Chapter 1
Introduction

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1 Introduction

Introduction

1.1 This Environmental Impact Assessment (EIA) Report has been prepared by LUC on behalf of SP Energy Networks (SPEN)[1] in relation to proposals to modernise and reinforce the 132 kilovolt (kV) electricity transmission network between Kendoon and Tongland in Dumfries and Galloway. The project is called the Kendoon to Tongland 132kV Reinforcement Project (hereafter referred to as 'the KTR Project').

1.2 The KTR Project consists of proposals for the replacement of the existing 132kV transmission overhead lines (OHLs) supported on steel towers between Polquhanity in the north, through the existing Glenlee substation, and south to the Tongland substation. The 132kV transmission lines to be replaced, currently connect five hydro-electric power stations in Galloway that serve the populations of Galloway, Dumfries and Ayrshire with electricity. Built in the 1930s and running at full capacity, the existing line is at the end of its operational life and is therefore in need of replacement.

1.3 The location of the KTR Project is shown in **Figure 1.1**.

1.4 The EIA Report documents the EIA process undertaken in connection with the KTR Project, which involves the identification, assessment and presentation of likely significant environmental effects (both positive and negative), of the construction and operation of the new OHLs and the decommissioning of the existing 132kV OHLs (known as N and R routes). The EIA Report has been prepared to meet the requirements of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended[2] ('the EIA Regulations').

1.5 The EIA Report has been provided in support of five applications being submitted by SPEN to the Scottish Ministers through the Scottish Government Energy Consents Unit (ECU). Consent will be sought under section 37 of the Electricity Act 1989 ('section 37 consent') for the five OHLs comprising the KTR Project. SPEN will also apply for deemed planning permission under section 57 (2) of the Town and Country Planning (Scotland) Act 1997 for the new OHLs and associated works (such as temporary infrastructure) as well as the decommissioning of the N and R routes ('deemed planning permission').

1.6 The information presented in this EIA Report will be used by Scottish Ministers to inform the determination of the applications for section 37 consent and deemed planning permission for the OHLs and associated works.

1.7 Further details on the requirements associated with the EIA process are provided in **Chapter 3: Approach to the EIA**.

Background to the KTR Project

1.8 The KTR Project originally comprised an integral part of the larger Dumfries & Galloway Strategic Reinforcement (DGSR) Project. The outputs from the early routeing and consultation stages of the DGSR Project have influenced the KTR Project.

1.9 In the summer of 2015, SPEN carried out a three-month stakeholder consultation on the DGSR Project, which included proposals for:

- a new high voltage OHL of up to 400kV from Auchencrosh, in South Ayrshire, through Dumfries and Galloway, to Harker, near Carlisle;
- two new 132kV OHL from Kendoon to Glenlee and from Glenlee to Tongland; and
- four new high voltage substations at Auchencrosh, Newton Stewart, Glenlee and Dumfries.

1.10 In parallel with the consultation in 2015, SPEN worked with National Grid, in its role as GB Transmission System Operator, to carry out a thorough cost-benefit analysis (CBA) of the DGSR Project to makes sure Dumfries and Galloway's transmission system was developed in the most efficient and economical way.

1.11 The CBA investigated options ranging from the full 400kV Auchencrosh to Harker proposal to a reduced scheme based on the modernisation of existing 132kV infrastructure, and the provision of some additional capacity on the system.

1.12 The results concluded that the 400kV Auchencrosh to Harker proposal did not deliver enough benefit for electricity consumers in Great Britain relative to the cost of the project at the time. The outcome of this work was the identification of a recommended solution, significantly reduced in scope and scale and which partially meets the original project drivers. It was therefore recommended that a 'reduced scheme', which is integral to and forms part of the original project, should be progressed at present.

1.13 This reduced scheme involves the replacement and increase in capacity of the existing 132kV OHL between Kendoon and Glenlee, and from Glenlee to Tongland, i.e. the KTR Project which is the subject of this EIA Report.

The Existing Electricity Transmission Network

1.14 The existing electricity transmission network in the south-west of Scotland, as illustrated in **Figure 1.2**, was developed between the 1930s and 1970s to supply local customers and to connect the area's hydro generation schemes. It currently serves more than 83,000 customers.

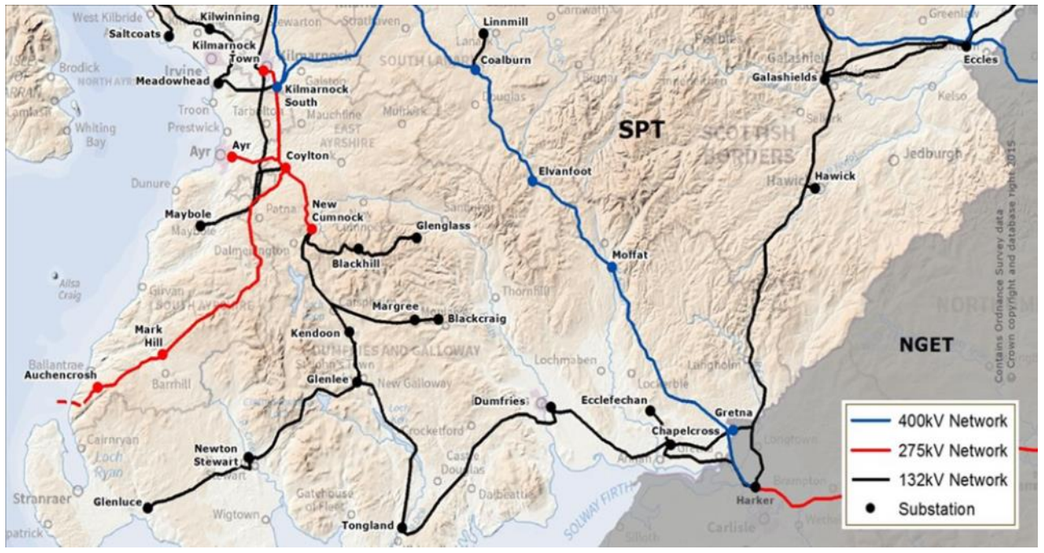
1.15 When SPEN assessed the network as part of its asset replacement programme, nearly 90km of the transmission lines in Dumfries and Galloway were found to be approaching the end of their operational life. Specifically, these are the lines running from Kendoon to Glenlee, from Glenlee to Tongland, from Tongland to Dumfries and to a lesser extent the line from Chapelcross to Harker. As assets get older, the need for maintenance work becomes more critical and more difficult, and the exposure to unplanned outages (faults) increases. Asset replacement is essential to provide secure, reliable supplies to existing and future customers and users for the next 60 to 70 years.

1.16 National Planning Framework 3 designates enhancements to high voltage transmission networks including transmission lines of 132kV and above as 'national development', required to deliver the Government's spatial strategy. The KTR Project is a national development and the need for it is therefore established.

[1] SPEN, the trading name for Scottish Power Energy Network Holdings Limited which 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 within this EIA Report to SPEN in the context of statutory and licence duties should be read as applying to SP Transmission plc.

[2] In light of the current public health advice relating to the COVID-19 outbreak, parts of the EIA Regulations were amended on 24th April 2020 by The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 to temporarily relax the requirements to place hardcopies of EIA Reports in the public domain during statutory application consultation periods and to make copies available electronically.

Figure 1.2 Electricity Transmission System in South-West Scotland



The KTR Project Location and Surrounding Area

1.17 The KTR Project is situated within Dumfries and Galloway and is located within the Glenkens Valley and Galloway Hills, forming part of the southern reaches of the Southern Uplands. The route covers a linear area, running broadly north to south, from Polquhanity (approximately 3km to the north of the existing Kendoon substation), to the existing substation at Tongland (approximately 1.5km to the north of Kirkcudbright). The area is broadly bounded by the A762 and Loch Ken to the east and the eastern periphery of the Galloway Forest Park and forested hilltop summits to the west.

1.18 The area within which the northern section of the KTR Project is located, is predominantly rural in nature comprising land cover of rough pasture and grazing farmland before entering the coniferous forestry of the Galloway Forest Park on the western side of the Glenkens Valley, east of New Galloway. The central section of the KTR Project is located in an area that consists most notably of extensive commercial forestry, including the eastern periphery of the Galloway Forest Park and Laurieston forest immediately to the south. Towards the southern reaches of the area within which the KTR Project is located remains predominantly rural in nature and is characterised by a pattern of farmland and scattered coppices of deciduous woodland.

1.19 The area within which the KTR Project is located is sparsely populated in comparison to the more densely populated coastal areas to the south. Settlements nearby include several small towns and villages including, amongst others, the villages of St John's Town of Dalry, Mossdale, and Laurieston, with smaller 'clusters' and individual properties dispersed throughout the area. The local road network encompasses a section of the A713 from Polquhanity to St John's Town of Dalry the A762 south to Tongland the A711, A713 and the A75 trunk road which service both the main settlements and smaller dwellings, connecting them to the wider Dumfries and Galloway area. Within the commercially forested areas, numerous forest tracks create access to the more remote areas of the Southern Uplands.

1.20 The Study Area for each discipline has been defined separately to reflect the likely extent of the effects. For example, the Study Area for the traffic and transport assessment covers the local roads which will be used for vehicles during construction and operation, whereas the Study Area for the ecology assessment covers the KTR Project footprint and relevant areas for the species assessed.

The KTR Project

1.21 The KTR Project will provide an appropriate level of transmission infrastructure that is needed in the short term and the design also allows flexibility to adopt further upgrades that may occur in the future such as potential significant changes to energy policy, or potential future changes to the operational requirements of the transmission network. The new double circuited connections will be supported by steel lattice towers with six arms. They will carry more power compared to the existing single capacity circuits providing more flexibility for future developments.

1.22 The KTR Project includes five new OHLs which will all operate at 132kV via a mix of double and single circuited connections[3]. The routes of the five connections are illustrated on **Figure 1.3**:

- A new 132kV double circuit steel tower OHL, of approximately 10.1km in length between Polquhanity (approximately 3km north of the existing Kendoon substation) and Glenlee substation, via the existing Kendoon substation (hereafter known as **P-G via K**).
- A new 132kV single circuit wood pole OHL, of approximately 2.6km in length, between Carsfad and Kendoon (hereafter known as **C-K**).
- A new 132kV single circuit wood pole OHL, of approximately 1.6km in length, between Earlstoun and Glenlee together with a short section of approximately 250m of underground cable to connect into Glenlee substation (hereafter known as **E-G**).
- A new 132kV double circuit steel tower OHL deviation of the existing BG route, at Glenlee substation approximately 1.2km in length (hereafter known as **BG Deviation**).
- A new 132kV double circuit steel tower OHL, of approximately 32.3km in length, between Glenlee and Tongland (hereafter known as **G-T**).

1.23 In addition to the five new connections above, the KTR Project includes ancillary development both permanent and temporary, including the removal of the existing 132kV OHL between Polquhanity, Kendoon, Carsfad, Earlstoun, Glenlee and Tongland. This will involve the decommissioning of around 43.3km of existing OHL infrastructure. The removal of the N route towers between Polquhanity and Kendoon, and part of R route between Kendoon and Glenlee are the subject of an application for deemed planning permission which accompanies the P-G via K application for section 37 consent. Deemed planning permission has also been sought for the removal of the other section of R route between Glenlee and Tongland and this accompanies the G-T application for section 37 consent. The existing 132kV N and R[4] routes are also shown on **Figure 1.3**.

1.24 In addition, to support the wider KTR Project, an extension of approximately 90m x 40m (excluding earthworks and landscape planting areas) is required to the existing 132kV Glenlee substation compound. The compound will accommodate the new switchgear associated with the replacement connections to Kendoon and Tongland. The Glenlee substation extension works will need to be completed in advance of the construction of the proposed OHL and as such, SPEN submitted a separate planning application to Dumfries and Galloway Council (D&GC) in September 2019 (application reference: 19/1498/FUL) The Glenlee substation planning application was accompanied by an EIA report (Sep 2019)[5] covering all relevant issues, such as landscape and visual impact, construction noise and traffic and transport. The extension to the Glenlee substation is also considered within the cumulative assessment as part of the EIA for the KTR Project.

1.25 Full details of the construction and the operational details of the components of the KTR project are provided in **Chapter 4: Development Description** and **Chapter 5: Felling, Construction and Operational Maintenance**.

The Applicant

1.26 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). Its transmission network is the backbone of the electricity system in its area

[3] The connections are referred to both as connections or as overhead lines (OHLs) within the EIA Report.

[4] R (north) represents the existing R route from Glenlee substation to Kendoon substation and R (south) represents the existing R route from Glenlee to Tongland substation.

[5] https://www.spenergynetworks.co.uk/pages/dumfries_galloway_project_documents.aspx

carrying large amounts of electricity at high voltages from generating sources such as windfarms and power stations across long distances. The transmission network includes more than 4,000km of OHL and more than 360km of underground cables. The electricity is then delivered via the distribution system serving two million customers, with 83,000 customers located in south-west Scotland.

1.27 As a transmission licence holder for central and southern Scotland, SPEN 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.

1.28 SPEN also has the following obligations pursuant to its licence conditions:

- To make its transmission system available for generators wishing to connect to it and ensure that the system is fit for purpose through appropriate reinforcements to accommodate the contracted capacity.
- To plan and develop its transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and in so doing take account of National Grid's obligations as system operator, to co-ordinate and direct the flow of electricity on, to and over the GB transmission system.

1.29 In response to statutory and licence obligations upon it, SPEN therefore requires to ensure that the transmission system is developed and maintained in an economic, coordinated and efficient manner in the interests of existing and future customers.

1.30 Section 38 and Schedule 9 of the Electricity Act 1989 impose 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 of 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."

1.31 SPEN has a 'Schedule 9 Statement' which 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.

The Consenting and Environmental Impact Assessment Process

1.32 As noted above, the KTR Project comprises five new OHLs, the decommissioning and removal of the existing 132kV N and R routes, and other ancillary development. Section 37 consent is being sought from the Scottish Ministers, to install and keep installed the five new OHLs. Deemed planning permission is also being sought for the OHLs, ancillary development works and the removal of N and R routes.

1.33 The KTR Project falls within Schedule 2 of the 2017 EIA Regulations in that it comprises:

"(2) an electric line installed above ground—

(a) with a voltage of 132 kilovolts or more;

(b) in a sensitive area; or

(c) the purpose of which installation is to connect the electric line to a generating station the construction or operation of which requires consent under section 36 of the Electricity Act 1989".

1.34 In addition, the KTR Project is also *"likely to have significant effects on the environment by virtue of factors such as its nature, size or location"*[6]. As a result, the KTR Project is EIA development[7] and an EIA requires to be undertaken. Further details on the requirements for EIA are set out in **Chapter**.

1.35 This EIA Report details the findings of the assessment of the likely significant effects of the KTR Project on the environment during its construction and operation, including the likely significant effects of the decommissioning of N and R routes. The assessment forms part of the wider process of EIA, which is undertaken to ensure that the likely significant effects, both positive and negative, of certain types of development are considered in full by the decision maker prior to the determination of an application for section 37 consent and deemed panning permission.

