible 'route options' for the Knockodhar Grid Connection Project are identified. This process involves the avoidance where possible of areas of highest '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.

3.16 Given the limited nature of areas of highest amenity value within the study area the process also includes the consideration of areas that are of more local importance and are smaller in scale, which may not necessarily be designated at an international or national level.

3.17 The study area also includes consideration of matters such as altitude and slope gradients, over which technical limitations would mean a route was unachievable.

3.18 The route options are then appraised against environmental criteria.

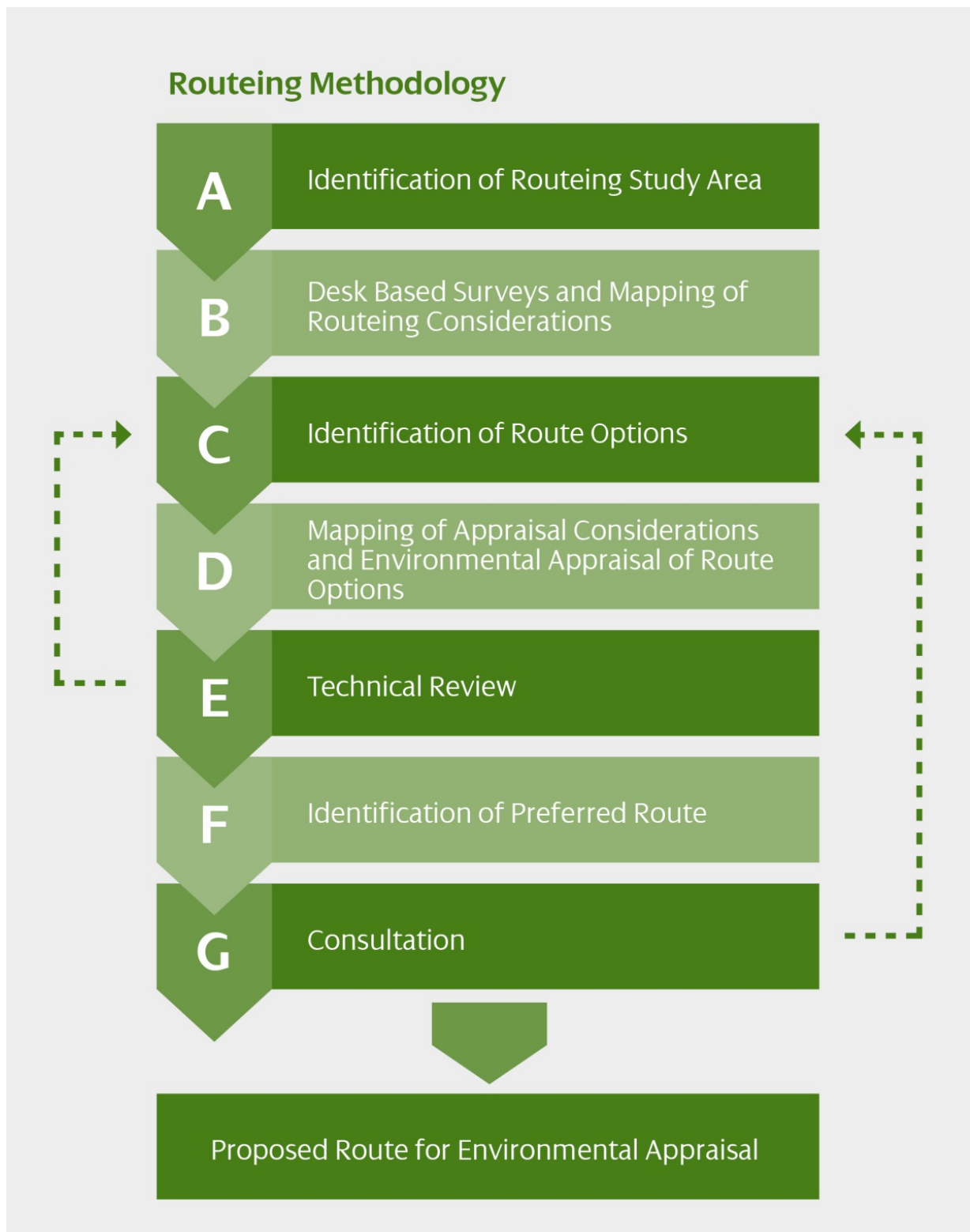
Selection of the Preferred Route

3.19 The environmental 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 (**Chapter 6**). At this stage the emerging preferred route is also subject 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.

3.20 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.

3.21 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.

Figure 3.1: Routeing Methodology



Chapter 4

Identification of Route Options

The Project Routeing Strategy

4.1 The routeing strategy, which has informed the identification and appraisal of the route options is:

“Route options will take account of the grain of the local landscape, making use of appropriate crossing points, woodland cover and the containing nature of the Muck Water valley landform to avoid areas of highest amenity value and sensitivity as far as possible. Proximity to residential properties and other forms of development within the study area will also require consideration to limit potential visual and cumulative effects.”

The Study Area

4.2 The first step in the routeing process involves identification of the study area, predominantly for the purposes of gathering data specific to the project area. In identifying the study area, it was important to ensure that this was large enough to accommodate all likely route options reflecting the Routeing Objective and Routeing Strategy.

4.3 On this basis, the study area was required to be able to accommodate a continuous 132kV OHL from the Knockodhar Wind Farm proposed substation to the existing Mark Hill substation.

4.4 A preliminary check was also carried out to identify the presence of International, European or Nationally Designated areas within or immediately adjacent to the study area, to ensure that potential effects on these areas could be considered. Taking account of the above, and also informed by topography, the maximum area across which the route options were likely to be located, was identified. The study area is shown in **Figure 4.1**

Study Area Description

4.5 The study area is within the council area of South Ayrshire and extends broadly from the proposed Knockodhar Wind Farm in the north to Mark Hill Windfarm in the south-east.

4.6 The landscape of the study area is largely defined by the pastoral valley of the River Muck and the upland plateaus to the north and south which include areas of open moorland and coniferous forest cover. The course of the River Muck generally flows from north-east to the south-west, flowing into

the Duisk River to the west and outside the study area. The elevation range across the study area is from approximately 100m AOD in the western reaches of the valley floor while the hill summits above include high points to the south at Garfellin Hill (228m AOD with summit just outside study area). The upland areas to the north and south comprise low rounded hills forming elevated plateaus.

4.7 The study area is characterised by a more elevated open valley landform with extensive areas of commercial conifer plantation to the immediate east, and which form part of the wider Galloway Forest Park (and Galloway Dark Skies Park) outwith the study area. The far western lower lying part of the study area generally comprises more settled agricultural valley. Much of the study area is located within the locally designated South Ayrshire Scenic Area (SASA). The SASA covers large parts of the Muck, Duisk and Stinchar River Valleys to the east of the Galloway Forest Park.

4.8 Settlement is relatively sparse with a number of scattered residential properties and farmsteads located along the unclassified road which runs close to the River Muck (crossing the river at Craigconnochie Burn) and links to the A714 to the west. Along the valley floor and from east to west properties include Mark and Bellamore. Both properties are just outside the study area extents and Bellamore appears to be uninhabited. The closest settlement is the village of Pinwherry, approximately 3.5km outside and to the west of the study area. The A714 and Glasgow South Western Railway runs to the west of the village.

4.9 In terms of land use the valley floor comprises mainly of agricultural land with areas of broadleaf and mixed woodland largely associated with the watercourses and residential properties. Loosely rectangular to irregular fields extend up the valley sides bound by post and wire fences and low stone walls.

4.10 Higher elevations are characterised by open moorland with large areas of commercial conifer plantation in the wider surrounding landscape outwith the study area.

4.11 In terms of existing development, Mark Hill windfarm extends across the elevated plateau, south of Garleffin Hill to the south-east of the study area. An existing 275kV overhead line supported by steel lattice towers extends north-east to south-west across the southern part of the study area along the northern slopes of Garleffin Hill. The overhead line connects to Mark Hill substation which is located close to the north-western edge of Mark Hill Windfarm within the eastern fringe of coniferous forest covering Craiccannoiche Hill.

4.12 In terms of recreational access there is an access track through the northern half of the study area which forks north leading to Pinmore Mains (outwith study area to north) and east leading to the property at Mark (just outwith the study area to the north-east).

Planning Policy Context

Local and Strategic Planning Policy

4.13 The Statutory Development Plan for the study area consists of:

- The South Ayrshire Local Development Plan (LDP) (adopted September 2014).
- Statutory Supplementary Guidance.

4.14 The LDP is a strategic land use plan that sets out strategic spatial priorities and policies for South Ayrshire and will secure land for specified uses (e.g. housing/industry etc.) to provide certainty for development.

4.15 The Council has adopted supplementary guidance which constitutes a material consideration, carrying the weight of the development plan. Non-statutory guidance is also available.

4.16 The preparation of the next Local Development Plan, LDP2 is far advanced, with adoption expected in 2021.

National Planning Policy

4.17 The Third National Planning Framework (NPF3)³, which was laid in the Scottish Parliament on 23rd June 2014, is the spatial expression of the Scottish Government's Economic Strategy and plans for infrastructure investment and development priorities over the next 20 to 30 years.

4.18 NPF3 strengthens the link between strategy and delivery through 14 national development priorities identified within Annex A. In relation to development priority number four of Annex A, 'An Enhanced High Voltage Electricity Network', the statement of need is as follows: *"These classes of development are needed to support the delivery of an enhanced high voltage electricity transmission grid which is vital in meeting national targets for electricity generation, statutory climate change targets, and security of energy supplies."*

4.19 In terms of the description of Classes of Development it includes, new or upgraded onshore electricity cabling of or in excess of 132kV. The OHL forming part of the Knockodhar Project constitutes national development. The need for the OHL is therefore established.

³ The National Planning Framework (2014) available [online] at: <<http://www.gov.scot/Publications/2014/06/3539>>

4.20 The updated Scottish Planning Policy (SPP)⁴

document was published in June 2014 and is a statement of Scottish Government policy on development and land use planning. Paragraph 156 states that “*strategic development plans should support national priorities for the construction or improvement of strategic energy infrastructure, including generation, storage, transmission and distribution networks.*”

4.21 National Planning Framework 4 (NPF4) is currently being reviewed by the Scottish Government and will incorporate SPP to allow spatial and thematic policies to be addressed in one document. NPF4 will have development plan status which will place a stronger emphasis on NPF4 policies in decision-making. It is expected that NPF4 will provide improved alignment with wider national programmes and strategies, which will include infrastructure and economic investment in addition to addressing the meeting of targets relating to the reduction of greenhouse gas emissions.

4.22 A draft NPF4 is targeted to be laid before the Scottish Parliament in Autumn 2021, with final adoption in Spring 2022.

Identification and Mapping of Routeing Considerations

4.23 The Holford Rules are broadly hierarchical, with Rule 1 deemed the first rule to be considered in routeing. Rule 1 relates to the avoidance, where possible, of “*major areas of highest amenity value*”. Holford Rule 2 makes the following recommendation: “*avoid smaller areas of high amenity value or scientific interest by means of deviation*”.

4.24 As the Holford Rules do not define what constitutes a major area (Rule 1), and the importance of the area is irrespective of size, smaller areas of highest amenity value were also mapped at this stage alongside larger areas.

4.25 The Holford Rules do not identify which designated areas constitute areas of *highest amenity value*. However, SHETL clarification note b) (see **Appendix A**) states that areas of highest amenity value “*require to be established on a project-by-project basis considering Schedule 9 of the Electricity Act, 1989*”, and provides examples to be considered.

4.26 In this routeing study, the term ‘environmental’ has also been used in place of ‘amenity’ (with the exception of residential amenity) to reflect more recent thinking which also seeks to recognise the intrinsic value of such areas.

4.27 There are no ‘areas of highest environmental value’ (Holford Rule 1) located within the study area, and therefore

national level designations have not been considered within this stage of the routeing process.

4.28 As noted in **Chapter 3**, additional considerations can be introduced into the appraisal to help inform the selection of a preferred route option. These may be of more local importance and smaller in scale. As there are no national level designations, “regional and local amenity value” have been included.