Structure of the EIA Report

1.36 Each component part of the KTR project, i.e. each of the five new OHL connections, including the relevant sections of OHL to be removed (N and R routes), is supported by this EIA Report which includes individual assessments for each connection, with an overarching assessment of the combined effects of the KTR Project as a whole.

1.37 The EIA Report comprises six volumes as well as a free-standing Non-technical Summary (NTS):

- Volume One: Main text;
- Volume Two: Figures;
- Volume Three: Appendices;
- Volume Four: Visualisations;
- Volume Five: Visualisations; and
- Volume Six: Visualisations.

1.38 Volume One comprises the following chapters.

- **Chapter 1: Introduction** (this chapter) provides a brief introduction and background to the proposed KTR Project, the consenting and legislative requirements for an EIA, together with an outline of the structure of the EIA Report and an introduction to the applicant.
- **Chapter 2: The Routeing Process and Design Strategy** outlines SPEN's routeing commitment and the strategic routeing methodology for the KTR Project, thereby adhering to both the statutory duties imposed by Schedule 9 and Section 38 of the 1989 Act and the Holford Rules[8]. This covers the requirement to consider 'alternatives' as required under the 2017 EIA Regulations. The design strategy for the towers, access tracks and other infrastructure and forestry felling/replanting is also detailed.
- **Chapter 3: Approach to the EIA** describes the EIA process in relation to the requirements of the 2017 EIA Regulations, including the key steps in the process of EIA, and the consultation undertaken. Information on topics 'scoped out' of detailed assessment is also provided in this chapter.
- **Chapter 4: Development Description** provides details of the development proposals for each of the connections comprising the KTR Project and the decommissioning of the existing N and R routes.
- **Chapter 5: Felling, Construction, Operational Maintenance and Decommissioning** describes the proposals for forestry felling, including the wayleave requirements, the construction process and programme for the KTR Project, the operational maintenance requirements and the process for decommissioning and removal of the existing N and R routes.
- **Chapter 6: Planning Policy Context** summarises the national and local planning policy context of relevance to the KTR Project.
- **Chapter 7: Landscape and Visual Amenity** presents the findings of the assessment of the likely significant effects of the KTR Project on landscape and visual amenity (including landscape character and resources, designated landscapes, views and the visual amenity of residents).

[6] Regulation 2(1) of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
[7] Regulation 2(1) of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
[8] The Holford Rules are the Guidelines for the Routeing of New High Voltage Overhead Transmission Lines

- **Chapter 8: Forestry** presents the findings of the assessment of the likely significant effects of the KTR Project on the forestry, including ancient and semi-natural woodland and native woodlands and forestry activities.
- **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat** presents the findings of the assessment of the likely significant effects of the KTR Project on hydrology, potential implications for flood risk, and effects associated with ground conditions including peat.
- **Chapter 10: Ecology** presents the findings of the assessment of the likely significant effects of the KTR Project on ecology, including protected habitats and species, and including consideration of wider biodiversity effects.
- **Chapter 11: Ornithology** presents the findings of the assessment of the likely significant effects of the KTR Project on ornithological interests. The chapter and accompanying appendices also set out the information to allow Scottish Ministers to undertake an appropriate assessment of the effects of the KTR Project on the SPA (and Ramsar site).
- **Chapter 12: Cultural Heritage** presents the findings of the assessment of the likely significant effects of the KTR Project on cultural heritage assets.
- **Chapter 13: Traffic and Transport** presents the findings of the assessment of the likely significant effects of the construction of the KTR Project on traffic and transport, including road safety and community effects.
- **Chapter 14: Noise** presents the findings of the assessment of the likely significant construction and operational noise effects of the KTR Project on construction noise.
- **Chapter 15: Socio-economics, Tourism and Recreation** presents the findings of the assessment of the likely significant socio-economic, tourism and recreation effects, resulting from the construction and operation of the KTR Project.
- **Chapter 16: Other Issues** presents the findings of the assessment of the likely significant effects associated with Electric and Magnetic Fields (EMF) during operation of the KTR Project and the effects of dust during construction.
- **Chapter 17: Intra-Connection and Intra-KTR Effects** presents the findings of the assessment of likely significant effects of (i) each connection of the KTR Project on a single receptor (the 'intra-connection effects' e.g. where a particular property is affected by dust, noise and traffic disruption during construction), and (ii) effects on environmental receptors as a result of the KTR Project as a Whole as if it were the subject of a single Section 37 Application (i.e. the combined effects on a single receptor resulting from a number of separate effects).
- **Chapter 18: Summary of Likely Significant Effects** sets out a summary of all the likely significant effects associated with each connection (Section 37 consent application) as identified in **Chapters 7-17**.

1.39 Within each of the environmental topic chapters (**Chapters 7 to 16**), the information provided is structured in a consistent way, as far as practicable. **Box 1** provides further information on the structure of each chapter.

1.40 The assessment section of each specialist chapter is structured in a way that is most logical for that particular topic area and, whilst maintaining the general structure identified below, may include other sections specific to that particular topic.

Box 1: Structure of EIA Report Topic Chapters (Chapters 7-16)

Introduction: outlines the content and key objectives of the chapter.

Scope of the Assessment: identifies the key issues to be considered in the assessment and any issues which are considered unlikely to be significant and which have been scoped out of detailed assessment.

Assessment Methodology: outlines the legislation and guidance that the assessment has been undertaken in accordance with, the consultation undertaken with statutory consultees and other organisations, methods used (desk study, surveys etc.), the Study Area, the criteria used to assess the significance of the effects and, (as required by the 2017 EIA Regulations) any limitations encountered in undertaking the assessment.

Future Baseline in the Absence of the Development: provides a description of the predicted environmental conditions and proposed or likely changes likely to occur in the absence of KTR Project which are of relevance to the topic assessed. This includes natural changes, climate change and the potential for future developments in the Study Area.

Infrastructure Location Allowance: details any specific areas where use of the 50 m infrastructure location allowance (ILA) is proposed to be utilised in advance of detailed site investigation works taking place.

Embedded Mitigation Measures: outlines measures for construction and operation working practices that are assumed to be in place during construction and operation of the KTR Project.

Existing Conditions: summarises the baseline situation, including field survey results where appropriate.

Predicted Construction and Operational Effects for Each Connection: details the likely significance of effects (both negative and positive) of the relevant connection during the construction and operational phases, as well as the cumulative effects for each connection. Proposed mitigation and residual effects are also detailed. Each chapter considers each of the five connections including the removal of the existing N and R routes in the relevant connection assessment. Cumulative effects are also considered for each connection where relevant.

KTR Project as a Whole: Assessment of Effects: considers the inter-related nature of the different components of the KTR Project assessed above and sets out the mitigation measures and the likely residual effects during the construction and operational phases for the entire KTR Project, as well as the cumulative effects with other developments.

Interrelationship between Effects: considers where effects between topics may interact to lead to interrelated effects on a single receptor.

Summary of Significant Effects: summarises in tabular format the significance of effects, mitigation measures and residual effects.

Statement of Expertise

1.41 Regulation 5 of the 2017 EIA Regulations relating to the preparation of the EIA Report states:

"In order to ensure the completeness and quality of the EIA Report—

(a) the developer must ensure that the EIA Report is prepared by competent experts; and

(b) the EIA Report must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts."

1.42 LUC has coordinated the EIA and compiled this EIA Report on behalf of the SPEN. LUC has secured the Institute of Environmental Management and Assessment (IEMA) Quality Mark for EIA. This provides assurance to third party stakeholders that the EIA is of high quality and that LUC's EIA activities have been independently reviewed by IEMA. LUC prepared the introductory chapters (**Chapters 1-6**) in conjunction with SPEN, the Intra-Connection and Intra-KTR Effects chapter (**Chapter 17**) the summary chapter (**Chapter 18**) and the NTS in addition to a number of specialist topic areas as noted in **Table**

1.1 below. Whilst LUC has overall responsibility for the EIA Report, sub-consultants have undertaken specialist assessments where necessary as detailed in **Table 1.1**.

Table 1.1: Responsibilities for the EIA Report[9]

EIA Report Chapter		Organisation Responsible
Chapter 7	Landscape and Visual Amenity	LUC
Chapter 8	Forestry	RTS Forestry
Chapter 9	Geology, Hydrology, Hydrogeology, Water Resources and Peat	Kaya Consulting Limited (Geology, Hydrology, Hydrogeology, Water Resources) Fluid Environmental Consulting and East Point Geo (Peat)
Chapter 10	Ecology	LUC
Chapter 11	Ornithology	Natural Research Projects Limited
Chapter 12	Cultural Heritage	CFA Archaeology Limited
Chapter 13	Traffic and Transport	Mott MacDonald
Chapter 14	Noise	Hoare Lea
Chapter 15	Socioeconomics, Tourism and Recreation	Stantec UK
Chapter 16	Other Issues	LUC and National Grid

1.43 Details of the relevant qualifications and experience of the lead members of the EIA team are set out in **Appendix 1.1: Statement of Expertise** in EIA Report Volume Three.

Availability of the Environmental Impact Assessment Report

1.44 Electronic copies of the NTS and all other EIA Report documents can be downloaded free of charge via the KTR Project website: www.spendgsr.co.uk.

1.45 In light of the current public health advice relating to the Covid-19 outbreak, parts of the EIA Regulations were amended on 24th April 2020 by The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 to temporarily relax the requirements to place hardcopies of EIA Reports in the public domain during statutory application consultation periods and to make copies available electronically. On this basis, hard copies are not available to view in public viewing locations in accordance with the Regulations.

1.46 An electronic copy (via USB) of the EIA Report documents can be obtained free of charge, and hard copies of the EIA Report may be purchased for £800, by contacting SPEN using the contact details set out below:

- By dedicated freephone number: 0800157 7353; or
- By email to dgsr@communityrelations.co.uk; or
- By post to FREEPOST SPEN DGSR.

Representations

1.47 Any representations to the application may be submitted via the Energy Consents Unit website at www.energyconsents.scot/Register.aspx; by email to the Scottish Government, Energy Consents Unit mailbox at representations@gov.scot ; or by post to the Scottish Government, Energy Consents Unit, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU, identifying the proposal and specifying the grounds for representation.

[9] Data used in preparation of the figures of **Chapters 7-16** of the EIA Report was supplied by the relevant organisations detailed in **Table 1.1**.

Chapter 2
The Routeing Process and Design Strategy

Contents

Figures

2 The Routeing Process and Design Strategy

2.1 This chapter outlines SP Energy Networks' (SPEN) approach to routeing, the routeing objective, the routeing methodology for the Kendoon to Tongland 132 kilovolt (kV) replacement project ('the KTR Project') and the outcomes of the routeing and consultation process.

2.2 Following the completion of the routeing process, further modifications to the design of the overhead lines (OHLs), including siting of towers/poles and associated infrastructure and felling/replanting proposals were made to further avoid or reduce likely significant effects. Following a review of the relevant policy context, the remainder of this chapter discusses the design strategy for the towers/poles, access tracks and forestry felling/replanting, the design of which, in combination with the routeing work, played a critical role in seeking to avoid and reduce likely significant environmental effects.

2.3 In accordance with the scoping opinion, this chapter also presents the alternatives considered (in addition to routeing), to avoid or reduce likely significant effects.

SPEN's Approach to Routeing

2.4 The Government[1], Ofgem[2] and the electricity industry including SPEN have reviewed their positions on the routeing of major electrical infrastructure projects including 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. It is therefore SPEN's view that wherever practical an OHL approach is taken when planning and designing new or reinforced transmission lines. However, SPEN accepts that there are specific circumstances in which an undergrounding approach should be considered.

2.5 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[3]). This document is available at www.spendgsr.co.uk.

The Routeing Objective

2.6 As stated above, section 38 and Schedule 9 of the Electricity Act 1989 impose a statutory duty on SPEN to take account of the following factors in formulating proposals for the installation of overhead transmission lines and other works:

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

(b) 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."

2.7 SPEN has a 'Schedule 9 Statement' which sets out how it will meet the duty placed upon it under section 38 and Schedule 9. As a result of this and its duties under section 9 of the Electricity Act 1989, SPEN is required to formulate proposals that meet 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.

2.8 In developing and maintaining an efficient and co-ordinated technically and economically viable transmission system, in accordance with its statutory duties and transmission licence obligations, SPEN is committed to limiting disturbance to people and the environment by its operations. It is widely acknowledged that the best way to achieve this is through careful routeing. The exercise of professional judgement is required in weighing a range of issues to ultimately identify routes, which, on balance, best meet the project routeing objective.

2.9 The Routeing Objective for the KTR Project is:

"To identify a technically feasible and economically viable route for a continuous 132kV overhead line connection supported on lattice steel towers from Polquhanity to Kendoon, from Kendoon to Glenlee, and from Glenlee to Tongland. The Project is also required to identify new 132kV overhead line connections supported on trident wood poles from Carsfad to Kendoon, and from Earlstoun to Glenlee. The routes should, on balance, cause the least disturbance to the environment and the people who live, work and enjoy recreation within it."

The Routeing Methodology

2.10 It is generally accepted across the electricity industry that the guidelines developed by the late Lord Holford in 1959 for routeing overhead transmission lines, 'The Holford Rules'[4], with subsequent updates, should continue to be employed as the methodological basis for routeing high voltage overhead transmission lines. Whilst the Holford Rules relate specifically to transmission lines carried on steel towers, many similarities exist with routeing of lines carried on wood poles. On that basis, many of the principles contained in the Holford Rules have also been used as a guide to routeing of the connections[5] on wood poles.

2.11 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' and the screening[6] of infrastructure.

2.12 Where, due to the requirement to balance a number of technical and environmental factors, the OHLs are routed through forestry, the Forestry Commission's Landscape Design Guidelines[7] , which contain guidance in relation to routeing OHLs in areas of forestry, have been followed. The guidelines advise *"a power line through the forest should*:

- *avoid areas of landscape sensitivity;*
- *not follow the line of sight of important views;*
- *be kept in valleys and depressions;*
- *not divide a hill in two similar parts where it crosses over a summit;*
- cross skylines or ridges where they dip to a low point;
- *follow alignments diagonal to the contour as far as possible; and*
- *vary in the alignment to reflect the landform by rising in hollows and descending on ridges."*

2.13 The routeing methodology for the KTR Project was also informed by the following:

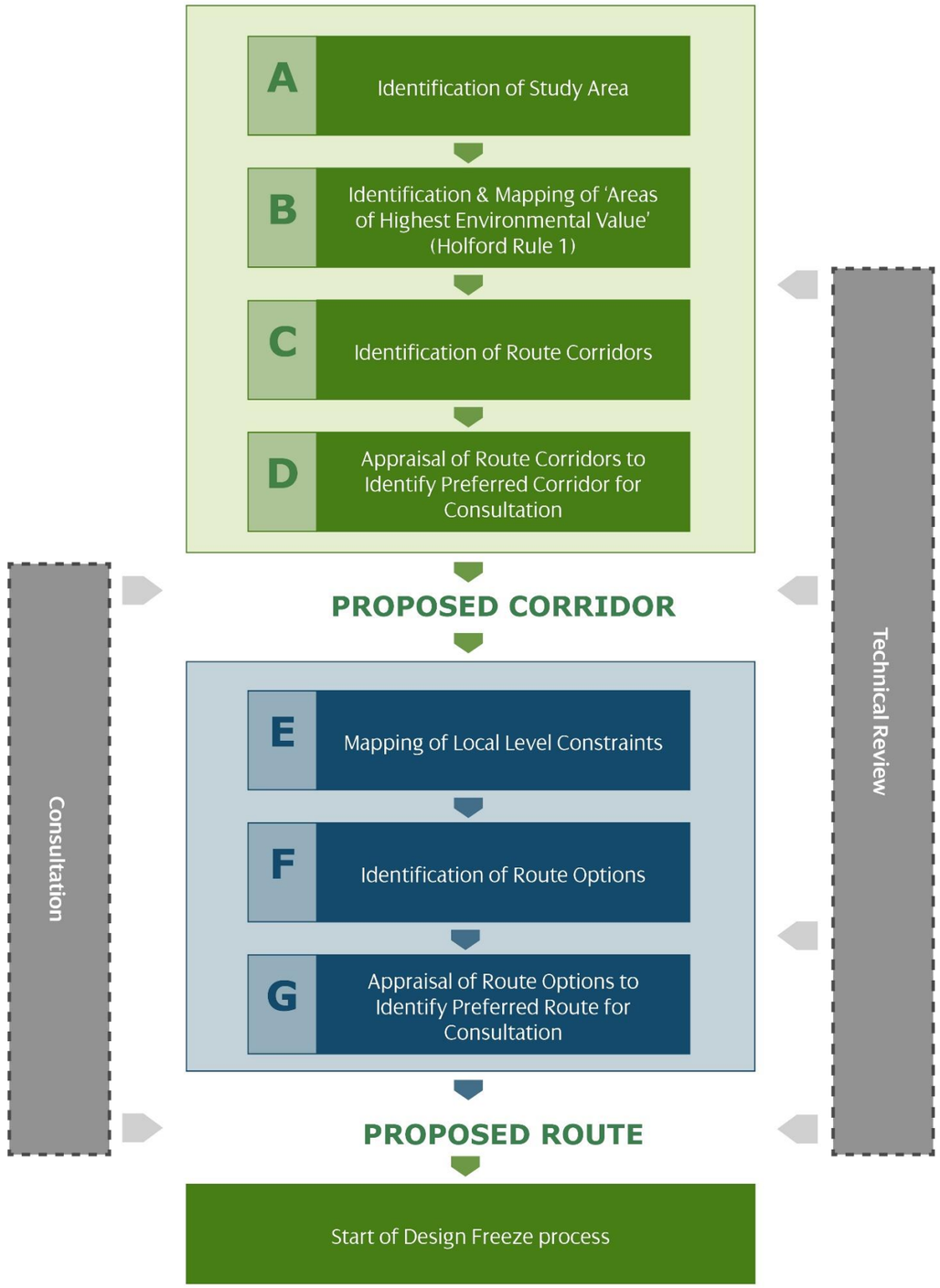
- SPEN and LUC experience of routeing OHLs;
- relevant national and local planning policy and guidance;
- consultation with stakeholders comprising the Statutory Stakeholder Liaison Group[8] (SSLG), non-statutory consultees, interested parties/groups and the public.

2.14 The methodology for line routeing comprises a number of broadly sequential steps as shown in **Figure 2.1** below**.** For simplicity, the methodology is set out in a linear manner, with the findings of each step

[1] Through National Policy Statements for Electricity Networks Infrastructure such as EN-5
[2] In terms of allowances and expenditure
[3] This document is reviewed every 3-5 years.
[4] NGC 1992, SHETL 2003
[5] Connections as comprised in the KTR Project as listed in Chapter 1 and illustrated on figure 1.3
[6] It is acknowledged that in relation to the provision of woodland screening (with reference to commercial woodland in particular) screening is often only of a temporary nature.
[8] The SSLG is chaired by the Scottish Government and is attended by SPEN and consultees who are directly involved in the consenting process. Minutes of these meetings are published on the Scottish Government website at http://www.gov.scot/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/DumfriesandGallowayStrategicReinforcementProject

informing the next step, building up an ever-increasing level of understanding to inform the routeing process. However, it is important that the process for identification of routes remains iterative. This means that the outcome of each step is subject to a technical and, where relevant, consultation 'check' to ensure that LUC, SPEN and key stakeholders are confident of the findings prior to commencing the next step.

Figure 2.1: Routeing Methodology



2.15 A number of overarching principles which informed the routeing methodology for the KTR Project are outlined below.

Technical Considerations

2.16 Technical issues to be considered in routeing were identified by SPEN. These included physical constraints to routeing such as existing high and low voltage OHLs within the area including the 132kV network running from Polquhanity to Tongland via Glenlee (the N and R routes), slope, altitude, access, and large waterbodies.

2.17 Additional technical issues, including tower/pole design, construction techniques, operational life and maintenance, and government guidelines were considered during the more detailed design stages as discussed further in The Design Process (later in this chapter), **Chapter 5: Felling, Construction, Operational Maintenance and Decommissioning** and reported in the specialist topic **Chapters 7-16**, where relevant**.**

Economic Considerations

2.18 In compliance with the duties within section 9 of the 1989 Act, the Routeing Objective required the proposed routes to be 'economically viable'. This is interpreted by SPEN as meaning that as far as is reasonably possible, and other things being equal, each OHL 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.

Environmental Considerations

2.19 Statutory duties imposed by the Electricity Act 1989 require licence holders to seek to preserve features of natural and cultural heritage interest and mitigate, where possible, any effects which their proposals may have on such features. The construction and operation (and decommissioning of N and R routes) of the KTR Project will potentially have effects on the environmental and the people who live, work and recreate within it, including effects on the following:

- Visual amenity;
- Landscape character;
- Ecology and ornithology;
- Hydrology, geology and water resources;
- Cultural heritage;
- Land uses including agriculture, forestry and minerals;
- Residential amenity; and
- Recreation and tourism.

2.20 Some environmental effects can be avoided or reduced through careful routeing, other effects are best mitigated through local deviations of the route, the refining of tower/pole locations and specific construction practices. The design strategy section of this chapter provides examples of those factors that were taken into consideration during the design process to avoid or minimise environmental effects.

Overview of Key Stages in the Routeing Process

2.21 As set out in **Chapter 1: Introduction**, the KTR Project originally comprised an integral part of the larger Dumfries and Galloway Strategic Reinforcement Project (DGSR Project[9]). The outputs from the early routeing and consultation stages of the DGSR Project have influenced the KTR Project.

2.22 Steps A to D of the routeing methodology were undertaken for the KTR Project in 2014/2015 as part of the DGSR Project, culminating in the identification of 'preferred corridors' from Kendoon to Glenlee and Glenlee to Tongland. These preferred corridors were taken forward for a three month stakeholder and public consultation between June 9th and 31st August 31st 2015 (Round One Consultation – see below). The methodology and findings of these steps of the routeing process are presented in the DGSR Project: Routeing and Consultation Document (2015). Following the evaluation of feedback and further SPEN review, the preferred corridors were confirmed as the 'proposed corridors' and these were progressed to the next steps of the routeing methodology (steps E to G).

2.23 Steps E to G culminate in the identification of the 'preferred route' for the OHLs which were taken forward for stakeholder and public consultation between 31st October 2016 and 21st December 2016[10] (Round Two Consultation – see below). Further detail on Steps E-G of the methodology, i.e. the steps followed to identify preferred routes for each connection comprising the KTR Project and the findings of these steps of the routeing methodology are presented in The Kendoon to Tongland Reinforcement Project: Routeing and Consultation Document (2016). Following the evaluation of feedback and further SPEN review the preferred route was confirmed as the 'proposed route' for progression to the more detailed review of the proposed line alignment which is informed by the parallel EIA stage.

2.24 The proposed routes were taking forward to the alignment stage and informed by the emerging findings of environmental surveys, landowner discussions and engineering design, locations of infrastructure comprising towers/poles, accesses and working areas were identified. The alignment was taken forward for stakeholder and public consultation between 20th November 2017 and 26th January 2018 (Round Three Consultation – see below). Further detail on the work undertaken to identify the alignment of the OHLs and associated infrastructure is presented in the Kendoon to Tongland Reinforcement Project: Consultation Round Three: Consultation Document (2017).

The Routeing Consultation Process

2.25 SPEN is committed to consulting with key stakeholders, including statutory and non-statutory consultees and the local community. The consultation and engagement process begins at the early stages of development project and continues into construction once consent has been granted.

2.26 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' (available to download from www.spendgsr.co.uk). SPEN aims to ensure effective, inclusive and meaningful engagement with local communities, statutory consultees, stakeholders and interested parties through four key engagement stages:

(i) pre-project notification and engagement;

(ii) information gathering to inform the routeing stage;

(iii) obtaining feedback on emerging route options; and

(iv) the Environmental Impact Assessment (EIA) stage.

2.27 In addition, as outlined in **Chapter 1**, SPEN as holder of a transmission licence, has a duty under section 38 and Schedule 9 of, the Electricity Act 1989, when putting forward proposals for new electric lines and other transmission development, to have regard to the effect of the proposals on communities, in addition to the desirability of the preservation of amenity, the natural environment, cultural heritage, landscape and visual quality.

Consultation Rounds

2.28 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 and Deployment Unit's Best Practice Guidance (January 2013). This guidance encourages applicants to engage with stakeholders and the public to develop their proposals in advance of such applications being made. Therefore during the routeing and EIA stages of the KTR Project SPEN carried out three rounds of consultation with stakeholders and the public. The three rounds comprised:

- **Round One:** Public consultation on the preferred corridors, which was carried out from June 8th to August 31st 2015 (as part of the wider DGSR Project).

[9] Further background to the DGSR Project and how KTR relates to it is provided in Chapter 1.

[10] deadline for consultation responses was extended until 13th January 2017 due to the festive holiday period.

- **Round Two:** Public consultation on preferred routes, which was carried out from October 31st to December 21st 2016[11].
- **Round Three:** Public consultation on detailed route alignment, which was carried out from November 20th 2017 to January 26th 2018.

2.29 For each round of consultation the following was undertaken:

- **Advertising**: adverts were placed in local weekly newspapers at least seven days before the first exhibition and a press release was issued to local media.
- **Leaflet**: a leaflet explaining the project and consultation was posted out to homes, businesses, community councils, local interest/community groups in the area.
- **Exhibitions**: exhibitions were held within the local area where members of the public could talk to members of the project team, look at project information and maps, and visualisations (Consultation Rounds Two and Three only), and pick up a feedback form.
- **Project website**: a website was set up to host information and project documents.
- **Public information points**: hard copies of the consultation documents were lodged at a number of publically accessible local information points for the period of the consultation.
- **Feedback**: forums for the provision of feedback comprised; in person at exhibitions, online, by post, by e-mail and by phone.

2.30 Further information in relation to each routeing and consultation round is provided below. Details of the public consultation events are presented in the KTR Project Pre-Application Consultation (PAC) Report (2019).

The Statutory Stakeholder and Community Liaison Groups

2.31 An SSLG was formed at the outset of the KTR Project consisting of statutory consultees including Dumfries and Galloway Council (D&GC), Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) and Historic Environment Scotland (HES). In addition, whilst not a statutory consultee, the Scottish Government also invited Forestry Commission Scotland (Scottish Forestry[12]) to join the Group given the extent of forestry within the KTR Study Area. Chaired by the Scottish Government Energy Consents Unit (ECU), the SSLG met as necessary at key milestones throughout the project programme. This process ensured that all statutory consultees were kept up to date with project progress, and that they had the opportunity to comment on and feed in to the routeing process.

2.32 In addition, a Community Liaison Group (CLG), chaired by the ECU, was established prior to the second round of consultation. This forum provided representatives of communities who are directly affected by the KTR Project with the opportunity to be informed on the latest proposals and to raise points for discussion with SPEN. The CLG also met as necessary at key milestones throughout the project programme.

Wider Consultation

2.33 Throughout the consultation process various groups of stakeholders and organisations relevant to the KTR Project in addition to those comprising the SSLG and CLG were consulted. These included:

- Local communities and members of the public;
- Community councils;
- Local interest organisation and groups;
- Local Councillors within Dumfries and Galloway; and
- Local Member of Parliament (MP) and Members of the Scottish Parliament (MSPs).

Routeing and Consultation Round One

Routeing Methodology Steps A-C

2.34 As outlined above, the initial routeing and consultation stage for the KTR Project was undertaken as part of the wider DGSR Project. Details of the routeing process and findings are presented in 'The Dumfries and Galloway Strategic Reinforcement Project: Routeing and Consultation Document' (May 2015). This initial stage of the routeing process follows Steps A-D of the overarching routeing methodology, comprising the identification of the Study Area and mapping of 'areas of highest environmental value' (Holford Rule 1), to inform the landscape led identification of route corridors, and subsequent environmental and technical appraisal to identify a preferred route corridor.

2.35 The Study Area was identified during Step A, to ensure that it was large enough to accommodate all likely corridor options, reflecting the routeing objective, topography and land mass. A preliminary check was carried out to identify the presence of International, European or nationally designated areas within the vicinity of the proposed Study Area to ensure potential effects on these areas could be considered.

2.36 Step B comprised the identification of 'areas of highest environmental value' to further focus the Study Area, reflecting the guidelines included in the Holford Rules (Rule 1) and accompanying Scottish Hydro Electric Transmission Limited (SHETL) clarification notes. Rule 1 relates to the avoidance, where possible, of 'major areas of highest amenity value'[13]. SHETL clarification note b) states that areas of highest amenity value *"require to be established on a project-by-project basis considering Schedule 9 to the Electricity Act, 1989, Scottish Planning Policies, National Planning Policy Guidelines, Circulars and Planning Advice Notes and the spatial extent of areas identified."* The Holford Rules provide examples to be considered. Holford Rule 2 makes the following recommendation *"avoid smaller areas of high amenity value or scientific interest by means of deviation",* and SHETL clarification note a) states that *"small areas of highest amenity value not included in Rule 1 as a result of their spatial extent should be identified".*

2.37 On this basis, all areas considered to be of 'highest environmental value' regardless of their spatial extent were identified and mapped as Step B, reflecting both Rule 1 and Rule 2 in relation to spatial extent. Areas of highest environmental value located within the Study Area, and therefore considered within Step B of the methodology, of relevance to the KTR Project, included:

- Special Protection Areas (SPA);
- Sites of Special Scientific Interest (SSSI);
- Scheduled Monuments (SM); and
- Inventory Gardens and Designed Landscapes (IGDL).