4.29 The SHETL note a) on Holford Rule 2 (see **Appendix A**) states these areas of “regional or local high amenity value” should be identified from Development Plans. For this routeing study, the other areas which have been considered are shown on **Figure 4.2** and include:

- Areas of Native woodland of Scotland (NWS) as defined by the National Woodland Survey of Scotland.
- National Forestry Inventory (NFI).
- Local Nature Conservation Sites (LNCS) (including provisional sites): a ‘catch-all’ term used to define various local nature conservation sites designated by local authorities. In most cases, these are designated as they represent a viable example of a habitat or species of conservation interest at a local level.

4.30 These have been mapped where present and treated as ‘avoid where possible’, or where not possible, ‘balance with other considerations’.

4.31 The South Ayrshire Scenic Area, as defined within the South Ayrshire Local Plan, covers the entire study area, therefore as this cannot be avoided during routeing it will be considered during the appraisal of route options.

4.32 The entire study area is within the Western Southern Uplands Environmentally Sensitive Area (ESA). It is therefore not possible to avoid the ESA, however the considerations outlined above will ensure that the objectives of the designation are not significantly affected. The ESA is therefore not shown on **Figure 4.2**.

4.33 Supplementary Note a) of the Rules relates to residential areas, stating “*avoid routeing close to residential areas as far as possible on grounds of general amenity*”.

4.34 There are no Settlements, defined as towns and villages identified within the Local Development Plan within the study area.

4.35 In this routeing report, residential properties have been mapped and included as areas of highest environmental

⁴ Scottish Planning Policy available [online] at:
<<https://beta.gov.scot/publications/scottish-planning-policy/pages/2/>>

value. The nearest property to the study area is Mark approximately 106m to the east.

4.36 Whilst it is recognised that proximity to properties is not an absolute constraint to routeing, a 150m 'trigger for consideration' has been mapped around each residential property to allow this proximity to be balanced with other considerations, while also helping identify possible 'pinch points'. This is shown on **Figure 4.2**.

4.37 At this stage all operational wind farms, wind farms with consent and those with valid planning applications were also mapped, as these form an environmental constraint to routeing as committed development and also as a technical constraint due to the requirement for a separation distance between turbines and the OHL. Turbines were mapped with a tip height plus 10% buffer included as 'avoid where possible' constraint to routeing. This is shown on **Figure 4.2**.

4.38 In addition to this, the 'wake effect' of wind turbines on overhead lines has been mapped through the application of a three times rotor diameter buffer being applied to the mapped turbine locations of the operational, consented and valid planning application wind farms. This is shown on **Figure 4.2**.

4.39 The existing and proposed overhead and underground line connection network, including the existing Tralorg wind farm 33kV OHL/underground cable connection, 11kV OHL, Arecleoch wind farm 132kV OHL and YY Route 275kV interconnector and the proposed Clauchrie OHL connection have been included as both an environmental and technical constraint. This is shown on **Figure 4.2**.

4.40 Furthermore, waterbodies including the Muck Water, Docherneil Burn and tributaries have also been included (and shown on **Figure 4.2**) as both an environmental and technical constraint.

Identification of Route Options

4.41 Given the nature of overhead transmission 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.

4.42 Holford Rules 1 and 2, as described above, formed 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.

4.43 Following a desk-based mapping exercise to define potential route options based on the environmental and technical constraints, a site visit was undertaken by LUC's landscape architects in August 2020 to further refine the potential route options for taking forward to the appraisal stage.

Description of Route Options

4.44 The identified route options are shown in **Figure 4.3** and described below. **Figure 4.3a** illustrates the route options in the context of the routeing considerations.

Route Option 1

4.45 From the proposed Knockodhar substation, this route option travels south and then south-west, along the upper valley side to the north of the Muck Water. The route then heads in a more south-easterly direction passing down steeper ground to the east of a block of coniferous woodland before crossing the minor road and Muck Water to the west of the ruined structure at Garleffin. The route option continues south climbing the southern valley side, to the immediate east of a short section of the Tralorg OHL, before linking into the existing Mark Hill substation to the south of the study area.

Route Option 2

4.46 From the proposed Knockodhar substation, this route option travels south along the upper valley side to the north of the Muck Water. The route continues south, crossing the minor road, passing down the valley side to the west of a block of coniferous woodland before crossing Muck Water to the east of the ruined structure at Garleffin. The route option continues south-east, south-west and then south climbing the southern valley side, to the immediate east of a short section of the Tralorg OHL, before linking into the existing Mark Hill substation.

Route Option 3

4.47 From the proposed Knockodhar substation, this route option travels south crossing the access track to Mark and following a subtle valley and tributary which feeds into the Muck Water. The route continues south crossing the Muck Water. On the southern valley side the route option continues south, south-west and then south climbing valley side to the immediate east of a short section of the Tralorg OHL, on its approach to Mark Hill substation.

Route Option 4

4.48 From the proposed Knockodhar substation, this route option travels south-east down the northern valley side crossing the access track to Mark. The route then travels south crossing the Muck Water to the west of the ruined

structure at Cawan. On the southern valley side the route option continues south-west and then south climbing valley side to the immediate east of a short section of the Tralorg OHL, on its approach to Mark Hill substation.