2.38 In addition to the above, Supplementary Note a) of the Holford Rules states "*avoid routeing close to residential area as far as possible on the grounds of general amenity*." At this stage in the routeing methodology, settlements were identified to represent residential areas to be avoided where possible in the identification of corridors and substation siting areas. Settlements are defined as those areas identified within Development Plans.

2.39 Areas of highest environmental value were avoided in identifying options for OHL corridors and substation siting areas, taking account of other technical considerations[14] . A review was also undertaken by SPEN to identify potential technical considerations to be reflected in Step B, including operational or consented wind turbines and areas of high/steep ground.

2.40 Step C comprised the identification of route corridors for the OHLs. The development of electrical transmission infrastructure, including OHLs, and ancillary components is likely to have a number of landscape and visual effects which are difficult to avoid. The best way to limit adverse effects on landscape and visual amenity is by careful line routeing undertaken by landscape architects based on professional judgement and informed by fieldwork. Taking account of the guidance provided in Rules 4 and 5 of the Holford Rules, OHL infrastructure is judged to be more widely visible from surrounding areas when located on higher ground, for example ridges and skylines. With consideration of areas of highest environmental value, technical considerations identified in Step B and informed by topography, potential

[11] deadline for consultation responses was extended until 13th January 2017 due to the festive holiday period.
[12] Forestry Commission Scotland (FCS) are known as Scottish Forestry from 1st April 2019
[13] Interpreted in this report as 'environmental value' to reflect wider intrinsic value.
[14] Where individual SMs and LBs or clusters of SMs and LBs have a spatial extent considered large enough to influence the identification of corridors.

route corridor options were identified. These corridor options included existing 132kV OHLs, even where these are located within areas of highest amenity value, reflecting Note a) on Rule 1 and Note c) on Rule 2 of the Holford Rules.

Corridor Options

2.41 Due to the relatively short length of the connection, and limited opportunities for identifying multiple corridors due primarily to local topography, only one corridor option was identified between Kendoon (K) and Glenlee (G), which follows the broad valley of Water of Ken. Corridor K/G1 runs from Glenlee to Polquhanity in a northern direction and provides a single wide corridor with line routeing options through the Glenkens valley, avoiding the higher ground to the west and east of the valley.

2.42 Four alternative corridor options were identified between Glenlee (G) and Tongland (T). Corridor G/T1 runs from Glenlee to Tongland in a southern direction providing routeing options which avoid Loch Ken (and its associated ecological designations). In the southern section, the corridor provides routeing options to the west of the high ground at Laurieston Forest.

2.43 Corridor G/T2 runs from Glenlee to Tongland in a southern direction and follows the alignment of the existing 132kV OHL. In the northern section, the corridor provides routeing options to cross Loch Ken to the north of the SSSI/ Ramsar site and though the area where the existing 132kV OHL crosses the loch. In the southern section, the corridor provides routeing options to the east of the high ground at Laurieston Forest.

2.44 Corridor G/T3 runs from Glenlee to Tongland in a southern direction. In the northern section the corridor passes to the east of Newton Stewart and then crosses Loch Ken to the south of the SSSI/ Ramsar site to the north of this waterbody. In the southern section, the corridor provides routeing options to the east of the high ground at Laurieston Forest.

2.45 Corridor G/T4 runs from Glenlee to Tongland in a southern direction and follows the alignment of the existing 132kV OHL. In the northern section, the corridor provides routeing options to cross Loch Ken to the north of the more southerly SSSI/ Ramsar site on the loch and though the area where the existing 132kV OHL crosses the loch. In the southern section, the corridor provides routeing options to the east of the high ground at Laurieston Forest.

Step D - Corridor Appraisal and Identification of Preferred Corridor

2.46 The corridor options were subjected to a comparative appraisal against a number of environmental criteria as Step D of the routeing methodology. Based on the preliminary findings of Steps A-C, knowledge of the Study Area and previous routeing experience, appraisal criteria were proposed in relation to the following:

- length of corridor;
- biodiversity and geological conservation;
- landscape and visual amenity;
- cultural heritage;
- flood risk; and
- land use.

2.47 These criteria comprise both constraints/considerations identified in previous steps, e.g. areas of highest environmental value, and new constraints, e.g. areas of regional or local value, as required in this step.

Preferred Corridors

2.48 K/G1 was the preferred corridor as only one option was identified.

2.49 Corridor G/T2 was the preferred corridor as it avoids proximity to the National Scenic Area (Holford Rule 1) and in relation to visual amenity it avoids the more sensitive receptors around the Loch Ken area (viewpoints and tourist route). The corridor also avoids landscapes with low capacity for OHL development, however, as with the other corridors, the Regional Scenic Area cannot be avoided (Holford Rule 2). Corridor G/T is also preferred on biodiversity grounds, primarily ornithology as the 'trigger for consideration zone' of the Loch Ken and River Dee Marshes SPA can be avoided. In relation to cultural heritage, Corridor G/T2 avoids the Archaeologically Sensitive Area and has a relatively lower density of Scheduled Monuments and Listed Buildings. Corridor G/T2 is also the shortest corridor (Holford Rule 3) and avoids the 1/200yr flood risk zones. However, the felling of woodland will be required to accommodate the OHL (Holford Rule 4 and 5).

2.50 Following a technical review, SPEN confirmed that a continuous corridor had been found for an OHL development which meets the KTR Project routeing objective. The corridor was taken forward to Consultation Round One as outlined above and detailed in the Pre-application Consultation (PAC) Report (2019).

2.51 The outcome of Consultation Round One is presented in DGSR: Summary of Feedback from 2015 Consultation, which remains relevant to the KTR Project, a revised scheme (July 2016).

2.52 The feedback received informed SPEN's review of the KTR Project with regards to the following:

- People's views on the project as a whole, including the routeing methodology;
- People's views on SPEN's corridors;
- Information about the local area, for example, areas people use for recreation, local environmental features people wanted us to consider, and any plans people had to build anything in our preferred corridors; and
- People's views on conducting future rounds of consultation.

2.53 In conclusion, after reviewing all comments and suggestions in detail against i) the overarching KTR Project objective and ii) the methodology for the identification and appraisal of corridors, the proposed corridor for the 132kV OHL between Glenlee and Tongland was G/T2. However, in response to the feedback from the public and consultees to the first round of consultation, SPEN proposed to widen the corridor to the west near Mossdale (where it does not encroach on areas of highest environmental value) to incorporate the Laurieston Forest. This was to enable SPEN to consider line route options within an extended corridor area[15]. Corridor K/G 1 was also confirmed as the proposed corridor between Kendoon and Glenlee. The proposed corridors are shown on **Figure 2.2**.

2.54 These proposed corridors were progressed to the next stage of the routeing process as outlined below.

Routeing and Consultation Round Two

2.55 The round one consultation process was originally undertaken for the wider DGSR Project, which covered relevant elements of the KTR Project. Therefore, in developing the strategy for the second stage of the routeing process and consultation process, feedback submitted by stakeholders and communities during the first round of consultation was taken into account. This included feedback from the SSLG on the routeing methodology which was revised following the reduction in scope of the DGSR Project, to the KTR Project, and issued to the SSLG in July 2016 for review and comment.

2.56 The routeing method for steps E to G continued to follow a staged iterative process as summarised below:

- Step E: mapping of Holford Rule 1 and 2 constraints (which include regional and local level constraints), as well as opportunities, within the Study Area;
- Step F: identifying route options using best landscape fit (following Holford Rules 3-7); and
- Step G: appraising route options to identify a preferred route for each OHL.

Routeing Methodology Steps E-F

2.57 The next step in routeing was the identification and mapping of Holford Rule 2 constraints, comprising smaller geographical areas of highest amenity value and areas of regional or local high amenity value identified from development plans. These were mapped in addition to those identified during previous steps (corridor identification and appraisal steps A to D), as is consistent with the Holford Rules and SPEN's approach to routeing.

[15] See paragraphs 8.2.15 to 8.2.17 of the Summary of Feedback Report (July 2016)

2.58 In addition to the relevant Areas of Highest Environmental Value mapped during Step B, information included during the appraisal of corridors stage (Step D), which remain relevant to this route option stage were mapped namely:

- Regional Scenic Areas (RSAs);
- Key viewpoints including mapped viewpoints and tourist routes,
- Conservation Areas;
- Archaeologically Sensitive Areas;
- Flood risk areas (1/200yr);
- Woodland; and
- Committed and Existing Development.

2.59 Further information was gathered specifically to inform the identification of route options. This comprised Holford Rule 2 constraints which were mapped and treated as 'avoid where possible', or 'where not possible, balanced with other considerations'. Further details of the information gathered to inform the identification and appraisal of route options is provided in 'The Kendoon to Tongland Reinforcement Project: Routeing and Consultation Document' (October 2016).

2.60 This information was used to inform Step F of the routeing methodology, which comprised the identification of route options using the methodology set out below to meet the overarching Routeing Objective whilst reflecting the Routeing Strategy.

2.61 Route options approximately 200m wide, which met technical parameters, whilst wherever possible avoiding environmental constraints, including individual residential properties, were identified by landscape architects using the desk based mapping supplemented by knowledge of the area gathered during field work. In addition to seeking to avoid the identified Holford Rule 1 and 2 constraints, consideration was given to Holford Rules 3 to 7.

2.62 Consideration was also given to the 'fit' of the OHL within the topography and the landscape. Key objectives were as follows, namely to:

- follow the grain of the landscape, running within valleys, in parallel with woodland edges, field boundaries etc. wherever possible;
- use woodland and topography as a backdrop to the line, or as a foreground screen (Holford Rule 4);
- minimise the number of crossings of linear features (e.g. roads and rivers), and when appropriate cross at a perpendicular angle;
- minimise the exposure of the line over prominent ridges and skylines (Holford Rule 4);
- avoid creating wirescape with existing infrastructure (Holford Rule 6);
- avoid residential areas as far as practicable, including individual properties which could be adversely affected, particularly by steel towers (Holford Supplementary Note a); and
- other things being equal, prefer the shortest and/or most direct alignment (Holford Rule 3).

2.63 Initial desk-based identification of route options was followed by fieldwork[16]. The findings from application of the desk-based criteria were verified and refined where necessary to more accurately reflect the local conditions and characteristics observed in the field. The identification of route options included understanding the principal/ primary view(s) from residential properties which were considered pertinent to routeing; including consideration of the potential screening provided by local landform, woodland and hedgerows; and identifying important views/locally sensitive landscape characteristics. Modifications were made to the route options, where required, to reflect the findings of the site based field work and identify suitable route options to take forward for appraisal.

2.64 It is important to note that at this stage in the routeing process, the approach continued to build on the 'blank sheet' approach adopted at the corridor routeing stage, not solely reflecting the route of existing 132kV OHLs. This ensured that all potential route options were identified and appraised. Where a corridor included an existing OHL, the route option was assessed against the same routeing criteria as newly identified potential route options.

2.65 At this stage, a technical review was undertaken by SPEN to confirm that the route options were technically feasible prior to being progressed to the appraisal step.

Route Options

2.66 Each section of the proposed route was given a unique reference which reflects the substation origin and termination points and the route option letter. For example, route options originating at Kendoon substation (K) and terminating at Glenlee substation (G) are prefixed with K/G and the route option letter e.g. A, B, C etc.

2.67 Six route options were identified for the 132kV L7 lattice steel tower connection between Polquhanity T-in point (P) and the existing Kendoon substation (K).

2.68 Six route options were identified for the 132kV L7 lattice steel tower connection between Kendoon substation (K) and Glenlee substation (G).

2.69 One route option was identified for the 132kV 'trident' wood pole connection between Earlstoun hydro power station (E) and Glenlee substation (G).

2.70 One route option was identified for the 132kV 'trident' wood pole connection between the Carsfad hydro power station (C) and Kendoon substation (K).

2.71 Due to the length of the connection between Glenlee substation (G) and Tongland substation (T), for ease of description and appraisal of options, the Study Area for the 132kV L4 lattice steel tower connection was divided into five sections and numbered accordingly from north to south (e.g. 1, 2, 3 etc.). A number of route options were identified within each route section and referenced by letter e.g. A, B, C etc.

Step G- Route Appraisal and Identification of Preferred Route

2.72 The objective of the appraisal of the route options within Step G was to identify a preferred route, for each connection of the Project. 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.

2.73 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 The Routeing of New High Voltage OHLs; and
- draw out distinctions between the routes to enable the relative strengths and weaknesses of each to be identified.

2.74 Based on the findings of Steps A to E, feedback received from consultation Round One and knowledge of the Study Area, the route options were appraised using the following criteria, which continue to reflect the key considerations of the routeing methodology:

- length of route;
- biodiversity and geological conservation (natural heritage);
- landscape and visual amenity (including recreation and tourism);
- cultural heritage;
- land use;
- forestry; and
- flood risk.[17]

[16] Field based observations undertaken from publicly accessible locations.

[17] See Chapter 5 of the Routeing and Consultation Document (October 2016) for further detail.

2.75 Following the environmental appraisal of route options and subsequent technical review by SPEN, the emerging preferred routes for each part of the KTR Project were subjected to an environmental review of the connections in combination with each other. The review identified where cumulative effects were possible, which comprised areas where the OHLs ran in parallel to each other i.e. the K/G OHL and the C/K OHL and E/G OHL, with cumulative effects continuing to be considered during the route alignment and EIA stages.

2.76 On the basis of the findings of the environmental appraisal and technical review undertaken as Step G of the routeing process, the emerging preferred routes were confirmed by SPEN as preferred routes, which SPEN consider meet the Routeing Objective.

2.77 The preferred route commences at the T-off point at Polquhanity and follows route option **P/K-B** southwards to the Kendoon substation. From Kendoon, route option **K/G-A** follows the route of the existing 132kV OHL along the west of Carsfad and Earlstoun Lochs to the existing substation at Glenlee. Route option **G/T1A** exits the Glenlee substation following the existing 132kV line south-westwards before heading south towards Stroan Loch. From here, route option **G/T2B** routes through Laurieston Forest to join **G/T3C** at Bargaton Loch before crossing the A75 and following the existing 132kV OHL southwards via **G/T4A** and **G/T5B** to the existing substation at Tongland.

2.78 The Carsfad to Kendoon (C-K) and Earlstoun to Glenlee (E-G) connections broadly follow the existing 132kV routes on the western side of Carsfad and Earlstoun Lochs.

2.79 These preferred routes, along with the alternatives considered, formed the basis of consultation with stakeholders and the public as Consultation Round Two.

2.80 The round two consultation focussed on the preferred routes; any alternative route options considered during the appraisal process; any other issues, suggestions or feedback and the removal of the existing OHLs. The findings of the round two consultation process is presented in 'The Kendoon to Tongland 132kV Reinforcement Project: Summary of Feedback from Second Round of Consultation Report (March 2017).

2.81 In addition to feedback on the KTR Project in general, including the need for the KTR Project and suggestions for undergrounding, a number of comments were made on the preferred routes, particularly between Glenlee and Tongland. Comments included support for SPEN's preferred route within this zone/section, as well as preferences for alternative route options considered by SPEN, suggested new routes, and/or deviations, from SPEN's preferred route. At this stage, in response to the consultation on the preferred routes, SPEN actively considered each of the route deviations proposed in the feedback via the appraisal process.

2.82 Maps of the seven proposed deviations which were subjected to appraisal are shown in Chapter 6, Figures 6.3a-d of the 2017 feedback report, and descriptions of the routes together with the findings of the appraisals are detailed in Appendix U of the report.

2.83 In addition, in response to feedback received by the public, a route option was identified for the Glenlee to Tongland connection (G-T) which followed, where possible, the route of the existing 132kV OHL to the east of Loch Ken. This route was subjected to appraisal using the same criteria as the SPEN route options. Detailed maps of this route together with findings of the appraisal and SPEN's conclusions are contained in Appendix V of the 2017 feedback report[18]. In balancing the environmental issues considered for both the existing route (east of Loch Ken), and the SPEN preferred route (west of Loch Ken), in the appraisal process, alongside the feedback received from the public and stakeholders, SPEN's overall preference remained the preferred route west of Loch Ken. The consideration and balancing of these factors is set out below (extract from Appendix V of the 2017 feedback report).

- The route option east of Loch Ken passes directly through the Loch Ken and River Dee Marshes SPA, Ramsar Site and SSSI designated for its ornithological interest. This route option would increase the risk of disturbance and particularly collision to the SPA's qualifying species, as collated information shows flights by the qualifying species would occur across this route option. Mortality arising from increased collisions (due to the configuration of the L4 tower) is likely to have a significant effect on the SPA. Any development which is likely to have a significant effect on the SPA would be subject to a Habitats Regulations Appraisal under the Habitats Regulations. Utilising information gathered as part of the EIA process, the competent authority would undertake an Appropriate Assessment of the project focussing on the qualifying interests of the SPA and potential impacts on the SPAs Conservation Objectives. The guidance[19] for decision makers considering such developments is clear. If it is not possible to establish that a development will not adversely affect the integrity of the site then permission must be refused unless there are no alternatives (such as an alternative route for the connection) and there are imperative reasons of over-riding public interest in proceeding. A formal Habitats Regulation Appraisal has not been undertaken in this case, as pertinent information, e.g. from field studies undertaken specifically for the KTR Project, is currently unavailable. Nevertheless, even if field studies were undertaken specific to this area, we do not consider that it would be possible to establish with the required degree of certainty, that the route option east of Loch Ken would not adversely affect site integrity given the nature of the risk, the sensitivity of the qualifying species and uncertainties in determining the magnitude of impacts on the qualifying species.
- The existing OHL would not have been subjected to the same assessment as environmental legislation, and associated requirements for environmental protection have changed materially since it was constructed in the 1930s.
- The appraisal recognises that the preferred route (west of Loch Ken), has the potential to affect Annex 1/Schedule 1 bird species, due to being located within the' trigger for consideration zones' of a number of nest sites with associated increased flight activity and passes through the 'trigger for consideration zone' of the Laughengie and Airie Hills SSSI. There are opportunities at the alignment stage to minimise disturbance to these species alongside application of appropriate mitigation to reduce and potentially enhance habitats for these species.
- In addition the current SPEN preferred route largely avoids the settled Glenkens Valley, minimising the potential for views from settlements and principal views from residential properties, whilst minimising potential visibility of the OHL from a number of promoted tourist routes and key viewpoints, including those located near to Loch Ken. It is recognised that there are people and residential properties located on the west side of Loch Ken, (as well as tourism and recreational features, including the Raiders Road Forest Drive). Nevertheless, the landscape of the preferred route is judged to have a greater capacity to accommodate an OHL of the size and scale proposed, whilst offering opportunities to utilise landform and tree cover to effectively route the OHL to minimise potential landscape and visual effects.
- The preferred route also offers opportunities to avoid the flood risk zones in comparison to the route east of Loch Ken where siting towers and associated infrastructure in the flood risk zones would be unavoidable.
- Whilst forest cover provides opportunities to limit visibility, it is acknowledged that effects on forestry and woodland will be greater by following the preferred route west of Loch Ken. SPEN will seek to minimise these effects through micro siting of towers in consultation with the forest/woodland managers.
- It is also acknowledged that the preferred route crosses a regionally important archaeologically sensitive area and has the potential for effects on the setting of cultural heritage features due to their relatively higher number and density in proximity to the route in comparison to the existing route east of Loch Ken.

2.84 In balancing the findings of the appraisal of both options in accordance with the KTR Project routeing objective and strategy, and in the context of the Holford Rules for routeing OHLs, SPEN sought to avoid effects on areas of highest amenity value and minimise effects on the landscape and people who live, work, visit and enjoy recreation within it. By progressing the current SPEN preferred route (west of Loch Ken), it enables removal of the existing OHL east of Loch Ken. This is considered an improvement in landscape and visual terms and in relation to the sites designated primarily for their ornithological interest. The beneficial effects of removal have also been highlighted in the consultation responses from SNH and D&GC (see Appendix A of 2017 feedback report).

Confirmation of Proposed Routes

2.85 Following appraisal it was found that a number of the deviations suggested in the consultation feedback were viable options for routeing. These were taken forward by SPEN to the next stage of the routeing process, and this resulted in route modifications near Polquhanity, Darsalloch, Stroan Loch, Slogarie and

[18] https://www.spenergynetworks.co.uk/userfiles/file/BACKGROUND_TO_NEED_CASE_MAY%202015_FINAL.pdf

[19] http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

Edgarton (as described in Chapter 6 of the 2017 Kendoon to Tongland 132kV Reinforcement Project: Summary of Feedback from Second Round of Consultation Report).

2.86 The findings of the appraisal of the proposed modifications resulted in some changes to the routes SPEN then took forward to the next phase of the project, which was detailed alignment as outlined below.

2.87 Polquhanity to Kendoon: The preferred route was selected as SPEN's proposed route for the 132kV OHL between Polquhanity and Kendoon substation. However, in response to the second round of consultation, SPEN moved the northern part of the route slightly further westwards into the forest near Polquhanity.

2.88 The preferred route for the 132kV OHL between Kendoon substation and Glenlee substation and the preferred routes for wooden pole connections from C-K and from E-G were confirmed as the proposed routes for these connections. These were not altered following consultation.

2.89 Due to its length, the G-T connection was considered in five sections. The preferred route consisting of sections 1A/2B/3C/4A/5B had been selected as SPEN's proposed route for the 132kV OHL between Glenlee substation and Tongland substation. However, in response to the feedback from the public and consultees to the second round of consultation, SPEN modified several sections of this route: 1. Section 1A was modified to pass east of Darsalloch Hill, increasing the distance and reducing associated residential visual amenity effects on the property at Darsalloch, as well as minimising loss of woodland; 2. Section 2B was modified in three areas: One minor deviation north of Stroan Loch which moves the route slightly north-eastwards, but not as far as suggested in the feedback to avoid increasing visibility of the route from properties at Mossdale; a second deviation north-west of Slogarie takes advantage of forestry on the eastern slopes of Slogarie Hill, to reduce visibility of the OHL from residential properties without compromising the ornithological constraints to the west; and the third deviation passes north of the properties at Edgarton, to avoid the principal outlook from these properties. The proposed routes for the entire KTR Project are shown on **Figure 2.3.**

Routeing Outcome

2.90 SPEN are of the opinion that the proposed routes taken forward to the detailed alignment stage best meet the strategic Routeing Objective for the KTR Project and SPEN's wider statutory duties.

The Design Strategy – Policy Context

2.91 In line with The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013, Part 3, Regulation 13, an application for planning permission for developments belonging to the categories of national developments or major developments require to be accompanied by a design statement. Although the KTR Project is not an application to which the regulations apply, SPEN recognise the value in explaining the design principles and concepts which have been applied to the proposals. Scottish Planning Policy (SPP) (2014) also highlights the importance of design as a material consideration in the determination of planning applications with Design Statements considered a valuable tool in guiding the quality of developments and the promotion of positive change. Development design and well-designed places is highlighted as a key consideration in the vision for the planning system in Scotland as set out in the SPP.

2.92 Planning Advice Note (PAN) 68 Design Statements (2003) aims to see Design Statements used more effectively in the planning process to create places of lasting quality. Importantly, whilst PAN68 is concerned mainly with urban design and the architectural quality of buildings as opposed to utility infrastructure, it does state that even where a formal Design Statement is not necessary, applicants should still have a clear and logical design philosophy which could be explained if required.

2.93 PAN68 highlights the need for the programme for delivery of the project to be considered in designing the project. The programme for construction of the KTR Project as a whole is 58 months with construction of the individual connections running concurrently. The programme has been carefully considered, taking into consideration wider timescales associated with other elements of the KTR Project, such as linking existing forest design plans to construction phasing and the timing of construction. Further details of the construction phases are provided in **Chapter 5.**

Detailed Design Alignment and Consultation Round Three

2.94 Following the identification of a proposed route for each of the KTR Project connections, work was progressed to identify the most appropriate alignment for the OHLs. This design process was led by the SPEN OHL design team informed by the emerging findings of the environmental surveys, emerging feedback from consultees via the scoping process and landowner feedback. Details in relation to the identification of the alignment of the OHLs and associated infrastructure are provided in 'The Kendoon to Tongland Reinforcement Project: Consultation Round Three: Consultation Document (October 2017).

Project Design Parameters

2.95 It is important to highlight the parameters which influenced the design of the KTR Project from the outset and these are as follows:

(i) The KTR Project comprises upgrading the existing 132kV transmission network between Polquhanity, Kendoon, Carsfad, Earlstoun, Glenlee and Tongland, to replace existing end-of-life infrastructure and enhance security of supply;

(ii) the required voltage and capacity of each individual connection was an important design parameter in influencing the selection of tower/pole type;

(iii) under section 38 and Schedule 9 of the 1989 Act, SPEN is required to consider technical, economic and environmental issues in undertaking its duties and in which design plays an important role;

(iv) as a consequence of the above, design and routeing objectives for the KTR Project required technical, economic and environmental issues to be balanced; and

(v) the design strategy reflects well established procedures and guidance (the Holford Rules[20],) and incorporates towers, poles and associated infrastructure used widely across the UK electricity transmission network.

2.96 In line with established practice, the design of the following was considered in sequence; informed by technical considerations, including the required transmission capacity, and by the proposed route for each connection:

a) the tower/pole locations, type, and span length;

b) the location and design of access tracks and other ancillary infrastructure (e.g. working areas and pulling areas); and

c) the design of forestry felling and re-planting.

The Design Team

2.97 The design work was led by SPEN's in-house engineering design team, informed by the findings of an environmental constraints mapping exercise undertaken by the project environmental specialist teams.

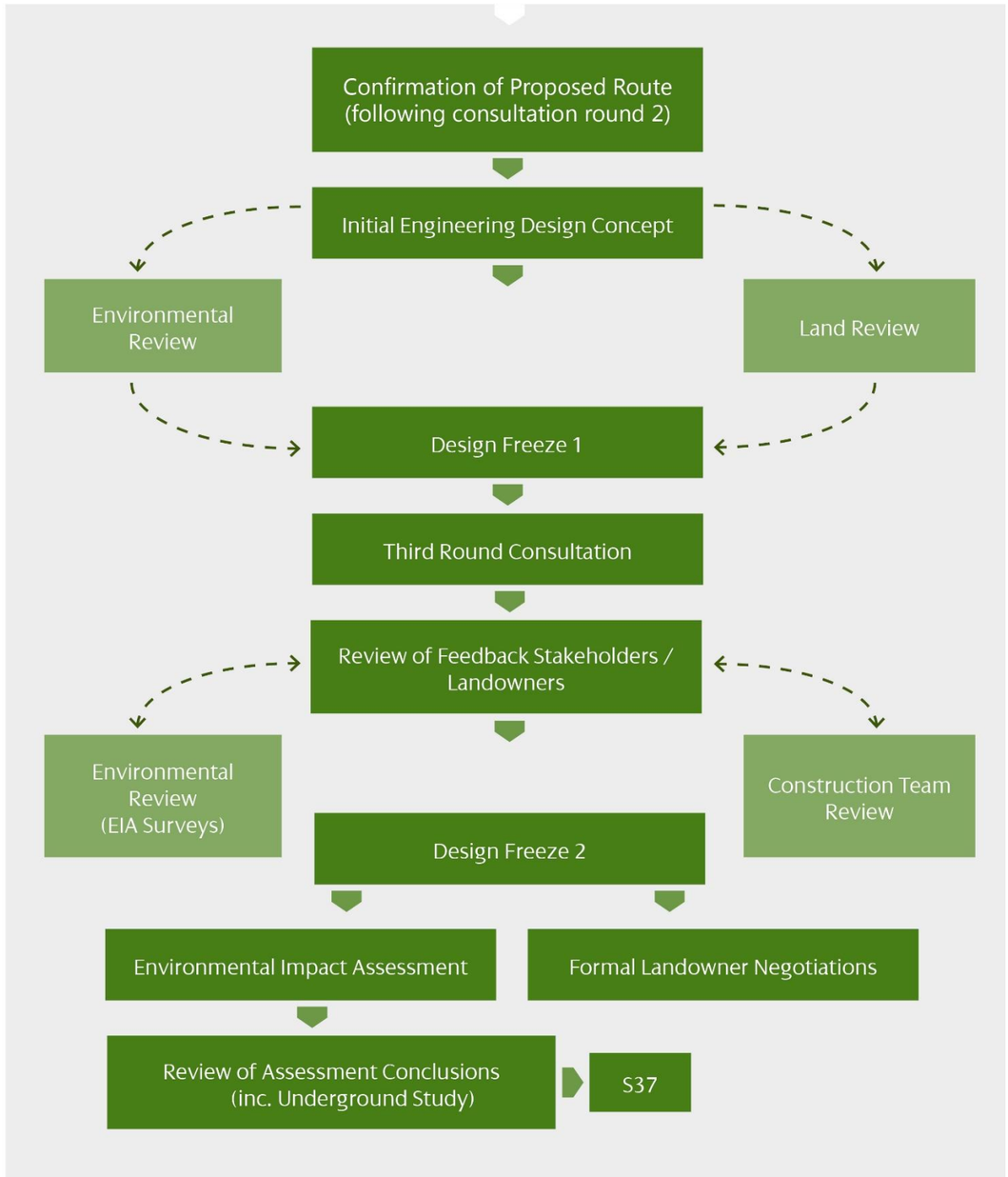
2.98 In consultation with SPEN and LUC, the forestry design work (c) was undertaken by RTS Ltd, an experienced forest management consultant. Consultation has also been undertaken with Forest and Land Scotland (previously Forest Enterprise Scotland), where the KTR Project has been routed through areas of National Forest Estate (NFE).