4.49 All route options will require a section of underground cable to connect the OHL to the Mark Hill substation.

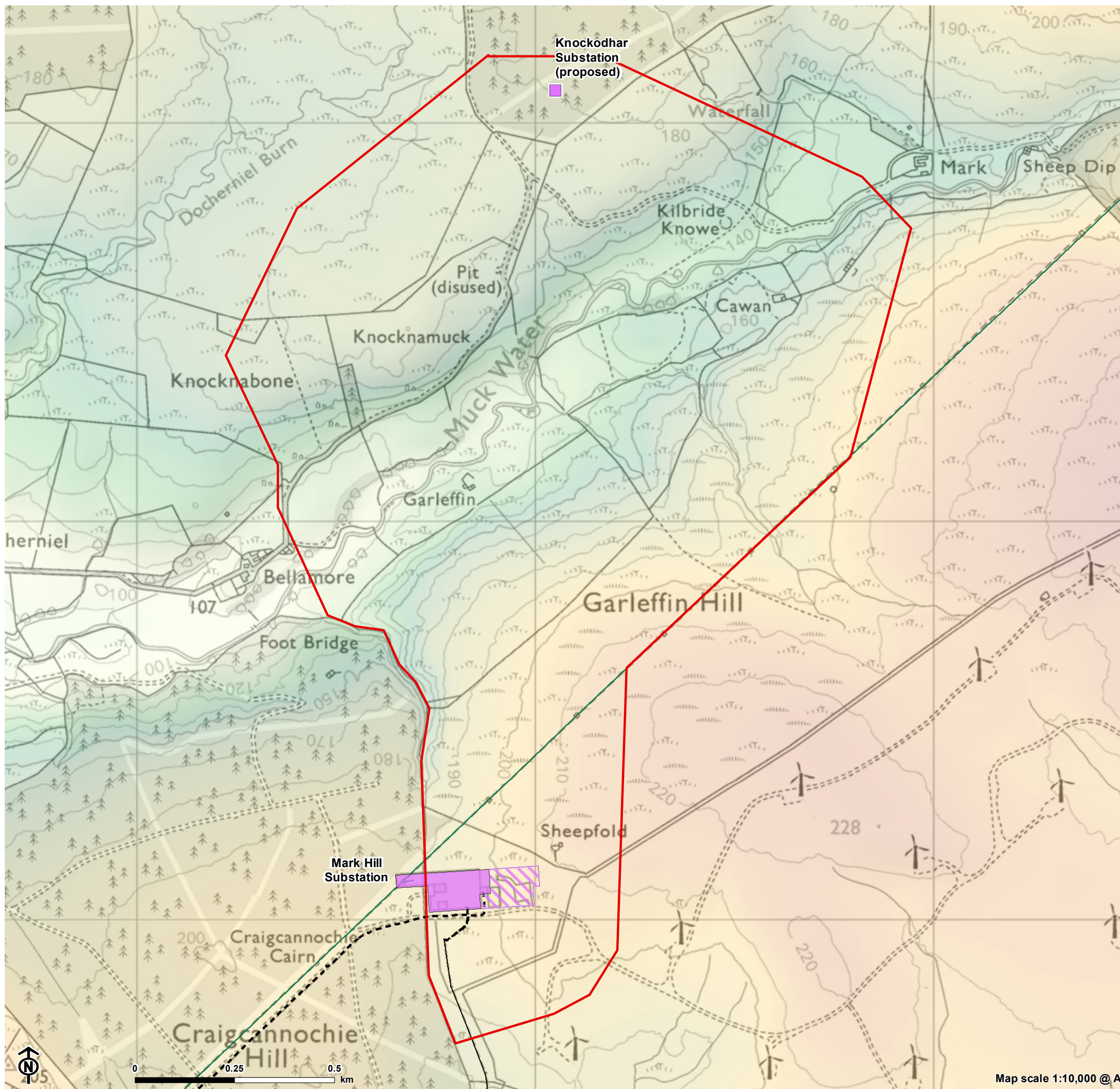


Figure 4.1: Study Area

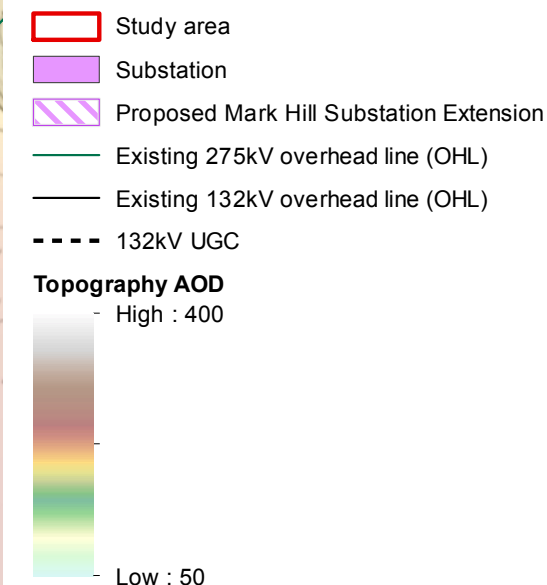
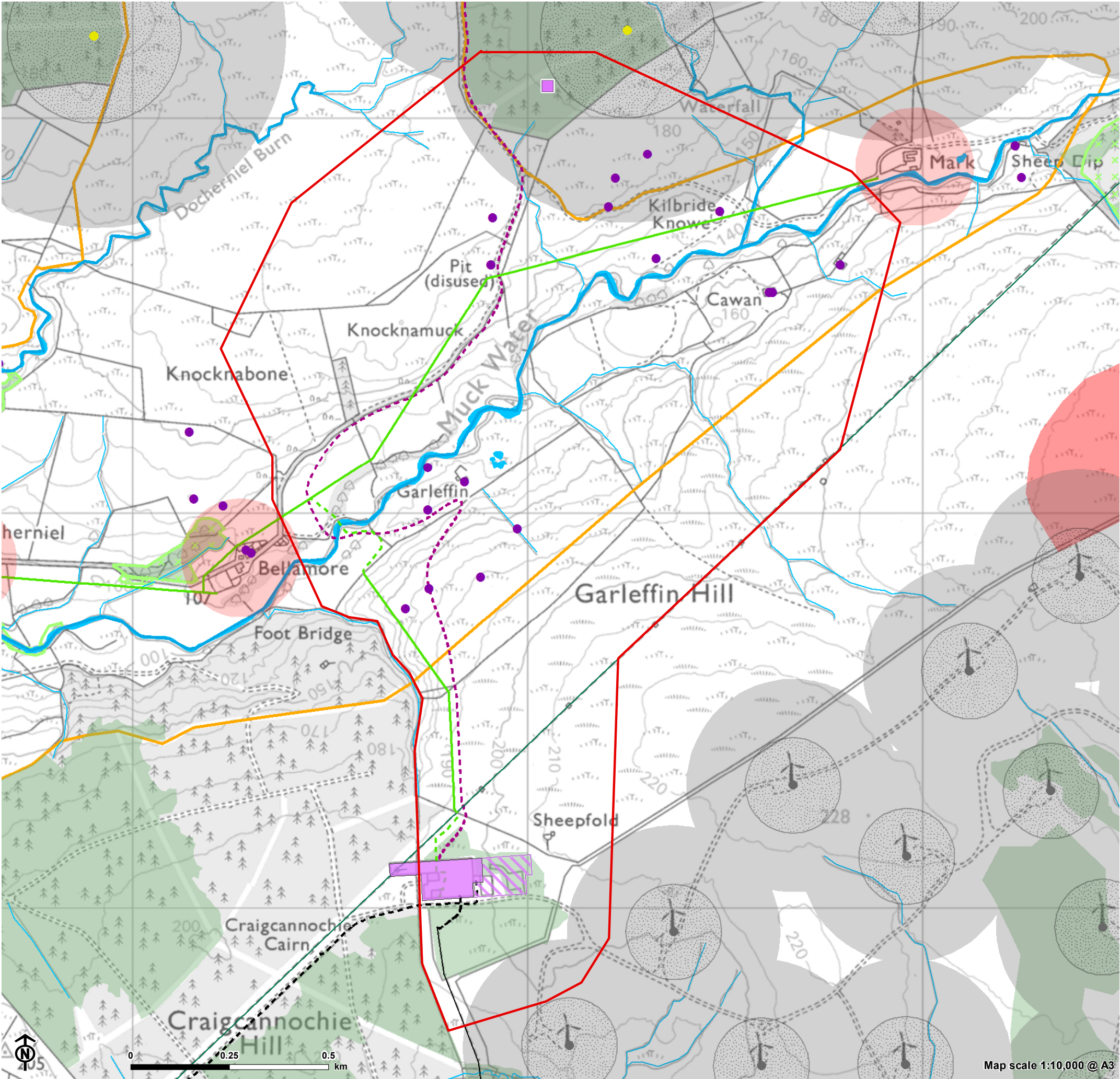
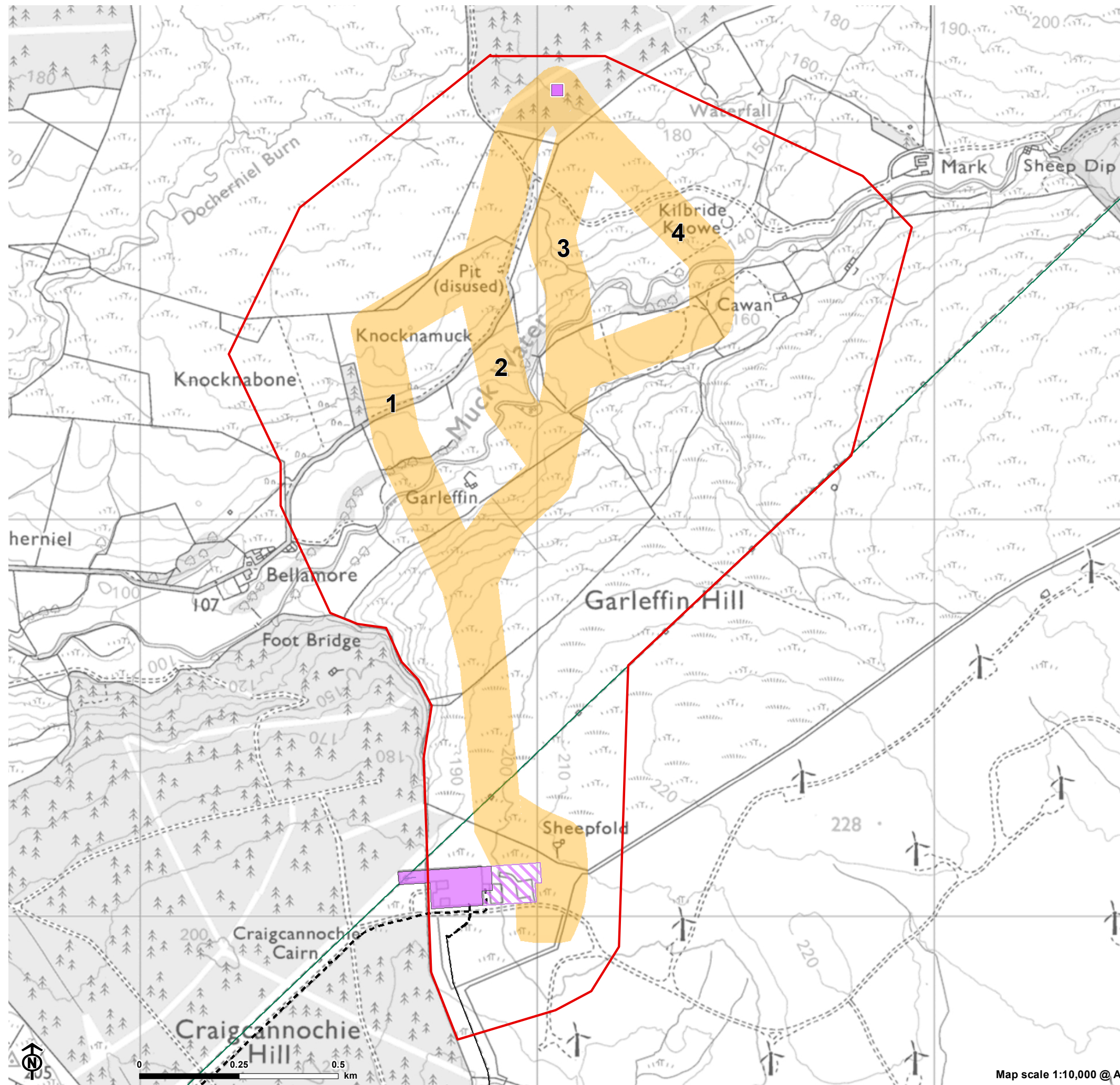


Figure 4.2: Routeing Considerations



- Study area
 - Substation
 - Proposed Mark Hill Substation Extension
 - Existing 275kV overhead line (OHL)
 - Existing 132kV overhead line (OHL)
 - 132kV UGC
 - 33kV UGC (Existing Tralorg Line)
 - 11kV OHL
 - 11kV UGC
- Routeing Considerations**
- Historic Environment Record
 - Carbon Peatland - Category 1
 - Local Nature Conservation Site
 - Native Woodland Survey of Scotland (NWSS)
 - National Forest Inventory (NFI)
 - Residential trigger for consideration 150m buffer
 - Wind Turbine - Operational
 - Wind Turbine - Design/Scoping
 - Turbine Topple Distance - Tip Height + 10%
 - 3 x Rotor Diameter (Wake Effect)
 - Watercourse

Figure 4.3: Route Options



- Study area
- Substation
- Proposed Mark Hill Substation Extension
- Existing 275kV overhead line (OHL)
- Existing 132kV overhead line (OHL)
- 132kV UGC
- Route Options

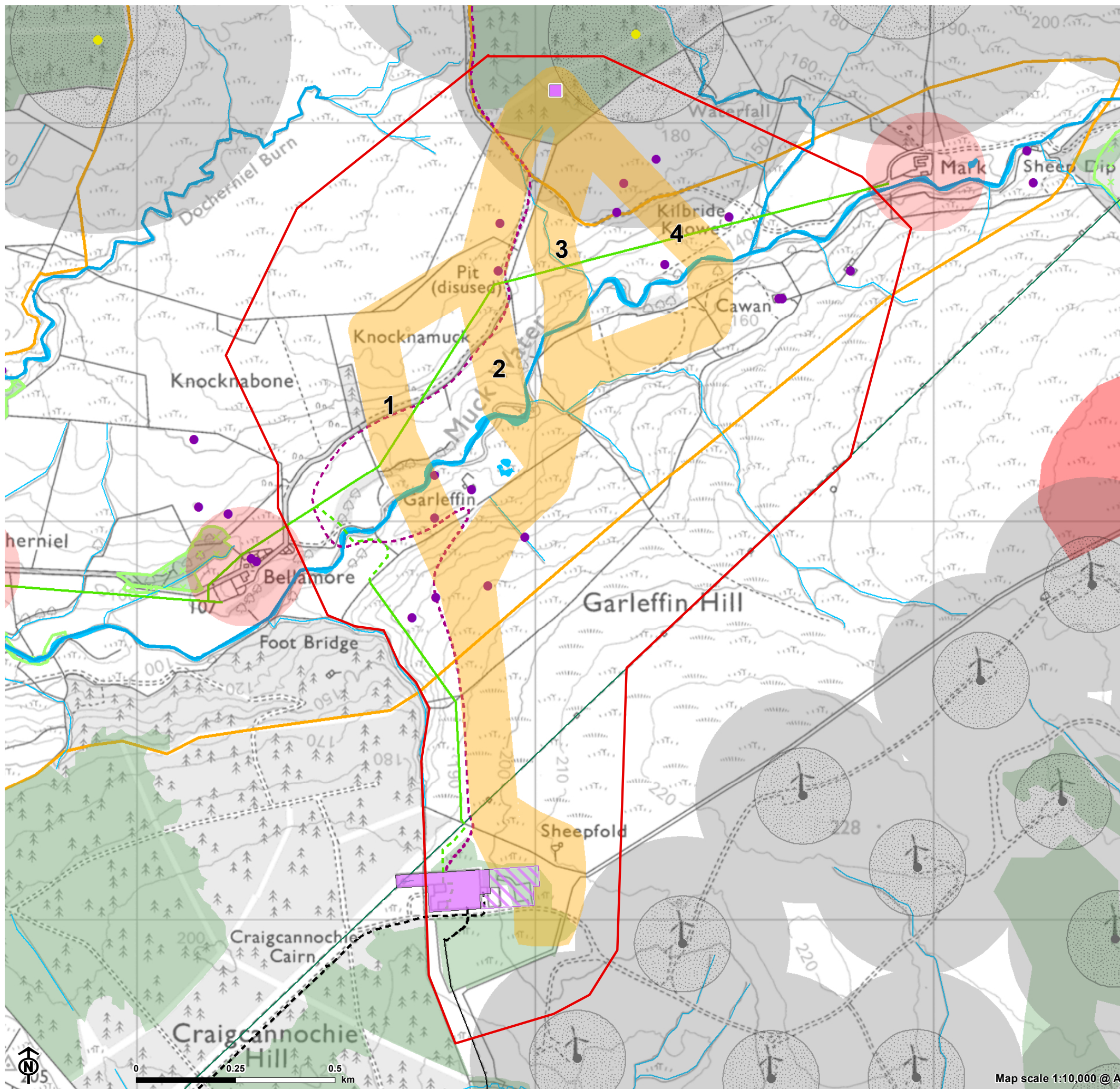


Figure 4.3a: Route Options

- Study area
 - Substation
 - Proposed Mark Hill Substation Extension
 - Existing 275kV overhead line (OHL)
 - Existing 132kV overhead line (OHL)
 - 132kV UGC
 - 33kV UGC (Existing Tralorg Line)
 - 11kV OHL
 - 11kV UGC
 - Route Options
- Routing Considerations**
- Historic Environment Record
 - Carbon Peatland - Category 1
 - Local Nature Conservation Site
 - Native Woodland Survey of Scotland (NWSS)
 - National Forest Inventory (NFI)
 - Residential trigger for consideration 150m buffer
 - Wind Turbine - Operational
 - Wind Turbine - Design/Scoping
 - Turbine Topple Distance - Tip Height + 10%
 - 3 x Rotor Diameter (Wake Effect)
 - Watercourse

Chapter 5

Appraisal of Route Options

Approach to Appraisal of Route Options

5.1 The objective of the appraisal of the route options was to identify a preferred route for the Knockodhar 132kV Connection Project, in a comparable, documented and transparent way to identify an overall preferred route option.

5.2 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.

5.3 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; and
- draw out distinctions between the routes to enable the relative strengths and weaknesses of each to be identified.

5.4 The comparative appraisal of route options was undertaken in stages as set out below:

- identification of appraisal criteria, together with their reasoning for inclusion;
- application of appraisal criteria to each route option, following the appraisal methodology;
- comparative appraisal of route options to identify a preferred route;
- SPEN technical review (of preferred route), reflecting system design requirements (**Chapter 6**); and
- cumulative appraisal with other OHL connections within the study area.

Appraisal Criteria

5.5 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 and Visual Amenity;
- Hydrology,
- Forestry;
- Biodiversity and Geological Conservation;
- Cultural Heritage; and
- Land Use;

5.6 The reasoning for the use of these criteria and an outline of the methodology for appraising each route option is set out below.

Length of Route Option

5.7 Holford Rule 3 states that “other things being equal choose the most direct line”. Although this rule primarily relates to avoiding sharp changes in direction, and therefore the need for more visually intrusive angle poles, choosing the most direct route may result in fewer adverse effects, than a longer, less direct route (taking due consideration of other constraints).

Landscape and Visual Amenity

5.8 Consideration of landscape sensitivity, with reference to both the susceptibility of the landscape to the type and scale of OHL development proposed and the value attributed to the landscape through formal designation or otherwise, using published baseline landscape character information.