2.99 The design elements (a) to (c) are discussed in turn below.

2.100 The process for identification of the alignment is outlined in **Figure 2.4** below.

[20] The Holford Rules for the Routeing of New High Voltage Overhead Transmission Lines (1959). Reviewed circa 1992 by the National Grid Company (NGC) plc (now National Grid Transmission (NGT)) as owner and operator of the electricity transmission network in England and Wales, with notes of clarification added to update the Rules. Both the Holford Rules (and NGC clarification notes) were reviewed subsequently by Scottish Hydro Electric Transmission Limited (SHETL) in 2003 to reflect Scottish circumstances. Whilst these relate to towers only, the principles are also useful in routeing high voltage wood pole lines.

Figure 2.4: Process for Design of Overhead Line Alignment



2.101 An initial engineering design concept comprising towers/poles, working areas and proposed access tracks, was designed by SPEN's technical design team reflecting technical parameters such as:

- To minimise the number of towers/poles required;
- To maximise the span lengths between towers/poles;
- To minimise the number of angle towers/poles; and
- To minimise the length of access tracks.

2.102 The design was also informed by the required capacity, the location and orientation of the connection points (substations) and by the proposed route for each connection of the network reinforcement. This determined: the tower /pole locations, type and span length; the location and design of access tracks and pulling areas and (as a separate but related design process, the design of forestry felling).

Tower and Pole Design

2.103 The key design objective for selection of the towers/poles for the KTR Project has been to meet technical requirements, including capacity, safety, network security requirements, and OHL design parameters, whilst taking account of economic and environmental considerations.

2.104 The security of transmission system connections are addressed in the 'National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS)'[21]. This standard addresses the design of generation and demand connections as well as the design and operation of the interconnected transmission system. The NETS SQSS requires that generation connections shall be planned such that, following a fault of a single transmission circuit, a second circuit is available to ensure no loss of power infeed to the transmission system from the generator.

2.105 The design of the OHL components has been based on the National Grid Generic Technical Specifications[22] for OHL design, which have been tested across the existing transmission network.

2.106 The steel towers selected by SPEN are double circuit designs which are NETS SQSS compliant and used currently across the existing network. However, in accordance with design code (BSEN 50341-1) the towers have been subjected to a site specific design review to reflect the final route for each connection[23].

2.107 The L7(c) tower design was chosen for the P-G via K connection as it is capable of supporting the twin phase 'UPAS' conductors (wires) for the double circuit connection required to reinforce existing transmission capacity between the existing Glenlee and New Cumnock substations. The L7(c) is suited to carrying the additional weight of the twin phase conductors as it has reinforced 'down-swept' cross arms. The L4(m) design is broadly similar in design to that of the L7(c) but with a lighter cross arm and smaller tower body. This tower design was chosen for the G-T connection as it is the standard design capable of supporting the lighter single phase 'Sycamore' conductors required to replace and modernise the network between Glenlee and Tongland. The wood pole 'trident' design was chosen for the replacement and modernisation of the C-K and E-G connections as it meets the technical requirements whilst avoiding the requirement for a further tower line in these areas.

2.108 On this basis, SPEN selected the following structures for the KTR Project:

- Polquhanity to Glenlee via Kendoon (P-G via K): a standard L7(c) 132kV galvanised steel lattice tower carrying twin conductors, as used currently by SPEN for OHLs operating at this voltage (see **Figure 2.5a**);
- C-K: 'Trident' design 132kV wood pole carrying single conductors (see **Figure 2.5c**);
- K-G: a standard L7(c) 132kV galvanised steel lattice tower carrying twin conductors, as used currently by SPEN for OHLs operating at this voltage (see **Figure 2.5a**);
- E-G: 'Trident' design 132kV wood pole carrying single conductors (see **Figure 2.5c**);
- BG Route Deviation (BG Deviation): a standard L4(m) galvanised steel lattice tower carrying twin conductors, as currently used by the existing route alignment between Glenlee substation and Newton Stewart substation (see **Figure 2.5b**);

[21] 'National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) (2017)
[22] National Grid Technical Specifications, 2.27 – Generic Design Principles for a New Overhead Line (2004)
[23] All designs have been checked to ensure compliance with ENA specification 43-8 and SPEN OHL14-005 in regards to safety clearance distances

- G-T: a standard L4 (m) galvanised steel lattice tower carrying twin conductors (see **Figure 2.5b**).

2.109 Each OHL requires several different types of towers/poles, as follows:

- Line or suspension towers/poles where the tower/pole is part of a straight section of line and no change in direction is required. Straight sections of wood pole lines include section poles where segmentation is required to contain any failure of the OHL.
- Angle or tension towers/poles where there is a horizontal or vertical deviation in the line direction and straight sections of line require to be segmented. There are usually three angle tower types: 30, 60 and 90 degrees. Angle poles can accommodate changes in direction of up to 35 degrees.
- Terminal towers/poles where the line terminates either at the substation or when the OHL becomes a cabled section.

2.110 Further details of the selected towers and poles, including dimensions, stringing details and photographs are provided in **Chapter 4: Development Description**.

2.111 It is not possible to colour towers to camouflage them for all times of day, all seasons or from all viewpoints. In addition, as steel lattice towers are to a large degree 'transparent', their colour can only be recognised from a short distance, beyond which the colour is not distinguishable and appears as shades of light and dark. New galvanised lattice towers turn a dull grey colour after about 18 months and are normally painted at intervals of approximately 15 to 20 years, subject to atmospheric conditions, for continued protection against corrosion. Wood poles are dark brown when first erected and weather to a silver/grey after about five years, a colour in between these is the colour on which routeing and impact has been assessed. The aluminium conductors will also weather after around 18 months following installation.

Design of Access Tracks and Other Ancillary Infrastructure

2.112 Access to every component of the KTR Project is required during construction. The overall design objectives for the access tracks have been to:

- Minimise the length of new access tracks and where feasible, SPEN has sought to use existing access points with the public road network in order to minimise disruption to road users. Where feasible, SPEN also propose to use separate access and egress points to create offsite one-way systems which will allow the number of vehicle movements to be reduced on the public road (**see Chapter 13: Traffic and Transport).**
- avoid and/or reduce effects upon natural and cultural heritage interests; and
- cause least disturbance to current land use and land management practices.

2.113 The principle method employed to achieve this has been to maximise the use of existing tracks (and bridges), with upgrading of these tracks where necessary. Where this is not possible, or where the use of existing tracks would result in unnecessarily long connecting tracks, two options for temporary access tracks have been considered as follows:

(i) the construction of temporary spurs from existing roads/tracks to each tower/pole;

(ii) the construction of temporary tracks between towers/poles which connect to an existing road or track.

2.114 Further details of the proposed tracks are provided in **Chapter 5**, including the temporary track options available for different ground conditions, where these are likely to be used within the KTR Project and the proposals for reinstatement once the tracks are removed. This chapter also includes an overview of modifications to the tracks proposed during the EIA process, comprising minimisation of the length of new tracks and maximising the use of existing tracks to further avoid or reduce environmental effects. Where possible, this design has also been influenced by discussions and input from landowners.

2.115 At this stage, working areas around towers/poles and indicative pulling areas where also identified reflecting the technical design requirements for their use during construction.

Environmental and Landowner Review

2.116 The initial engineering design of the OHLs was subsequently subjected to a review by the environmental specialist teams, informed by environmental information gathered during the desk and field surveys as well as feedback from consultees. This further environmental information and application to the alignment stage included:

- **Landscape and visual**: informed by consultation responses and landowner feedback, further field work was undertaken to establish the existing baseline conditions, from publicly accessible and private land (where access was granted) to identify potential landscape receptors, and key views and visual receptors (people). The alignment of the OHLs were reviewed in relation to landscape and visual sensitivities, and potential landscape and visual effects, to determine the most appropriate alignment, as well as the location and height of individual towers/poles (subject to technical limitations of the OHL design e.g. topography). The landscape and visual review considered key views from residential properties and popular recreational assets (e.g. Stroan Loch and the Raiders Road Forest Drive), views from key transitory routes (e.g. the crossing of the A75) and with consideration of how the alignment of the OHL is integrated alongside existing landscape features (e.g. forestry) and in relation to underlying landform and topography (e.g. consideration of tower height and elevation).
- **Forestry**: further desk-based and field surveys were undertaken supplemented by consultation with woodland owners/managers to assess existing woodland conditions and review proposals for long term management of woodland blocks (as set out in the relevant Forest Management Plans). This information was used to inform the alignment of the OHLs, to seek to minimise felling of broadleaf woodland, mature conifers (where not scheduled for felling imminently to avoid/minimise windthrow) and utilise existing forest edges where possible. The design also sought to ensure existing and future forest management activities are not compromised.
- **Geology, Hydrology, Hydrogeology, Water Resources and Peat**: a walkover hydrological survey was carried out to identify and document watercourses, identify other water features such as wetlands and springs, ground-truth private water supply (PWS) data, undertake an overview assessment of areas identified as floodplain within the SEPA Flood Maps and provide a general overview of landscape and land cover of importance to hydrology. These findings resulted in a number of design modifications to the alignment of the OHL, with a 10m 'buffer' being placed around all watercourses, and all towers / poles and working areas being located outwith this buffer wherever possible. In addition consideration was given to PWS catchments and areas of marsh land. Peat probing was undertaken systematically along the length of the KTR Project where peat was anticipated (based on the review of British Geological Survey Superficial Geology maps, Soils Scotland Mapping and SNH Carbon and Peatland Mapping), to identify the spatial coverage and depth of peat along the proposed route. More extensive probing was also undertaken at potential tower / pole locations where peat was identified as being present, and, towers/poles and associated infrastructure were designed to avoid areas of relatively deep peat where possible.
- **Biodiversity (ecology and ornithology)**: the initial biodiversity field surveys comprised an extended Phase 1 Habitat Survey including an assessment of suitable habitat for any protected species e.g. otter, water vole and badger, as well as a search for field signs of such species. The findings of the protected species surveys informed the alignment of the OHL where appropriate. Desk studies, consultations to date, and a programme of ongoing targeted ornithological field surveys commenced in October 2016. These included surveys for populations where individuals breed, roost or forage at distances of up to 2km from the KTR Project. One full year of surveys was completed (at the time of detailed alignment stage), which informed the alignment of the OHL where relevant, for example through consideration of tower heights within a number of forest areas.
- **Cultural Heritage**: a desk-based assessment and walkover field survey was conducted to identify all known cultural heritage assets as well as visits to key cultural heritage assets which have potential intervisibility with the KTR Project within the wider Study Area (5km wide), to assess whether the presence of KTR Project would affect their settings. Following the completion of the cultural heritage survey work, and the mapping of related constraints, a number of towers / poles, working areas and access tracks were relocated, or rerouted where possible to avoid direct effects identified cultural heritage assets.

2.117 Where possible, the SPEN wayleaves team also contacted landowners to discuss the initial engineering design of the OHL to gather their feedback. Where tower or pole positions were considered to have a potentially adverse effect on the environment, or an adverse effect on landholdings, a new position was suggested by the environmental and/or SPEN wayleaves team. Feedback from the landowner discussions included:

- Where possible infrastructure such as working areas, access tracks, and tower stays positioned so as to avoid straddling land boundaries;

- Where possible towers / poles positioned to minimise the sterilisation of current and proposed use of agricultural and/or forestry land;
- Existing access tracks utilised as far as practicable;
- Field drains avoided where possible; and
- PWSs avoided.

2.118 This environmental and landowner feedback was then provided to the SPEN OHL design team for further consideration and accommodation where possible, (without compromising the technical design requirements) resulting in the production of a modified alignment of the OHL (Design Freeze 1), which formed the basis of consultation with stakeholders and the public as Consultation Round Three.

Consultation Round Three

2.119 The focus of the third round of consultation was ascertaining stakeholder's views on the work which was carried out to identify the alignment of the OHL since the second round of consultation. This comprised Design Freeze 1. In particular views were sought on:

- The suggested OHL alignments, including potential tower and pole locations;
- Suggested locations for temporary construction access tracks and working areas;
- The removal of the existing OHLs; and
- 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 line route.

2.120 As a result of the third round of consultation and in direct response to comments made by members of the community, a number of changes were made to the design of the KTR Project. These included for example:

- Moving tower 9 further west of Airie Cottage and on to lower ground;
- Alteration of alignment across the Queens Way to maintain 30m distance from fishing ponds and 40m from existing forestry to comply with statutory safety clearance distances; and
- Alteration to the locations of a number of towers to reduce the amount of new access track required in the area around Slogarie and within Laurieston Forest.

2.121 Whilst a number of further suggestions were made throughout the public consultation process, it has not been possible to accommodate all of the suggested changes. Further details in relation to Consultation Round Three are found in The Kendoon to Tongland 132kV Reinforcement Project: Summary of Feedback from Third Round of Consultation Report (April 2019).

2.122 At this stage, SPEN's construction team was also engaged to review the 'constructability' of the OHLs and associated infrastructure and locations of quarries and construction compounds were identified by the construction team alongside the relevant landowners where possible.

Design of Forest Felling and Re-Planting

2.123 Whilst the implications of the design of the forest felling and re-planting areas have been taken account of concurrently with the early design stages, as the areas required for felling are directly associated with the locations of the OHLs and associated infrastructure, the final design was refined once the infrastructure locations were 'fixed' i.e. after Design Freeze 1 (and concurrently informed by the emerging EIA modifications during Design Freeze 2 stage, outlined below).

2.124 The overall design objective has been to minimise the extent of felling required. Where an OHL connection is routed within forestry, a 'wayleave' corridor is required for safety reasons to ensure that trees do not fall onto the line and for health and safety of forestry operatives. SPEN has statutory powers to secure tree clearance within the wayleave corridor. For the KTR Project, a corridor of 80m (i.e. 40m either side of the centre line) is required for each of the OHLs supported on steel towers. A corridor of 70m (i.e. 35m either side of the centre line) is required for the connections supports on wood poles. In addition, a wayleave of 10m is required for the short section of underground cable of the E-G connection at Glenlee substation. Further details of the felling requirements are provided in **Chapter 5**.

2.125 It is recognised that the felling of a standard width wayleave corridor would create a linear feature within the forestry, inconsistent with the Forestry Commission: Design techniques for forestry management planning[24]. On this basis, a 'Forest Design Concept' (FDC) will be developed for all forested areas affected by the KTR Project.

2.126 The objective of the FDC will be to analyse the landscape context and visual information for each area, to identify the key design factors that will influence the integration of the wayleave corridor into each forest landscape. The FDC approach will also need to balance ornithological and ecological objectives in areas of forestry where protected species are present to seek to maintain (and where possible, enhance) suitable habitat and connectivity for these species. The FDC will demonstrate how forest design principles will be applied to the shape and scale of the proposed wayleave corridor, with the final forest and wayleave design plan (FWDP) identifying a revised forest design, combining trees, shrubs and open ground which best meet, or 'balance' the ecological, ornithological and landscape and visual objectives.