5.9 The Nature Scot (formally SNH) digital map-based national Landscape Character Assessment (published in 2019) has been used as the basis for determining the susceptibility of Landscape Character Types (LCTs) across the study area. This was supplemented by information contained within published landscape capacity studies and observations made during fieldwork to appraise the relative landscape ‘fit’ of each broad corridor option.

5.10 The LCTs found across the study area are shown on **Figure 5.1**, and the findings of the landscape susceptibility appraisal are presented in **Appendix B**.

5.11 There are no landscape designations comprising ‘areas of highest environmental value’ (Holford Rule 1) within the study area. However, landscape areas of ‘high’ environmental value (Holford Rule 2), afforded landscape designation and protection at a local level (i.e. the South Ayrshire Scenic Area), is found across a relatively large proportion of the study area as shown on **Figure 5.2**.

5.12 Non-residential visual amenity as experienced by those in the wider landscape, e.g. travelling along roads/ tracks and working in the landscape, was also a factor in the appraisal of route options. This allowed consideration of topography, potential backclothing and visual prominence to be considered (similar to Holford Rule 4).

5.13 In relation to residential visual amenity, the following matters were considered: (1) the number of properties in proximity to the route option; (2) where the route option might encroach within the 150m ‘trigger for consideration zone’; and (3) the implications for principal views from individual properties.

5.14 Consideration was also given to tourism receptors such as promoted/ key recreational viewpoints and promoted routes such as core paths. No OS promoted viewpoints, Sustrans routes, core paths, long distance trails or known tourist attractions are within the study area (as shown on **Figure 5.2**).

Hydrology

5.15 In relation to potential conflicts with policy relating to flooding and to avoid potential increase to flood risk, SEPA flood zones were mapped using GIS. When appraising the route options, the ability to span the flood zone (average span of 100m for wood pole) was considered. The appraisal considered the potential to cross the flood zone at the narrowest point, all other environmental/ technical considerations being equal.

5.16 The waterbodies/watercourses, which the route options cross, or are in proximity to were also considered during the appraisal process.

Forestry

5.17 Forest areas within each of the route options were identified through the use of aerial photography, combined with digital data available from, NatureScot (formally SNH) and Scottish Forestry (SF) sources.

5.18 These forests were then divided into three groupings:

1. Conifer forest (NFI).
2. Ancient and Semi Natural Woodland sites (ASNW).
3. Native Woodlands from the Native Woodland Survey of Scotland (NWSS).

5.19 No areas of ASNWI or NWSS are found within the Study Area. The appraisal therefore only considered conifer forest (represented by the NFI dataset and verified onsite).

5.20 Appraisal against the forestry criterion comprised analysis of the extent and location of the conifer forest within the route options to identify net areas.

5.21 In general terms, the objective in identifying a preferred route is based on identifying the lowest impact for the conifer forest. This reflects the importance of the regional resource of this woodland type and as such, the implications of the proposed removal of this type of forest within the wayleave (area of forestry felled to accommodate the OHL).

5.22 Further consideration will also be given to minimising impacts on forestry at the route alignment stage, taking account of the need to create long term stable forest edges and to minimise impacts on any forestry management practices. During the alignment/Environmental Appraisal stage consideration will be given to conifer forest through:

- taking account of existing, and planned, windfarm boundaries to minimise sterilisation of commercial woodland areas and reduce the requirements for additional felling outwith the wayleave;
- taking account of forest design plans and liaising with forestry owners/managers to avoid, or reduce restrictions on forest management operations/techniques e.g. maintaining access to woodland blocks for harvesting/safety; and identification of opportunities to retain and/or plant particularly lower growing shrub species within the wayleave.

Biodiversity and Geological Conservation

5.23 There are no international or national designations (Ramsar, SPA, SAC and SSSI) within the study area (there are only regional/local designated sites which are outlined below).

5.24 The appraisal takes into account the Western Southern Uplands Environmentally Sensitive Area and the Muck Water Local Wildlife Site (LWS). The Muck Water LWS has been identified by SAC as being sufficiently distinct and/or representative of important local habitats to warrant policy protection.

5.25 The presence of NatureScot (formerly SNH) Priority Peatland Habitats (Class 1 and 2 peatlands) was also taken into account during the appraisal.

Cultural Heritage

5.26 There are no Scheduled Monuments, Listed Buildings, and Unscheduled Archaeology of likely National Importance within the study area. On this basis, the appraisal focusses on Unscheduled Archaeology of regional and local significance.

5.27 Potential effects of the OHL proposal on the setting of cultural heritage assets, have been assessed by initially identifying assets within 500m of the route option, and 'screening' the assets using professional judgement to identify

and appraise assets with the potential to experience an effect on their setting.

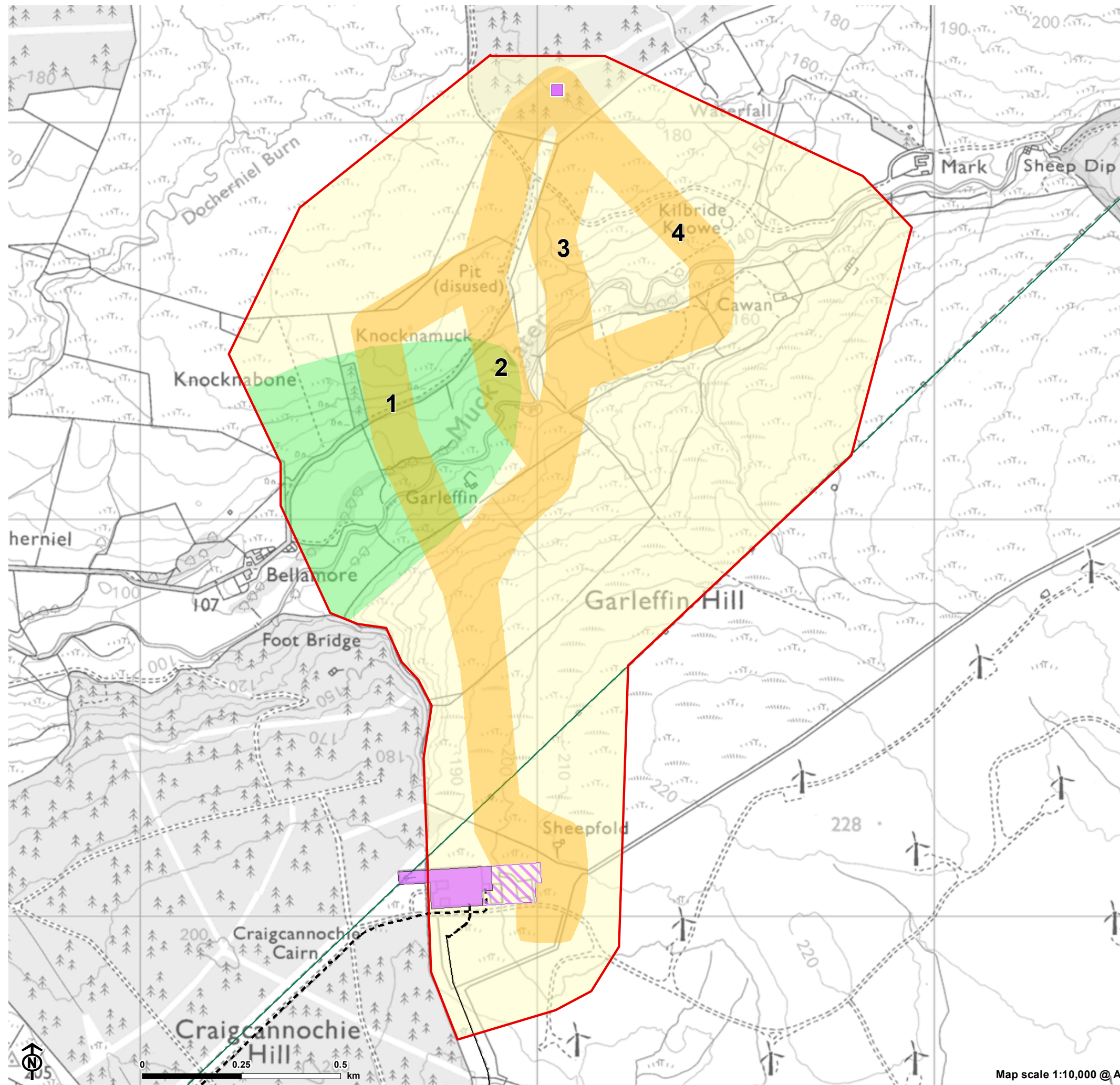
5.28 WoSAS (the provider of the HER data for the area), were contacted for data for route options appraisal on 5th October 2020 but had not yet replied at the time of report preparation, therefore the online mapping <https://www.wosas.net/mapsearch.html> and Historic Environment Scotland's <https://pastmap.org.uk/> were used and accessed on 16th October 2020.

Land Use

5.29 When appraising the route options, where a route was located within proximity to committed development, the implications of this for the alignment and/or subsequent environmental appraisal stage were highlighted. Existing and consented wind farms were also considered at this stage, with a 'trigger for consideration' zone of three times the rotor diameter placed around all turbines to account for the wake effect from the wind generated by the turbines as this can impact the OHL conductors if they are in the horizontal wind rose. A 'trigger for consideration' zone of the tip height plus 10% buffer was also placed around all turbines.

5.30 Committed development data has been obtained from South Ayrshire Council. With the exception of the proposed Knockodhar turbines, no areas of committed development within or in close proximity to the route options were identified.

Figure 5.1: Local Landscape Character Types



- Study area
- Substation
- Proposed Mark Hill Substation Extension
- Existing 275kV overhead line (OHL)
- Existing 132kV overhead line (OHL)
- 132kV UGC
- Route Options
- Local Landscape Character Type (LUC)**
- 1. Lower Pastoral Valley
- 2. Upper Valley and Plateau Moorland Fringes

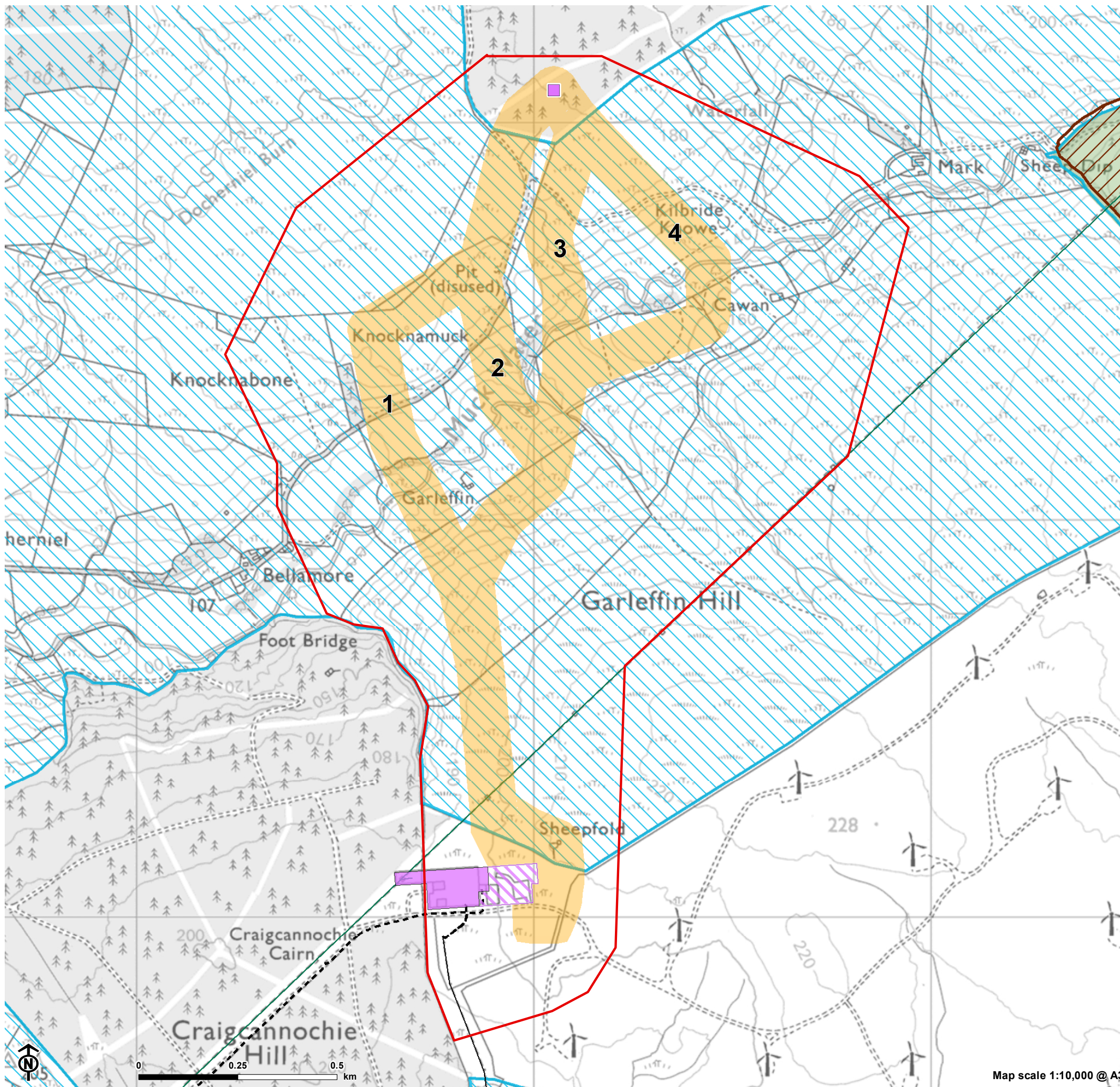


Figure 5.2: Local Landscape Designations

- Study area
- Substation
- Proposed Mark Hill Substation Extension
- Existing 275kV overhead line (OHL)
- Existing 132kV overhead line (OHL)
- 132kV UGC
- Route Options