2.127 Post-consent, the FDC will be applied to all forested areas affected by the wayleave required as part of the KTR Project. The outcome of this process will be the production of FWDPs for each woodland area. The FDC will be developed by SPEN and applied to the FWDPs by SPEN in collaboration with the landowners, who will be responsible for delivery of the final forest design for their respective woodland blocks. The FWDP will be incorporated into the landowner's revised Long Term Forest Plan (LTFP)which will be submitted to Scottish Forestry for approval, as the statutory authority with regard to forestry.

2.128 Further details in relation to the proposed approach to the FDC are provided in **Appendix 5.1: Forestry Design Concept**.

Design Freeze 2 and EIA

2.129 As shown in the flow-chart in **Figure 2.4**, the responses received from the consultation process (including scoping see **Chapter 3: Approach to the EIA**), were considered in combination with the findings of ongoing technical/construction and environmental surveys, including further landowner discussions to enable SPEN to further refine the design of the alignment of the OHL and associated infrastructure.

2.130 On the basis of the initial emerging findings of the EIA, where possible adverse environmental effects associated with the individual connections and/or with the KTR Project as a whole were identified, the EIA process was used to further influence the design, without compromising the overall routeing objective, to identify proposed alignments (comprising Design Freeze 2) which form the subject of the applications for section 37 consent. Modifications included the following:

- the relocation of individual towers/poles;
- a change to the height of some towers/poles;
- the relocation and/or re-orientation of working areas and pulling areas;
- modification of areas of felling for the wayleave and associated windthrow areas;
- relocation and or/modification of temporary construction compounds and quarry working areas;
- minimising the lengths of new tracks and maximising the use of existing access tracks; and
- modification of new access tracks, including creation of loop systems (where possible).

2.131 These modifications were undertaken to:

- reduce effects on visual amenity from a number of locations (including promoted viewpoints and areas used for recreation and tourism);
- increase distances between towers/poles and residential properties to reduce effects on residential visual amenity;
- increase distances between development components and watercourses, marshes, wetlands and other surface waterbodies (e.g. ponds and lochs);
- avoid where possible the functional floodplain of watercourses identified from SEPA Flood Maps;

[24] Forestry Commission: *Design techniques for forest management planning* (2014)

- avoid where possible indicative catchments for PWSs and/or increase distances between development components and PWS sources;
- avoid deeper areas of peat where possible;
- avoid where possible the requirement to fell areas of ancient woodland and to reduce the loss of semi-natural woodland and mature broadleaf woodland (including opportunities for crowning);
- avoid areas identified by forestry landowners for long term retention;
- reduce the requirement for felling of forest areas including coniferous plantations;
- reduce effects on habitats of nature conservation concern e.g. blanket bog and groundwater dependent terrestrial ecosystems (GWTEs);
- minimise requirements to affect woodland known or suspected to support protected species (e.g. bats, red squirrels and pine martin);
- ensure a minimum of 30m buffer around protected species resting sites, particularly main badger setts;
- increase distances between development components and waterbodies/watercourses supporting protected species;
- reduce potential nightjar collision risk by seeking a 10m ground clearance where possible[25] in core nightjar habitat areas;
- minimise the volume of construction traffic utilising the public roads;
- avoid sterilising areas used for recreation (e.g. fishing ponds); and
- avoid/minimise direct effects on known features of cultural heritage interest of national, regional and where possible local importance.

2.132 In reaching 'design freeze 2' for the KTR Project it has been necessary to balance the consultation feedback from both local communities, individuals and landowners against the engineering requirements and the findings of the detailed site environmental surveys which have focussed on localised issues including forestry and woodland, watercourses, peatlands, protected species (terrestrial and ornithological) and cultural heritage features.

Consideration of Alternatives

2.133 Part 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as addresses transitional provisions which are engaged in this case. Regulation 40(2)(c) requires that the EIA Report is to include the information referred to in Part II of Schedule 4 to the 2000 EIA Regulations, and, such of the information as is reasonably required to assess the environmental effect of the development. In terms of alternatives, The EIA Report is to include: *"A description of the main alternatives studied by the applicant and the main reasons for his choice, taking into account the environmental effects;"*

2.134 Previous guidance prepared by the (then) Scottish Executive in relation to the Electricity Works Regulations 2000 states in paragraph 4.1.3 that in relation to OHLs, this is "*likely to mean looking at alternative routes and undergrounding*".[i]

2.135 In the context of the requirements of the EIA Regulations and guidance, SPEN has considered the following reasonable alternatives to the final design of the KTR Project, and these are discussed in further detail below:

- **Alternative Solution: Re-Stringing the Existing Overhead Lines**
- **Alternative Routes**: (these are considered within the routeing sections earlier in this chapter with further detail being provided in relation to the routeing process in the Routeing and Consultation Documents (May 2015, October 2016 and October 2017).
- **Undergrounding.**
- **Alternative Technology: Twin Trident Wood Pole.**
- **Alternative Design: 'T-Pylon'**.

Alternative Solution: Re-stringing the Existing N and R Route Overhead Lines

2.136 The current transmission network in Dumfries and Galloway is approaching the end of its operational life and is beyond economic refurbishment. Parts date back to the 1930s when the hydro-electric power stations were built. Although the network is well-maintained, in-depth assessment of the health and condition of SPENs assets and the performance and criticality of the circuits shows that replacement needs to be carried out soon. SPEN assess all of the assets on their network on a regular basis, taking into account condition, design parameters and criticality as well as age. Circuit performance is also considered so that SPEN can identify necessary improvements to the existing infrastructure to ensure that the transmission network continues to deliver the reliability, security and performance levels demanded.

2.137 The life of OHLs can be extended by replacing key components that are more susceptible to wear and by protecting the steelwork. This is no longer an appropriate solution in Dumfries and Galloway for the following reasons:

- Component by component refurbishment is generally carried out by replacing the insulator strings and fittings and by pulling in new sections of conductors (wires) i.e. components that are not integral to the structure of the tower. Our assessment of the lines in Dumfries and Galloway is that the tower steelwork and foundations now need significant upgrading;
- The majority of the OHLs that we are proposing to replace are of a 'single circuit' construction and the replacement of the major structural sections involves the removal of conductors. This would require the whole circuit to be de-energised. To do extensive work under these circumstances would put supplies to homes and businesses in the area under risk of extended periods without power; and
- The maximum capacity that can be utilised with the current configuration is not sufficient to carry all the output of the currently connected generation in all circumstances. This is not sustainable and an improved configuration is required.

2.138 In the specific case of Dumfries and Galloway's transmission network, a like-for-like replacement of the current network would, on balance, be less economical, less efficient and potentially more challenging from an environmental perspective. In regard to efficiency, like for like replacement would not allow for an increase in capacity of the network in Dumfries and Galloway as the existing OHLs are not capable of accommodating the size of conductors (wires) proposed to achieve this. From an environmental perspective, whilst a like for like replacement may involve a 'heavy refurbishment' of existing OHLs in situ, this would still require similar enabling works to the construction of new OHLs e.g. new stone roads etc, to transport materials like concrete for foundation upgrades to each tower site. This would give rise to similar environmental challenges faced on the construction of a new OHL, but without the technical and economic advantages to the network in Dumfries and Galloway. Therefore, a like for like replacement would not be compliant with SPEN's transmission license obligations.

2.139 While both the existing and proposed OHLs have a voltage of 132kV, the majority of the existing OHLs to be replaced are only single circuit. This means that the steel towers have three cross-arms and support a single three -phase circuit (i.e. three 'conductors' – or wires). However, the proposed new OHLs will be 'double circuit' and will require a different tower design, with six cross-arms instead of three. When developing the KTR Project SPEN considered the location of existing infrastructure, the contracted generation portfolio as a whole and the future needs of the transmission network. By modernising the current transmission network this provides a dual benefit of secure supplies for local people and increased capacity for society as a whole for the future.

Undergrounding

2.140 Notwithstanding SPEN's published approach to routeing major electrical infrastructure projects, the Scottish Ministers, in their Scoping Opinion (October 2017), stated that within the EIA report for the KTR Project SPEN should: "*include information on alternative measures, including undergrounding, which have been considered to avoid, prevent or reduce and if possible offset the likely significant adverse landscape and visual effects where these have been identified through consultation feedback from*

[25] When balanced with other environmental considerations and safety requirements

affected communities or the routeing process e.g. 'pinch points' or cumulative effects on sensitive receptors".

2.141 In response to the Scottish Ministers' scoping opinion, taken with consultation feedback received from stakeholders and communities affected by the KTR Project, SPEN commissioned a study of underground options for the areas identified through the three rounds of pre-application consultation. The route sections considered in this study are as follows:

- Polquhanity to Kendoon;
- Kendoon to Glenlee;
- Queen's Way Crossing;
- Bennan, Slogarie and Laurieston Forests;
- A75 crossing; and
- Consideration of undergrounding the proposed G-T connection in its entirety.

2.142 The full report can be found here: www.spendgsr.co.uk .

2.143 The assessment of undergrounding options has been carried out in order to allow a transparent, detailed and comprehensive comparison of underground and overhead options. It has been carried out in a manner which reflects SPEN's statutory and license duties, considering the technical, economic and broad environmental differences between an overhead line and underground cable.

2.144 The assessment has been carried out across six distinct sections with the results summarised in the KTR Underground cable study summary report[26]. The balance involved in selecting an underground cable route is much more complex than that for an overhead line due to the need to strike a balance not only between underground cable system technical requirements, environmental and financial considerations, but also with the length of cable route which is directly related to both cost and disturbance. With an underground cable, the cost is the dominant consideration.

2.145 In considering whether electric lines should be placed underground to obtain the benefits of reductions in landscape and visual or other impacts (e.g. loss of forestry), there is a requirement on SPEN to balance those reductions against the costs (economic), other environmental impacts (e.g. effects on hydrology and cultural heritage) and the technical challenges of undergrounding.

2.146 In each section, SPEN's preference is to progress with an overhead line option. It is acknowledged by SPEN that the underground option is, in each case, technically feasible and, on balance, environmentally preferable having regard to landscape and visual as well as forestry impacts. Nevertheless, these environmental benefits must also be balanced against the additional costs involved.

2.147 The comparison of costs between each cable and overhead line section clearly demonstrates a significant economic differential. That differential (between cable and overhead line) ranges from a multiple of 3.38 to 5.01 times the overall cost in each section. The overall costs of the underground cable option compared to the equivalent section of overhead line range from £8.62M to £95.96M more expensive.

2.148 SPEN does not consider that the environmental benefits of undergrounding any of the cable sections are outweighed by the substantial additional costs involved. In conclusion, SPEN does not consider that pursuing any of the underground cable options would be consistent with the statutory and licence obligations to which it is subject.

2.149 Furthermore, in relation to SPEN's approach to routeing of major electrical infrastructure and the specific routeing objective set for the KTR Project which is:

"To identify a technically feasible and economically viable route for a continuous 132kV overhead line connection supported on lattice steel towers from Polquhanity to Kendoon, from Kendoon to Glenlee, and from Glenlee to Tongland. The Project is also required to identify new 132kV overhead line connections supported on trident wood poles from Carsfad to Kendoon, and from Earlstoun to Glenlee. The routes should, on balance, cause the least disturbance to the environment and the people who live, work and enjoy recreation within it."

SPEN believes that proceeding with an overhead line solution for each of the six sections, is a conclusion which remains consistent with the overall KTR routeing objective.

2.150 On the basis of the conclusions set out above, SPEN has proceeded with an overhead line option for each of the connections which collectively comprise the KTR Project.

Alternative Technology: Twin Trident Wood Poles through Bennan Forest

2.151 The suggestion to use two wood pole lines instead of steel towers was also made in the second round of consultation in relation to a section of the G-T connection in the Bennan Forest. SPEN's position, in line with nationally-recognised Electricity Networks Association Standards, is for any new connection requiring two circuits to be accommodated on steel towers. Towers installed under these standards have continuous earth wires in order to protect against faults caused by lightning strikes, to provide earth potential continuity between substations and incorporate communication and protection functions. Application of these established designs have historically ensured that SPEN's OHLs are robust and fit for construction, operational and maintenance purposes and provide a reliable connection to the grid.

2.152 Any reconfiguration of the circuits, such as a double circuit wood pole section between two sections of towers, would be a non-standard design. Further investigation identified the following concerns:

- A lower level of network reliability than with a continuous steel tower line;
- Further sterilisation of land (a wider wayleave corridor would be required by introducing either a third wood pole to accommodate an earth wire or underground earth wire);
- Increased costs associated with the installation and maintenance of a separate earth wire and the requirement to install, operate and maintain two separate OHL routes; and
- Asset renewal at different stages in the lifespan.

2.153 Taking into account the factors above in relation to the consideration of the use of alternative technology, SPEN proposes to use a continuous steel tower design on the K-G and G-T connections of the KTR Project

Alternative Design: T-Pylon

2.154 At the time of designing the KTR Project, National Grid were testing a new OHL design known as the 'T-Pylon'. However, this design is aimed at larger 275kV OHLs and is not practical for the smaller 132kV OHLs being proposed as part of the KTR Project. SPEN will continue to monitor, and contribute to, developments in the industry and make decisions on when and where new and appropriate designs might be utilised as part of the development of new Projects being brought forward in SPEN's network area.

[i] Scottish Executive (Energy division) (undated) *Guidance on The Electricity Works (Environmental impact Assessment) (Scotland) Regulations 2000,* Available [online] at: https://www2.gov.scot/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/Guidance/EIA-Guidance, Last accessed on 01/02/2019.

[26] www.spendgsr.co.uk

Chapter 3
Approach to the EIA

Contents

3 Approach to the EIA

Introduction

3.1 The principal aim of the Environmental Impact Assessment (EIA) Directive[1] is to ensure that the authority granting consent (the 'competent authority') for a particular project makes its decision in full knowledge of any likely significant effects on the environment. The EIA Directive therefore sets out a procedure that must be followed for certain types of project before they can be given 'development consent'. This procedure, known as Environmental Impact Assessment or 'EIA', is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the significance of the predicted effects, and the scope for reducing any adverse effects, is properly understood by the public and the competent authority before a decision is made. Early identification of potentially adverse environmental effects also leads to the identification and incorporation of appropriate mitigation measures into the scheme design.

3.2 This chapter sets out the approach that has been used in undertaking the EIA for the Kendoon to Tongland 132 kilovolt (kV) Reinforcement Project ('the KTR Project'). It provides an overview of the key stages that have been followed, in line with EIA best practice.

Requirement for EIA

3.3 As outlined in **Chapter 1: Introduction**, separate consents are being sought under section 37 of the Electricity Act 1989 for each of the five new overhead lines (OHLs) that comprise the KTR Project. In addition, deemed planning permission for the connections, ancillary development works, and the removal of N and R routes[2] is being sought under section 57 (2) of the Town and Country Planning (Scotland) Act 1997.