Local Landscape Designations

- Scenic Areas South Ayrshire
- Galloway Forest Park
- Dark Skies Park - Dumfries and Galloway

Chapter 6

Appraisal Findings

6.1 The emerging preferred route for the 132kV overhead line (OHL), i.e. the preference taking account of environmental considerations only, is **Route Option 3**. Route Option 3 is the shortest route and has the best potential, relative to other options, to minimise visual effects on residential receptors and effects on the wider landscape during the route alignment stage of the Knockodhar 132kV Connection Project. Route Option 3 also has the potential, relative to the other options, to minimise effects on biodiversity and land use and is of equal preference in terms of cultural heritage and forestry.

6.2 Route Option 3 does, however, cross the greatest number of watercourses. Therefore, the route alignment of the OHL and construction processes will be required to avoid/minimise the hydrological effects on these watercourses.

6.3 The detailed appraisal findings are included in **Appendix C**.

Technical Review of Emerging Preferred Route Option

6.4 Following the environmental appraisal of route options (as evidenced in **Appendix C**), the emerging preferred route (Route Option 3) was reviewed by SPEN in relation to the system/network design requirements. This technical review was undertaken to ensure that, based on the level of detail available, the preferred route is within the technical parameters required to construct the OHL. This included consideration of the following parameters:

- **Altitude;**
- **Topography** (particularly slopes greater than 22 degrees however, slopes that were not greater than 22 degrees but steep in nature were also considered as these could be less favourable for routing);
- **Buildability access constraints** (including restrictive roads and forestry access tracks);
- **Crossings of existing OHL transmission and distribution infrastructure** (such as the existing Tralorg Wind Farm 33kV OHL/cable connection, and the existing 11kV OHLs and 275kV interconnector (YY Route) north of Mark Hill Substation.);
- **Proximity to existing OHL transmission and distribution infrastructure;**

- **Mineworking areas** (Opencast etc);
- **Ground conditions** (including peat);
- **Public service utilities** (crossings/ proximity) (including major pipelines);
- **Watercourse / Catchment areas crossings** (i.e. River, Loch, Reservoir);
- **Road / railway crossings along corridor**;
- **Windfarms** (existing and future developments);
- **Residential / Industrial areas**; and
- **Pollution** (consideration of corrosion rates).

6.5 Potential technical risks identified within the SPEN technical review include the presence of steep slopes greater than 22 degrees (maximum of 24.5% along the route), crossing the existing 11kV and 275kV OHL routes, and crossing the Muck Water; none of which were identified as high risk.

6.6 Overall, the technical review confirmed the emerging preferred route could be progressed to the cumulative appraisal stage as outlined below.

Consideration of Cumulative Effects of Emerging Route Option Preference

6.7 As set out in **Chapter 3**, the routeing process takes cognisance of other OHL connections which share the project study area. When considering more than one project, combined or cumulative effects can arise from the concentration of effects in one area or the distribution of effects across a wider area. It is therefore necessary to find an appropriate balance using professional judgement and experience. The other existing OHL connections considered in the cumulative appraisal comprise the existing Tralorg Wind Farm 33kV OHL connection (this connection is an underground cable, so unlikely to result in operational cumulative interactions of note), the 275kV interconnector (YY Route), north of Mark Hill Substation, as well as an 11kV OHL which passes through the Study Area.

6.8 In conjunction with the Knockodhar 132kV Connection Project, SPEN are currently progressing the routeing and consultation strategy for the Clauchrie 132kV Connection Project. Both projects will link into the Mark Hill substation and will be consulted on at the same time.

6.9 Following technical confirmation of the emerging route preference, an environmental review was undertaken to consider the existing 275kV OHL, Tralorg UGC and Clauchrie OHL in combination with the emerging preferred Route Option 3.

6.10 The environmental review found that the emerging preferred route would require crossing the existing 275kV OHL on the approach to Mark Hill substation. It is likely that cumulative interactions with the proposed Clauchrie 132kV Connection Project be localised in the area where both OHLs will link into the Mark Hill Substation extension to the south of the study area. The emerging preferred route would also require crossing the existing 11kV OHL at some point north of Muck Water. The emerging preferred route would also run parallel to a further short section of 11kV OHL, which runs north of Mark Hill Substation.

6.11 Overall, there are no likely significant cumulative effects which will prevent Route Option 3 from being progressed further. Cumulative effects will, however, continue to be considered, and assessed where appropriate, throughout the alignment and environmental appraisal stages.

Conclusion

6.12 In accordance with the overarching project routeing strategy, the selection of the preferred route has primarily reflected the findings of the landscape and visual appraisal, including residential amenity, subject to avoiding areas of highest amenity value. This is on the basis that the routeing stage comprises the most effective way of avoiding and/or minimising potential landscape and visual effects, whereas effects on other environmental characteristics such as ecology can be more readily minimised during the route alignment stage (and potentially through adoption of mitigation measures).

6.13 On this basis, the environmental and technical appraisal undertaken as part of the routeing process has identified a continuous 132kV OHL route which meets the project routeing objective. The preferred route is confirmed as Route Option 3 and is shown in **Figure 6.1**. The preferred route, along with the alternative route options considered, form the basis of this round of consultation with stakeholders and the public. Further details in relation to the consultation process are provided in **Chapter 7**.

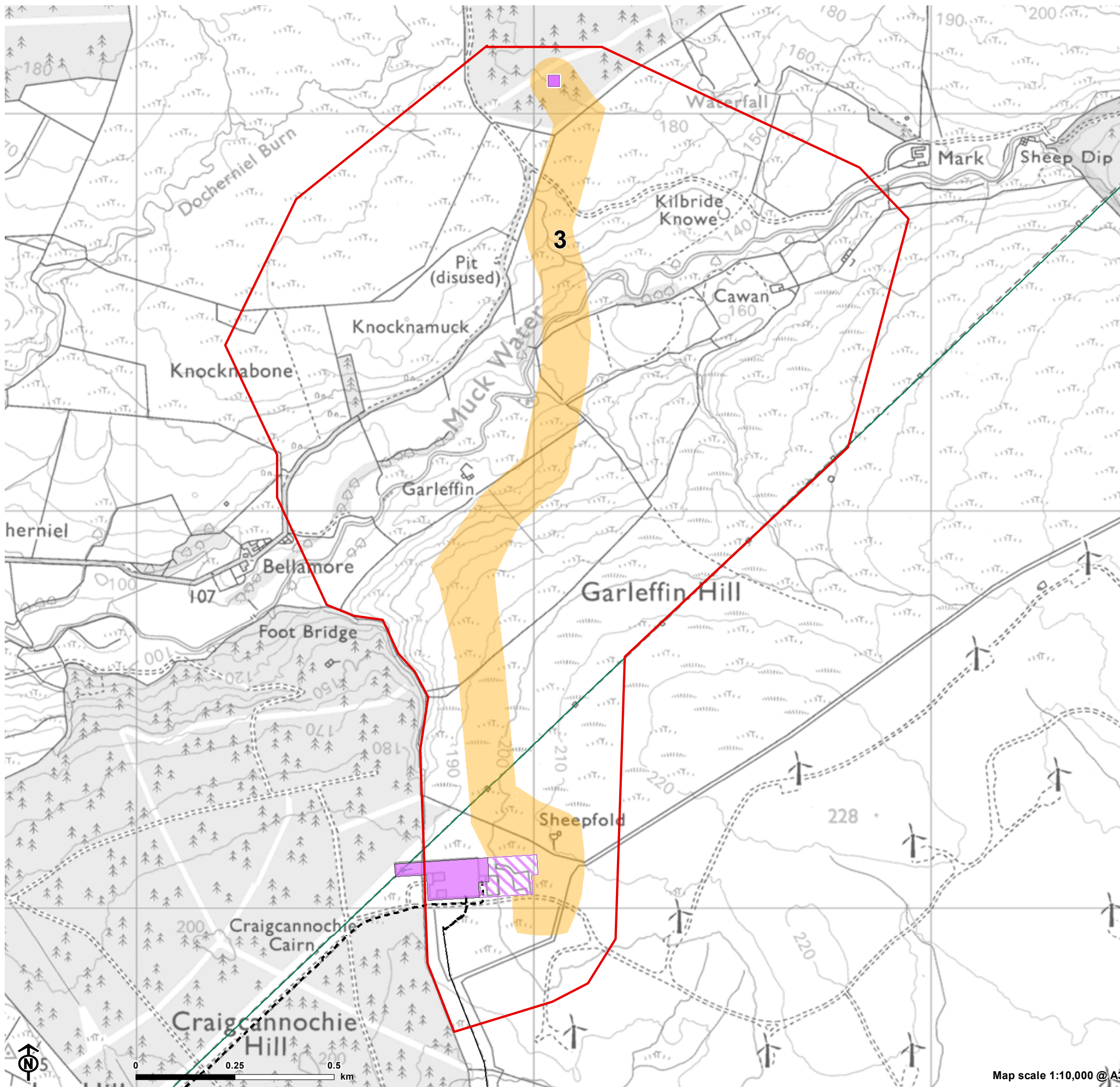


Figure 6.1: Preferred Route

- Study area
- Substation
- Proposed Mark Hill Substation Extension
- Existing 275kV overhead line (OHL)
- Existing 132kV overhead line (OHL)
- 132kV UGC
- Preferred Route**
- Route Option 3

Chapter 7

Consultation Process and Next Steps

The Consultation Process

7.1 As set out in **Chapter 1**, SPEN will apply to the Scottish Ministers for consent to install and keep installed the new 132kV overhead electricity line from the proposed Knockodhar Wind Farm (WF) (currently at Scoping stage, Energy Consent Unit reference ECU00002153) substation to the proposed 132kV substation extension at Mark Hill under Section 37 of the Electricity Act 1989. SPEN will also apply for deemed planning permission for the line and associated works under Section 57(2) of the Town and Country Planning (Scotland) Act 1997. While there are no formal pre-application requirements for consultation in seeking section 37 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.

7.2 Therefore, prior to the submission, SPEN is carrying out consultation with stakeholders and the public.

7.3 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 South Ayrshire Council.

7.4 As set out in **Chapter 6**, SPEN will also be undertaking consultation for the Clauchrie 132kV OHL Connection Project at the same time as the Knockodhar 132kV Connection Project.

Consultation Strategy

7.5 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 to help it develop the Knockodhar 132kV Connection Project in the best way.

7.6 The overall objective of the consultation process is to ensure that all parties with an interest in the Knockodhar 132kV Connection Project continue to have access to up to date information and are given clear and easy ways in which to shape and inform SPEN's proposals at the pre-application stage.

7.7 In addition, it is envisaged that the key issues identified through this process can be recorded and presented to decision makers to assist the consents process.

7.8 As part of the consultation strategy, SPEN will be holding virtual exhibitions for the public, stakeholders and consultees. Details of the consultation process are set out below.

Consultation Launch and Duration

7.9 The consultation will run for four weeks from May 17th until June 14th 2021.

7.10 Prior to the consultation, an advert will appear in the Ayr Advertiser (a local weekly newspaper) on Tuesday 4th May 2021. The advert provides information on the project, where and when the consultation will take place and confirms that comments received at this stage are informal comments to SP Energy Networks, with the opportunity to comment formally to the Energy Consents Unit (ECU) available once an application has been submitted to them. A copy of the advertisement text as publicised in the local newspaper is provided in **Appendix D**.

7.11 Leaflets have also been distributed to local properties which are located within 5km of the study area. The leaflet distributed is contained in **Appendix E**.

7.12 The closing date for sending responses to SPEN will be midnight on Monday 21st June 2021. Following this date, the information will remain accessible online (on the project website) and available to download (from the project website and the online virtual exhibition).

Consultees

7.13 SPEN wishes to consult with relevant stakeholders and gain their views on the proposed route of the Knockodhar 132kV Connection Project. The consultation will seek to gain views from the following broad groups:

- statutory and non-statutory consultees, including community councils;
- known local interest and community groups operating in South Ayrshire Council area;
- elected members of South Ayrshire Council area, the Member of Parliament (MP) and Members of the Scottish Parliament (MSPs) whose constituencies are within in the South Ayrshire Council area; and
- local residents, businesses and the public in general.

7.14 As noted above, leaflets have been distributed to local residents. Email correspondence has been sent to relevant stakeholders advising them of the consultation and seeking their views on the proposals. The list of stakeholders consulted can be found in **Appendix F**.

The Focus of the Consultation

7.15 This report presents the findings of Phase One of the Knockodhar 132kV Connection Project, the routeing process, resulting in the identification of a preferred route.

7.16 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 Information about the Consultation

7.17 The principal source of information regarding the consultation will comprise the Knockodhar 132kV Connection Project website and the online virtual exhibition.

Project Website

7.18 The website www.spenergynetworks.co.uk/KnockodharOHL will contain publicly available consultation documents for viewing or download.

Online Virtual Exhibition

7.19 Given the current social distancing restrictions due to the Covid-19 pandemic, it has not been possible to hold in-person public exhibitions. Therefore, as a form of good practice, SPEN will hold a virtual public exhibition from May 17th 2021 – 14th June 2021 as an alternative to face-to-face consultation. Although this is not a statutory consultation requirement, it remains in line with recent Scottish Government Guidance⁵.

7.20 The online exhibition will include a series of information boards outlining details of the Knockodhar 132kV Connection Project. The information on the Knockodhar 132kV Connection Project will also be available to download as a pdf.

7.21 Visitors to the online exhibition will have the opportunity to provide feedback by completing an online questionnaire or

⁵ Scottish Government, 2020, 'Covid 19 Emergency and Pre-Application Consultation and Requirements for a Public Event', Available [online] at:

<https://www.gov.scot/publications/coronavirus-covid-19-planning-guidance-on-pre-application-consultations-for-public-events/>

contacting SPEN via the project email
knockodharOHL@spenergynetworks.co.uk.

How People can make a Comment

7.22 People will be able to submit comments:

- at the virtual exhibition via the online survey and questionnaire; or
- by email.

At the Virtual Exhibition

7.23 Visitors to the online exhibition will have the opportunity to provide feedback by completing an online survey and questionnaire. The closing date for sending responses will be midnight on Monday 21st June 2021. Following this date, the information will remain accessible online and available to download.

E-Mail

7.24 SPEN will also accept comments relating to the specific focus of this round of consultation by e-mail to KnockodharOHL@spenergynetworks.co.uk no later than midnight on Monday 21st June 2021.

Next Steps: Route Alignment and Environmental Appraisal

7.25 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.

7.26 The proposed route will then progress to identify an OHL alignment, including individual pole positioning which will be informed by the Environmental Appraisal⁶ detailed engineering ground surveys and discussions with landowners. This alignment, including all ancillary development will be included in the application for Section 37 Consent and deemed planning permission.

7.27 SPEN will consult fully with affected landowners and occupiers on all aspects of the Knockodhar 132kV Connection Project and will give them an opportunity to comment on proposals as they progress.

⁶ Subject to the Scottish Ministers confirming the Project does not require an EIA.

Appendix A

The Holford Rules and SHETL Clarification Notes

The Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines (with NGC 1992 and SHETL 2003 Notes)

Rule 1

Avoid altogether, if possible, the major areas of highest amenity, 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 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 Guidelines⁷, 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)⁸

Special Protection Area (NPPG 14)⁹

Ramsar Site (NPPG 14)¹⁰

National Scenic Areas (NPPG 14)¹¹

National Parks (NPPG 14)¹²

National Nature Reserves (NPPG 14)¹³

Protected Coastal Zone Designations (NPPG 13)¹⁴

Sites of Special Scientific Interest (SSSI) (NPPG 14)¹⁵

Schedule of Ancient Monuments (NPPG 5)¹⁶

Listed Buildings (NPPG 18)¹⁷

Conservation Areas (NPPG 18)¹⁸

World Heritage Sites (a non-statutory designation) (NPPG 18)¹⁹

Historic Gardens and Designed Landscapes (a non-statutory designation) (NPPG 18)²⁰

⁷ The National Planning Policy Guidelines ("NPPG") have been superseded by the Scottish Planning Policy ("SPP") published on 23 June 2014. The references to the relevant equivalent paragraphs of the SPP are noted.

⁸ Now noted in SPP paragraph 207.

⁹ Now noted in SPP paragraph 207.

¹⁰ Now noted in SPP paragraph 211.

¹¹ Now noted in SPP paragraph 212.

¹² Now noted in SPP paragraph 212.

¹³ Now noted in SPP paragraph 212.

¹⁴ Now noted in SPP paragraph 87.

¹⁵ Now noted in SPP paragraphs 211-212.

¹⁶ Now noted in SPP paragraph 145.

¹⁷ Now noted in SPP paragraph 141.

¹⁸ Now noted in SPP paragraph 143.

¹⁹ Now noted in SPP paragraph 147.

²⁰ Now noted in SPP paragraph 148.

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. *Impacts 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 landuses have to some extent adjusted to its presence, particularly in the case of commercial forestry, then the 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 impacts 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 impacts on the amenity of existing development and on proposals for new development.
- c. When siting substations take account of the impacts 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 entitled *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 house, 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 impacts on existing land use and rights of way.
- d. Alternative designs of substation may also be considered, e.g. 'enclosed', rather than 'open', where additional cost can be justified.
- e. Consider the relationship of tower 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 impacts of line connections that will need to be made.

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, or 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 license 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 NPPG5: 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 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 Listed Buildings. None of these documents define setting.

ENVIRONMENTAL AND PLANNING DESIGNATIONS – EXAMPLES OF DESIGNATIONS TO BE TAKEN INTO ACCOUNT IN THE ROUTING 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 Policy Guidelines²¹:

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 Designated 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

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

²¹ See footnotes under Holford Rule 1 (note on Rule 1) for references update.

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.

Area of Historic, Archaeological or Architectural Value

4. Certain designations covering more limited areas are of relevance to the protection of views and the settings of towns, villages, buildings or 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 Designated Landscapes included in the Inventory of Gardens and Designated Landscapes of Scotland

Green Belts

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

Appendix B

Landscape Susceptibility Appraisal

Appraisal of Landscape Susceptibility to OHL Development


B.1 Landscape susceptibility is assessed with reference to the existing landscape characteristics and attributes of the landscape. Accordingly, the NatureScot (formerly SNH) web based 2019 Landscape Character Assessment has been used as the basis for determining landscape susceptibility across the study area. The following regional Landscape Character Types (LCT) fall within the study area and are mapped on **Figure 5.1**:

- Pastoral Valleys – Ayrshire (72); and
- Plateau Moorland – Ayrshire (78).

B.2 The regional landscape character assessments have been reviewed and refined to provide a finer grain landscape assessment of the study area, subdividing this into Local LCT (refer to **Figure 5.1**). This local landscape character assessment has been verified through fieldwork and provides a useful assessment tool for this routeing appraisal.

B.3 Each Local LCT which is potentially affected by a route option has been evaluated (on its susceptibility to being changed by OHL development of the type proposed) and categorised as having **higher to lower** susceptibility. The application of professional judgement in the use of the Local LCT also draws on the principles set out in the Holford Rules. Indicators of the relative levels of landscape susceptibility to accommodate OHL development are shown in the table below:

Table B.1: Indicators of Landscape Susceptibility


Susceptibility	Definition
Higher	Landscape character, existing land use, pattern, scale and attributes are vulnerable to being changed or lost resulting from the introduction of OHL development. Key perceptual and aesthetic characteristics are vulnerable to change or loss.
Medium	
Lower	Landscape character, existing land use, pattern, scale and attributes are robust and tolerant of the change resulting from OHL development. The change could be accommodated without geographically extensive and/ or significant adverse effects on (or loss of) key perceptual, physical or aesthetic characteristics.

B.4 For each Local LCT, the key characteristics are analysed to inform an overall judgement on the Local LCT's susceptibility to OHL development (refer to **Figure 5.1**). The following table outlines the rational for determining landscape susceptibility in relation to key landscape characteristics:

Criteria	Characteristics indicating a lower susceptibility to OHL development	Characteristics indicating a higher susceptibility to OHL development
Landform and Scale	Flatter or gently undulating landscapes Broad valley landscapes Larger scale landscapes	Steep, complex landscapes Complex topography Intimate scale landscapes
Landcover and pattern	Arable, pasture, rough grassland Moorland Simple patterns Landcover which can recover quickly/ does not require complex engineering solutions	Continuous woodland Bog, peat, wetlands Complex patterns Landcover which recovers slowly/ requires complex engineering solutions
Human influence	Industry, arable farming, presence of large built structures, disturbed areas Landscapes which have experienced a higher level of human influence More developed/ managed landscapes	Remote landscapes Areas with natural characteristics Landscapes with little evidence of human influence
Visual experience	Interrupted horizons Simple skylines	Uninterrupted horizons Distinctive/ complex skylines
Settlements	Industrial Sparsely settled arable	Residential Dense patterns of isolated farmstead/ small scale settlements


B.5 The following table presents LUC's appraisal of landscape susceptibility to OHL development with reference to the Local LCT through which the route options pass.

Table B.2: Landscape Susceptibility Appraisal

Local Landscape Character Type	Key landscape characteristics from LUC Finer Grain Landscape Character Assessment	LUC appraisal: Landscape susceptibility to OHL development of the type proposed
Lower Pastoral Valley	<p>Landform and Scale: more intimate scale valley landscape with steeper slopes and relatively flat valley floors;</p> <p>Landcover and pattern: diverse landcover with broadleaf woodland, shelterbelts, tree lined winding roads, riparian woodland and parcels of pasture;</p> <p>Human influence: a generally well tended and rural landscape with stone dykes, post and wire fences and winding minor roads. Forest cover on higher surrounding valley sides and distribution electricity infrastructure within the valley also apparent;</p> <p>Visual Experience: views tend to be short to medium distance, focused across and along the valley and contained by the valleys side and vegetation cover; and</p> <p>Settlement: dispersed pattern of isolated farmsteads and houses.</p>	<p>The key characteristics including the more intimate scale, complex landcover and topography indicate a medium-high susceptibility to OHL development.</p> 

Appendix B
Landscape Susceptibility Appraisal

Knockodhar Wind Farm 132kV Grid Connection
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Local Landscape Character Type	Key landscape characteristics from LUC Finer Grain Landscape Character Assessment	LUC appraisal: Landscape susceptibility to OHL development of the type proposed
Upper Valley and Plateau Moorland Fringes	<p>Landform and Scale: broader upland valley transitioning into undulating plateaux above;</p> <p>Landcover and pattern: unimproved grassland transitioning into grass and heather moorland on plateau fringes with areas of coniferous forest cover. Smaller areas of deciduous woodland in valley floor;</p> <p>Human influence: rural to remote with upland tracks and field boundaries. Wind farms in the surrounding landscape and electricity infrastructure within and surrounding the LCT are apparent.</p> <p>Visual Experience: Largely open landscape with medium to larger scale views opening up with elevation in the LCT.</p> <p>Settlement: very scarce, occasional remote farmsteads in upland valleys.</p>	<p>The key characteristics including the medium to larger scale and simpler topography and landscape pattern; and existing human influences indicate a medium-low susceptibility to OHL development.</p> 

Appendix C

Route Options Appraisal Table

Appendix C
Route Options Appraisal Table

Knockodhar Wind Farm 132kV Grid Connection
May 2021

Criterion	Sub-Criteria	Route Option 1	Route Option 2	Route Option 3	Route Option 4	Preference
Approximate Length of Line Route (km)	N/A	2.22km	2.16km	2.09km	2.45km	Route Option 3 is the preference as this is the shortest route option.
Biodiversity	Environmentally Sensitive Areas (ESA)	All options pass through the Western Southern Uplands ESA designated for the purpose of conserving, protecting and enhancing environmental features of the area by the maintenance or adoption of agricultural methods. The ESA is unavoidable for all route options due to its extent, Option 4 passes through a greater extent of the ESA than the other routes.				On balance, Route Option 3 is the preference All route options pass through the ESA and Local Wildlife site, however Option 3 is the shortest route through both.
	Local Wildlife Sites	All route options pass through the Muck Water Local Wildlife site. The Muck Water LWS has been identified by SAC as being sufficiently distinct and/or representative of important local habitats to warrant policy protection. Option 4 passes through a greater extent of the local wildlife site than the other routes				
	NatureScot (formally SNH) Priority Peatland Habitats (Class 1 and 2)	There are no Class 1 and 2 Priority Peatland habitat located within any of the route options..				
Landscape and Visual Amenity	Residential Visual Amenity with '150m trigger for consideration zone'	Route Option 1 is not within any '150m trigger for consideration zones'. This route option is the closest to the property at Bellamore (over 400m). The rear of this property has open views north-east up the Muck Water Valley.	Route Option 2 is not within any '150m trigger for consideration zones'.	Route Option 3 is not within any '150m trigger for consideration zones'.	Route Option 4 is not within any '150m trigger for consideration zones'. This route option is the closest to the property at Mark (over 500m). However, woodland around this property screens views south-west down the Muck Water Valley.	On balance, Route Option 3 is the preference. This route option provides the most direct route; minimises direct landscape effects associated with vegetation clearance; utilises belts of coniferous forest cover to help screen/ back cloth parts of the OHL in views up and down the Muck Water Valley; provides the best landscape fit (being contained fully within the lower sensitivity Upper Valley and Plateau Moorland Fringes LLCT); and avoids routing on
	Visual Amenity	Wayleave will be required to accommodate OHL where Route Option 1 crosses a row of mature beech trees, which line the southern side of the minor road which runs east to west along the valley side. This wayleave will be apparent for	Wayleave may be required to accommodate OHL where Route Option 2 crosses a row of mature beech trees, which line the southern side of the minor road which runs east to west along the valley side. This wayleave will be apparent for	Route Option 3 utilises a belt of coniferous woodland to the north of the Muck Water for back clothing/ screening in views up and down the Muck Water Valley. This option routes south of the minor road on lower ground and utilising a	Route Option 4 is a longer and less direct route, which routes further east of the proposed Knockodhar Substation to find a suitable crossing point of the Muck Water. This will result in greater visibility of OHL wood	

Appendix C
Route Options Appraisal Table

Knockodhar Wind Farm 132kV Grid Connection
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Criterion	Sub-Criteria	Route Option 1	Route Option 2	Route Option 3	Route Option 4	Preference
		walkers and road users on the minor road as they cross under an OHL through Route Option 1. This option also routes along a longer section of higher ground to the north of the Muck Water Valley, which increases the potential for wider visibility of OHL on horizons from within the valley.	walkers and road users on the minor road as they cross under any an OHL through Route Option 2. Route Option 2 utilises a belt of coniferous woodland, to the north of the Muck Water for back clothing/ screening in views up and down the Muck Water Valley. To the north of the minor road this route option routes along slightly higher ground on the approach to the proposed Knockodhar Substation. This increases the potential for wider visibility of OHL on horizons from within the valley.	subtle valley north of the Muck Water, on its approach to the proposed Knockodhar Substation. This will help minimise views of OHL on horizons from the valley.	pole infrastructure within the Muck Water Valley.	steeper and higher ground to the north of the Muck Water Valley.
	Landscape Designations	All route options pass through the locally designated South Ayrshire Scenic Area.				
	Local Landscape Character (refer to Appendix B and Figure 5.1 for further information on location of Local LLCT and landscape susceptibility appraisal)	<p>The central part of Route Option 1 passes through the Lower Pastoral Valley LLCT, which is identified as being of medium-high susceptibility to OHL development.</p> <p>When travelling from north to south, and at the point where the various route options diverge, Route Option 1 requires some limited vegetation removal. This will be required at the Muck Water crossing and through a line of mature</p>	<p>A very small section of Route Option 2 skirts the eastern fringes of the Lower Pastoral Valley LLCT, which is identified as being of medium-high susceptibility to OHL development.</p> <p>The majority of this Route Option is contained within the Upper Valley and Plateau Moorland Fringes LLCT, which is identified as being of medium-low sensitivity to OHL development.</p>	<p>This Route Option is contained within the Upper Valley and Plateau Moorland Fringes LLCT, which is identified as being of medium-low susceptibility to OHL development.</p> <p>Vegetation clearance along this route option will be minimal.</p>	<p>This Route Option is contained within the Upper Valley and Plateau Moorland Fringes LLCT, which is identified as being of medium-low susceptibility to OHL development.</p> <p>Vegetation clearance along this route option will be minimal.</p>	

Appendix C
Route Options Appraisal Table

Knockodhar Wind Farm 132kV Grid Connection
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Criterion	Sub-Criteria	Route Option 1	Route Option 2	Route Option 3	Route Option 4	Preference
		beech trees which run along the southern side of the minor road, north of the Muck Water. The route option climbs parallel to the grain of the landscape on steep ground to the north of the minor road, which will result in a relatively poor landscape fit.	Vegetation clearance along this route option will be minimal.			
	Tourism and Recreation: OS promoted viewpoints (visual amenity – Sustrans routes, core paths, long distance trails, tourist attractions and recreational areas such as golf courses)	There are no OS promoted viewpoints, Sustrans routes, core paths, long distance trails or tourist attractions of note within the study area. Route Options 1 and 2 cross the minor road/ track between Bellamore and Knockodhar Forest twice. Route Options 3 and 4 both cross the track to Mark (no public vehicle access) once.				
Cultural Heritage	Undesignated Archaeology of Regional/Local Importance (recorded on WoSAS and Historic Environment Scotland's mapping).	<p>The following heritage assets are outwith the route option, however they are in close proximity and may have potential for effects due to setting change:</p> <p>Garleffin, farmstead, WoSAS HER PIN 17195.</p>	<p>The following heritage assets are outwith the route option, however they are in close proximity and may have potential for effects due to setting change:</p> <p>Garleffin, farmstead, WoSAS HER PIN 17195.</p>	<p>The following heritage assets are outwith the route option, however they are in close proximity and may have potential for effects due to setting change:</p> <p>Garleffin, farmstead, WoSAS HER PIN 17195.</p>	<p>The following heritage assets are present within the route option:</p> <p>Kilbride Knowe, Mark, enclosure WoSAS HER PIN 11514.</p> <p>Kilbride Knowe farmstead, enclosure and cultivation remains WoSAS HER PIN 11506 and WoSAS HER PIN 68568.</p> <p>These could potentially be avoided during detailed alignment.</p> <p>The following heritage assets are outwith the route option, however they are in close proximity</p>	On the basis of the present evidence, route options 1, 2 and 3 are of equal preference as they do not have any cultural heritage features within the route.

Appendix C
Route Options Appraisal Table

Knockodhar Wind Farm 132kV Grid Connection
May 2021

Criterion	Sub-Criteria	Route Option 1	Route Option 2	Route Option 3	Route Option 4	Preference
					and may have potential for effects due to setting change: Cawan WoSAS HER PIN 17199 and 42471 farmstead.	
Land Use	Existing and Committed Development: areas allocated within the LDP including existing buildings/sites, residential use applications and valid planning applications for other non-residential uses of a size and geographic location to be considered 'major areas' (including minerals and wind farm turbines)	<p>There are no other areas of committed development within or in close proximity to these route options.</p> <p>The Knockodhar Substation is located within the 'trigger for consideration' zones for windfarm turbines and therefore all of the route options will pass through this zone when approaching the Knockodhar Substation.</p>				<p>On balance Option 3 is the preference.</p> <p>As Option 3 is the shortest route it will result in the lowest land take of the four options.</p>
Forestry	Forestry (NFI)	All route options have NFI Forestry at the Knockodhar substation and a small area north of the Mark Hill substation. ¹ There is no notable difference in the amount of NFI woodland within each of the options				There is no preferred route option as there is no notable difference in the amount of NFI woodland within each of the options.
Hydrology and Flood Risk	Flood Zones and Waterbodies	<p>All route options cross the Muck Water. The SEPA predicted 200-year floodplain is generally constrained close to the channel and can be spanned for all routes.</p> <p>Based on mapped watercourses on 1:25K Ordnance Survey, no other watercourses</p>	<p>All route options cross the Muck Water. The SEPA predicted 200-year floodplain is generally constrained close to the channel and can be spanned for all routes.</p> <p>Based on mapped watercourses on 1:25K Ordnance Survey, one other unnamed</p>	<p>All route options cross the Muck Water. The SEPA predicted 200-year floodplain is generally constrained close to the channel and can be spanned for all routes.</p> <p>Based on mapped watercourses on 1:25K Ordnance Survey, three other watercourses will</p>	<p>All route options cross the Muck Water. The SEPA predicted 200-year floodplain is generally constrained close to the channel and can be spanned for all routes.</p> <p>Based on mapped watercourses on 1:25K Ordnance Survey, two other watercourses will</p>	<p>Route Option 1 is the preference as this has the fewest watercourse crossings.</p>

Appendix C
Route Options Appraisal Table

Knockodhar Wind Farm 132kV Grid Connection
May 2021


Criterion	Sub-Criteria	Route Option 1	Route Option 2	Route Option 3	Route Option 4	Preference
		require to be crossed, although the route parallels a small tributary of the Muck Water in the north.	watercourse will have to be crossed in the south of the route. The route also parallels a small tributary of the Muck Water in the north.	have to be crossed. The route also parallels a tributary of the Muck Water for around 200m.	have to be crossed. The route also parallels a small watercourse and the Muck Water for around 450m.	
Overall Emerging Preference		<p>Overall emerging preferred route is Route Option 3</p> <p>Route Option 3 is the shortest route and also has the best potential, relative to other options, to minimise visual effects on residential receptors and effects on the wider landscape during the alignment stage of the OHL development.</p> <p>Route Option 3 also has the potential, relative to the other options to minimise effects on biodiversity and landuse and is of equal preference in terms of cultural heritage, forestry and technical aspects.</p> <p>Route Option 3 however does cross the greatest number of watercourses and the alignment of the OHL and construction processes will require to avoid/minimise hydrological effects on these watercourses.</p>				

Appendix D

Newspaper Advertisement 4th May 2021

Other Notices

The Clachrie 132kV Connection Project



We'd like your views

Public consultation

Overhead line connection from Clachrie Wind Farm to Mark Hill Substation

SP Energy Networks are seeking comments on a proposed 132kV, wood pole overhead line which would connect Clachrie Wind Farm to the transmission grid system at Mark Hill substation in South Ayrshire.

This consultation will run for four weeks between 17th May until 14th June 2021.

However, the information will remain accessible online and available to download in a pdf format after the 14th June 2021 from www.spenergynetworks.co.uk/ClachrieOHL


Due to current restrictions relating to the Covid-19 pandemic, a virtual, online consultation process is being undertaken, rather than a town hall presentation format. This will allow people to view the project information in a virtual environment and to leave comments on the preferred overhead line route. Hard copies of the Routeing and Consultation Report can be downloaded from the web page above and information leaflets will be distributed locally too. Feedback from this event will then be considered by SP Energy Networks prior to the proposed route being determined.

From 17th May 2021 the virtual consultation and questionnaire can be accessed from this link: www.ClachrieOHL.co.uk

Comments can also be sent to the project email address ClachrieOHL@spenergynetworks.co.uk

Please note - Comments at this stage are informal and are made to allow SP Energy Networks to determine whether changes to the route are necessary. An opportunity to comment formally to the Energy Consents Unit will follow at a later stage in the process following consultation by the Scottish Government once the application is submitted to them.

The Knockodhar 132kV Connection Project



We'd like your views

Public consultation

Overhead line connection from Knockodhar Wind Farm to Mark Hill Substation

SP Energy Networks are seeking comments on a proposed 132kV, wood pole overhead line which would connect Knockodhar Wind Farm to the transmission grid system at Mark Hill substation in South Ayrshire.

This consultation will run for four weeks between 17th May until 14th June 2021.

However, the information will remain accessible online and available to download in a pdf format after the 14th June 2021 from www.spenergynetworks.co.uk/KnockodharOHL

Due to current restrictions relating to the Covid-19 pandemic, a virtual, online consultation process is being undertaken, rather than a town hall presentation format. This will allow people to view the project information in a virtual environment and to leave comments on the preferred overhead line route. Hard copies of the Routeing and Consultation Report can be downloaded from the web page above and information leaflets will be distributed locally too. Feedback from this event will then be considered by SP Energy Networks prior to the proposed route being determined.

From 17th May 2021 the virtual consultation and questionnaire can be accessed from this link: www.KnockodharOHL.co.uk

Comments can also be sent to the project email address KnockodharOHL@spenergynetworks.co.uk

Please note - Comments at this stage are informal and are made to allow SP Energy Networks to determine whether changes to the route are necessary. An opportunity to comment formally to the Energy Consents Unit will follow at a later stage in the process following consultation by the Scottish Government once the application is submitted to them.

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Appendix E

Project Leaflet

How to make your views known?

Our consultation will run for four weeks from **17th May until 14th June 2021**. The closing date for you to send your responses to us is midnight on Monday 21st June 2021. Following this date, the information will remain accessible online and available to download.

Please find below the best ways to find out more or talk to us.



Visit the online virtual exhibition from 17th May 2021: www.KnockodharOHL.co.uk

In normal circumstances, we would engage with communities face-to-face through drop-in public exhibitions, however, given current social distancing restrictions this is not possible. Therefore, we have prepared an online virtual consultation to replicate the in-person village hall experience. Here you can see detailed maps, read about the proposals, download the project information as a pdf, and provide feedback via the online survey and questionnaire.



Visit the website: www.spenergynetworks.co.uk/KnockodharOHL

Our dedicated website has lots more information. You can view or download all the project documents, including this leaflet, on the website.



Email us: KnockodharOHL@spenergynetworks.co.uk

What happens next?

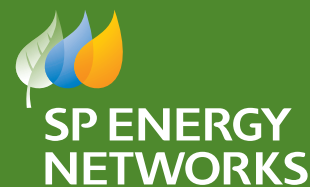
SP Energy Networks places great importance on the effect its work may have on the environment and local communities and is keen to hear the views of local people to help develop the project in the best way. Informed by the consultation responses, SP Energy Networks will confirm the proposed route for the Knockodhar 132kV Connection Project.

Reflecting the proposed route, SP Energy Networks intend to submit a Screening Opinion request to the Energy Consents Unit in Summer 2021 to confirm whether or not the proposed development requires an Environmental Impact Assessment (EIA). The proposed route will then progress to identification of an overhead line alignment, including individual wood pole positioning which will be informed by the Environmental Appraisal, detailed engineering ground surveys and discussions with landowners.

This alignment, including all ancillary temporary development e.g. temporary access tracks, will be included in the application for Section 37 Consent and deemed planning permission which we anticipate being submitted in Summer 2022. The Section 37 application will be submitted to the Scottish Ministers via the Energy Consents Unit; South Ayrshire Council will be notified as a statutory consultee to the proposed development as well as being asked to comment on the application prior to submission via the Simplified Notification process.

SP Energy Networks will consult fully with affected landowners and occupiers on all aspects of the Knockodhar 132kV Connection Project and will give them an opportunity to connect on proposals as they progress.

Thank you for taking the time to read this leaflet.



The Knockodhar 132kV Connection Project

Public Consultation Leaflet



Background

The proposed Knockodhar Wind Farm by REG Knockodhar Limited is located in a commercial forestry plantation approximately 3.5 kilometres (km) south west of Barr in South Ayrshire. It comprises 32 wind turbines.

To meet its licence obligations to connect the Knockodhar Wind Farm to the grid, SP Energy Networks is proposing a new 132 kilovolt (kV) overhead line (OHL) to connect the proposed Knockodhar Wind Farm to the transmission grid system at the Mark Hill substation in South Ayrshire. This new connection will be approximately 2km in length and supported on wood poles. The location of the start and end point of the connection is shown on the plan overleaf. The preferred route for the overhead line is also shown on the plan.

SP Energy Networks is part of the ScottishPower Group of companies and owns three regulated businesses in the UK. These businesses are 'asset-owner' companies holding the regulated assets and Electricity Transmission and Distribution licenses of ScottishPower. As part of this, SP Energy Networks operates, maintains and develops the network of cables, overhead lines and substations which transport electricity to connected homes and businesses in Southern and Central Scotland.

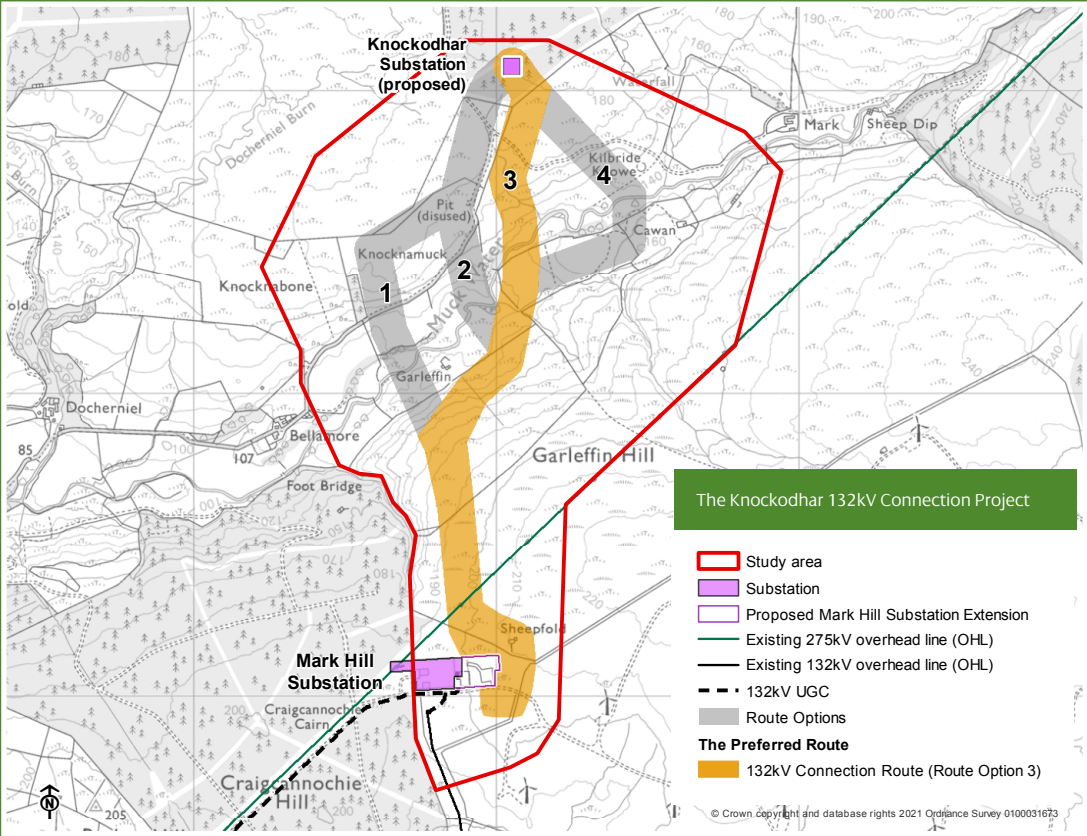
SP Energy Networks has a legal duty to keep its network up-to-date to safeguard electricity supplies. SP Energy Networks also has a duty to provide a connection for new generation to the wider electricity transmission network.

What will the Overhead Line look like?

The 132kV overhead line will be supported on Trident double 'H' wood poles which average between 11 metres (m) and 16m in height above ground. Opportunities to use single poles will be taken where possible, subject to further technical assessment. The section of OHL between the wood poles is known as the 'span'. Span lengths between the wood poles will average between 80m and 110m. The Trident 'H' wood poles are dark brown in colour when newly constructed and weather over the years to a light grey. They include two wood pole structures to support the conductors. For technical reasons, a section of underground cable approximately 500 metres in length will also form part of the connection as it enters Mark Hill substation.



The Knockodhar 132kV Connection Project



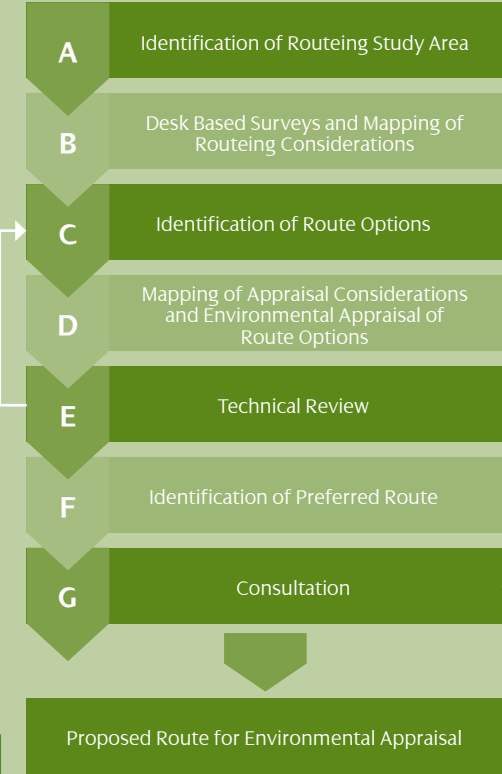
Routeing

SP Energy Networks has been working with independent environmental consultants to identify options for potential routes for the proposed overhead line. Our objective is to identify a route for the overhead line which meets the technical requirements of the electricity system, which are economically viable and cause, on balance, the least disturbance to the environment and the people who live, work and enjoy recreation within it.

Following an established best practice methodology for routeing overhead lines, four route options were identified for the overhead line. These were appraised against environmental criteria, including local landscape character and views, cultural heritage and biodiversity, to identify the preferred route. SP Energy Networks are committed to engaging with stakeholders, including local communities, through the consultation process and your feedback will be used to review the routeing findings and inform the next steps.

More information about the process we have followed to identify and appraise route options to select the preferred route can be found in our Routeing and Consultation Document (April 2021). This is available on the project website, www.spenergynetworks.co.uk/KnockodharOHL.

Routeing Methodology



What we would like your views on?

As part of the consultation we would particularly like your views on:

- 1 The preferred route for the Knockodhar 132kV Connection Project
- 2 Any of the alternative route options we considered during the routeing process
- 3 Any other issues, suggestions or feedback you would like us to consider. We would particularly like to hear your views on your local area, for example areas you use for recreation, local environmental features you would like us to consider, and any plans you may have to build in proximity to the preferred route.

Please note comments at this stage are informal comments to SP Energy Networks and are made to allow SP Energy Networks to determine whether changes to the preferred route are necessary. An opportunity to comment formally to the Scottish Government Energy Consents Unit will follow at a later stage in the process following submission of the Section 37 application.

Appendix F

Stakeholder Consultee List

The stakeholder groups listed in Table 1 below were contacted via email unless otherwise noted.

Table 1: List of Stakeholders consulted through the consultation process

Consultee	
Ayrshire Rivers Trust	RSPB Scotland
Barr Community Council	Scottish Badgers
Barrhill Community Council	Scottish Forestry
British Horse Society	Scottish Outdoor Access Network
British Trust for Ornithology (Ayrshire and Cumbrae)	Scottish Rights of Way and Access Society (ScotWays)
Central Scotland Bat Group	Scottish Water
Crown Estate Scotland	Scottish Wildlife Trust
Defence Infrastructure Organisation	SEPA
Fisheries – Local District Salmon Fisheries	South Ayrshire Council (Planning)
Fisheries Management Scotland	South Scotland Red Squirrel Group
Historic Environment Scotland	South Strathclyde Raptor Study Group
Mountaineering Scotland	Sustrans Scotland
National Farmers Union of Scotland	The Coal Authority
NATS Safeguarding	The Health and Safety Executive (HSE)*
NatureScot	The National Trust for Scotland
Nuclear Safety Directorate (HSE)	The Ramblers Association
Pinwherry and Pinmore Community Council	West of Scotland Archaeology Service
RAF	

*consultation details sent via post

ⁱ The Scottish Forestry Public Register Map identifies no new planting proposals for the area.