3.4 Collectively the new OHLs, ancillary development and removal of N and R routes form a 'single project' for the purposes of the EIA. As a request for a Scoping opinion in respect of the KTR Project was made prior to 16th May 2017, the EIA has been undertaken in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended[3] ('the EIA Regulations') but subject to the transitional arrangements detailed within regulation 40.

3.5 The five new OHLs included within the KTR Project, fall within Schedule 2 of EIA Regulations, i.e. *"(2) an electric line installed above ground—*

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

3.6 As the OHLs are Schedule 2 development *"likely to have significant effects on the environment by virtue of factors such as its nature, size or location"*, the KTR Project is therefore EIA development[4] and, as such, an EIA is required.

3.7 All of the component parts of the KTR project, i.e. each of the five new OHLs, ancillary development and the sections of OHLs to be removed (comprising N and R routes (R comprising sections north and south of Glenlee substation), are supported by one EIA Report containing an assessment of each individual OHL connection (including relevant section of existing line removal). An assessment of the combined effects of the KTR Project as a whole has also been undertaken.

The EIA Process

3.8 The EIA Report has been prepared in accordance with the applicable EIA Regulations and advice and good practice, including:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[i];
- Planning Circular 1/2017: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[5];
- Guidance on The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000[6,ii];
- Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment (Revision 1; updated to reflect the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017)[7,iii];
- Institute of Environmental Management and Assessment (IEMA) (2017) Delivering Proportionate EIA: A Collaborative Strategy for Enhancing Environmental Impact Assessment Practice)[iv];
- IEMA (2006) Guidelines for Environmental Impact Assessment (hereinafter referred to as the IEMA Guidelines)[v];
- IEMA (2016) Environmental Impact Assessment Guide to: Delivering Quality Development[vi]; and,
- Scottish Natural Heritage (2018) A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultation Bodies and others involved in the Environmental Impact Assessment Process in Scotland (Version 3)[vii].

3.9 This EIA Report presents the written output of the EIA process. The information contained in this EIA Report fulfils the requirements of the EIA Regulations and once submitted, it will enable the competent authority, in this case the Scottish Ministers, to make a decision on the five applications for section 37 consent, as well as the applications for deemed planning permission.

3.10 Part 12 of the EIA Regulations addresses transitional provisions which are engaged in the case of the KTR Project. These apply, amongst other things, to applications for consent under the Electricity Act 1989 where a request for a Scoping opinion in respect of the development was made prior to 16th May 2017 when the EIA Regulations came into force. Regulation 40(2)(c) requires that the EIA Report includes the information referred to in Part II of Schedule 4 to the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 ('the 2000 EIA Regulations'):

- A description of the development comprising information on the site, design and size of the development.
- A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.
- The data required to identify and assess the main effects which the development is likely to have on the environment.
- A description of the main alternatives studied by the applicant and the main reasons for this choice, taking into account the environmental effects. A description of the main alternatives considered is provided in **Chapter 2: The Routeing Process and Design Strategy**. These included:
  - re-stringing the existing OHL;
  - alternative routes;
  - undergrounding;
  - alternative technology i.e. twin trident wood pole; and

[1] Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU.
[2] R (north) represents the existing R route from Glenlee substation to Kendoon substation and R (south) represents the existing R route from Glenlee to Tongland substation.
[3] In light of Covid-19, parts of the EIA Regulations were amended on 24th April 2020 by The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 to temporarily relax the requirements to place hardcopies of EIA Reports in the public domain during statutory application consultation periods.
[4] Regulation 2 (1).
[5] Whilst this circular does not directly concern developments consented under the Electricity Act, the guidance contained within it is relevant.
[6] Although the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 replaced the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 on 16th May 2017, there are certain provisions of the 2000 EIA Regulations which are still applicable. The Guidance for the 2000 EIA Regulations remains applicable and instructive in the absence of fresh Guidance under the EIA Regulations.
[7] Whilst this PAN does not directly concern developments consented under the Electricity Act, the guidance contained within it is relevant.

- alternative design i.e. 'T-Pylon'.
- Such of the information referred to in Part I of Schedule 4 to the 2000 EIA Regulations as is reasonably required to assess the environmental effects of the development and which having regard in particular to current knowledge and methods of assessment, the applicant can reasonably be required to compile taking into account the terms of any Scoping opinion given.
- A non-technical summary of the information provided.

Good Practice Guidance

3.11 PAN 1/2013 (Revision 1) provides guidance on EIA good practice, with the key steps to be followed in the EIA process as detailed below. These steps also reflect relevant IEMA and SNH guidance referred to above.

Scoping

- Undertake a scoping exercise to establish the scope and level of information to be provided within the EIA Report.

Baseline Studies

- Examine, through baseline studies, the environmental character of the area likely to be affected by the development.
- Identify relevant natural and man-made processes which may already be changing the character of the site.

Predicting and Assessing Effects

- Consider the possible interactions between the proposed development and both existing and future site conditions.
- Predict and assess the possible effects, both adverse and beneficial, of the development on the environment.

Mitigation and Monitoring

- Introduce design and operational modifications or other mitigation measures to avoid, prevent or reduce, and if possible, offset likely significant adverse effects and enhance beneficial effects.
- Identify any monitoring measures proposed to monitor any significant effects of the development on the environment and/or any applied mitigation measures.

Integration

- EIA should be an iterative process which aims to ensure early consideration of environmental issues at all stages of project development, and is founded on appropriate engagement with planning authorities and the Consultation Bodies. In addition to meeting the requirements of the EIA Regulations, EIA should add value to the design process, improving environmental outcomes and creating a framework for community engagement.

Proportionality

- An EIA should be fit for purpose and must be accessible to the planning authority[8], consultees and the public. As such it should focus on significant environmental effects to avoid being overly long in nature.

Efficiency

- Early identification of assessment and information requirements can ensure a coordinated EIA process and can minimise delays.

EIA and the Design Process

3.12 EIA should be treated as an iterative process, rather than a one-off, post-design environmental appraisal. In this way, the emerging findings from the EIA can be fed into the design process, to avoid and reduce potential environmental effects. This approach has been used in relation to the design stages of the KTR Project. Where the potential for significant adverse environmental effects was identified through the routeing and/or OHL alignment stages or later during the detailed EIA, consideration was given as to how the KTR Project design should be modified to design out these adverse environmental effects, or where this was not possible, to determine appropriate mitigation measures. Post-routeing stage modifications to the scheme design are outlined in **Chapter 2** and in the subsequent assessment chapters.

Scope of the Environmental Impact Assessment

3.13 To determine which aspects of the KTR Project are likely to give rise to likely significant environmental effects and to inform the requirements and content of the EIA Report, LUC prepared a Scoping report[viii] [9] which was submitted to the Scottish Government Energy Consents Unit (ECU) on 28th April 2017 together with a request for a scoping opinion.

3.14 Shortly after submission of the request for a scoping opinion and prior to the adoption by Scottish Ministers of the scoping opinion, the EIA Regulations came into force. The EIA has therefore been undertaken pursuant to the transitional provisions set out in Part 12 of the EIA Regulations. Regulation 40(3) requires that when adopting a scoping opinion, Scottish Ministers are to assess the scope and level of detail of information to be contained in the EIA Report by reference to the scope and level of detail of information which immediately prior to 16th May 2017, had to be included in an environmental statement prepared in accordance with regulation 4(1) and Schedule 4 of the 2000 EIA Regulations.

3.15 The purpose of scoping is to ensure that the EIA process focuses on the key environmental issues. Therefore, the scoping report sought to focus the EIA on the main effects, with each of the topic-based chapters within the scoping report setting out a provisional list of significant effects prior to mitigation and a second provisional list of non-significant effects to be 'scoped out' of full assessment. These were drafted on the basis of the findings of the preliminary survey work undertaken, the professional judgement of the EIA team, experience from other projects of a similar nature, and guidance and standards of relevance to the topic area in question.

3.16 On this basis, whilst a range of possible effects have been investigated as part of the EIA process, only effects identified as being of likely significance prior to the implementation of the proposed mitigation measures have been addressed fully in the EIA Report.

3.17 The scoping opinion provided by the Scottish Government (dated 4th October 2017) issued on behalf of Scottish Ministers included the consultation responses from the statutory consultees. **Appendix 3.1: Summary of the KTR Project Scoping Opinion** provides a summary of the issues raised in the scoping opinion. The scoping opinion is available to view in full on the SP Energy Networks (SPEN) and the Scottish Government ECU websites[10].

3.18 In addition to the consultees contacted by the Scottish Government during the formal scoping process, topic area specialists contacted a number of other parties to obtain background information to further inform the EIA and to allow them the opportunity to raise any concerns that they might have in relation to the KTR Project. Details of all relevant consultation are provided in the specialist assessments in **Chapters 7** to**16**.

3.19 Following the scoping process, the ECU undertook a further consultation in the form of a 'pre application EIA gatecheck exercise' in March and April 2019, where further consultation was undertaken with key consultees. The feedback from this exercise is detailed further below.

Topic Areas Scoped Out

3.20 Guidance on the 2000 EIA Regulations[ix] provides advice on the general requirements relating to the preparation and content of an environmental statement (now an EIA Report) and states:

"*Whilst every ES should provide a full factual description of the development, the emphasis of Schedule 4 is on the 'significant' environmental effects to which a development is likely to give rise. Some effects*

[8] Scottish Ministers as competent authority in the case of applications for section 37 consent

[9] The Scoping report is available to view on the KTR Project website https://www.spenergynetworks.co.uk/userfiles/file/KTR_scoping_report.pdf.

[10] The scoping opinion is available to view on the Scottish Government Energy Consents Unit website at https://www.energyconsents.scot/ApplicationDetails.aspx using reference ECU00000411, and on the KTR Project website at www.spendgsr.co.uk.

may be of little value or no significance for the particular development in question. They will therefore need only very brief treatment to indicate that their possible relevance has been considered."[11]

3.21 Furthermore, PAN 1/2013 notes that scoping forms a key part of the EIA process, and that its purpose is to:

- identify the key issues to be considered;
- identify those matters which can either be scoped out or which need not be addressed in detail;
- discuss and agree appropriate methods of impact assessment, including survey methodology where relevant; and
- identify any other project level assessment or survey obligations which may apply.

3.22 In line with the guidance outlined above, the work undertaken to date, responses to the consultation exercises, and SPEN's expertise and experience in the construction and operation of developments similar to the KTR Project, where no significant effects have been identified for a particular topic these have been 'scoped out' as detailed below. In addition to these topics that have been scoped out in their entirety, some elements of the topics which are assessed in detail have been scoped out of assessment e.g. operational effects on Traffic and Transport and Forestry. Where applicable, this is explained in the relevant chapters of the EIA Report.

Air Quality

3.23 Based on professional judgement and experience in the assessment of effects associated with OHL projects, effects relating to air quality are not anticipated to be significant and have been scoped out of detailed assessment. Notwithstanding this, the potential for the effects of dust during construction on nearby sensitive receptors has been considered and is assessed in **Chapter 16: Other Issues**.

Land

3.24 Based on the Macaulay Institute's land capability for agriculture classifications[x], the predominant land use capability classes within the application boundary are:

- 4: land capable of producing a narrow range of crops;
- 5: land capable of use as improved grassland; and,
- 6: land capable of use only as rough grazing.

3.25 Part of the existing R Route passes through class 3.2 land (land capable of supporting Mixed Agriculture) which surrounds Loch Ken. There is no 'best and most versatile land' (classes 1, 2 and 3.1) located within the area where the new OHL comprising the KTR Project are to be constructed.

3.26 In relation to existing agricultural land use, effects are limited to short-term disturbance during construction and, in the longer term, to the areas underneath the permanent development footprint, e.g. under towers/poles and the substations. As areas under towers/poles are small in size, grazing can continue as per current activity. Furthermore, the majority of the KTR Project is proposed on land capability classes on 4, 5 and 6, considered not to be 'prime agricultural land', and used predominantly for grazing and commercial forestry, with little (or no) arable agricultural taking place. On the basis of the above, effects on agricultural activity are not likely to be significant.

3.27 In relation to managing potential effects on land use (including agriculture), SPEN's 'Grantor's Charter'[xi] outlines its commitment to landowners which includes:

- how land will be accessed;
- how works will be undertaken on the land;
- how any resulting damage/compensation will be dealt with;
- how annual wayleave payments are derived; and
- lines of communication and contact information.

Aviation and Defence

3.28 National Air Traffic Services (NATS) and the Civil Aviation Authority (CAA) were both consultees at the EIA scoping stage. NATS anticipates no effects are likely to arise from the KTR Project and the CAA had no comments about the proposed development, however they requested that SPEN made the following organisations aware of the KTR Project:

- Low Flying Ops Flight (LFOF), based at RAF Wittering;
- Safeguarding Department within the Ministry of Defence Infrastructure Organisation (DIO) to ensure that the military aircraft safety is taken into consideration; and
- Defence Geographic Centre (DCG) which maintains a database of tall structures.

3.29 The above organisations will be advised of the submission of the application for the KTR Project which will ensure that all relevant safeguarding maps and database for tall structures are updated with the final positions of the KTR Project once operational.

Existing Services

3.30 The locations of existing gas, electricity and water services have been identified by SPEN through consultation with the relevant service providers and this will be confirmed by the contractor prior to construction. SPEN will therefore use this information to ensure that there will be no disruption to gas and water services during all phases of the KTR Project. 'Outages' to the electricity network (i.e. where the line is temporarily taken out of service, usually in periods of low demand (e.g. summer) within the Study Area will be required to enable the connection of the KTR Project to the existing network. It is unlikely there will be power outages during construction. However, if this was necessary, any outages would be planned well in advance and sufficient notice given to businesses and homeowners. Local 'low voltage' lines will be undergrounded or temporarily 'outed' as required. On this basis, effects on existing services are considered non-significant.

Topics Introduced by 2017 EIA Regulations

3.31 The EIA process has been carried out and EIA Report prepared in line with the EIA Regulations as subject to regulation 40 (Transitional Provisions). As the scoping opinion was requested in advance of 16th May 2017 and the scoping opinion adopted after 16th May, the ECU confirmed that a detailed assessment of the new topics introduced under 'the 2017 EIA Regulations (as amended)' was not required[12]. On this basis, potential effects associated with climate change, human health, and the risk of major accidents and disasters, did not require to be assessed as part of the EIA[13]. However, further information on these topics is included below.

Climate Change

3.32 Whilst a detailed assessment of the potential effects of the development on climate change, and vulnerability of the project to climate change, has not been undertaken, consideration has been given to the implications of climate change for each of the topics assessed in detail in the EIA in the relevant assessment chapters. This has been based on The UK Climate Projections 2018 (UKCP18[14]).

3.33 The UKCP18 for temperature and precipitation are presented for the UK as a whole and also on a regional basis. The UK projections consider three variables:

- **Timeframe**: the projections are presented for four overlapping time periods (2020s, 2040s, 2060s and 2080s).
- **Probability**: The projections are provided as probability distributions rather than single values, with figures provided for 5, 10, 50, 90 and 95% probability.

[11] The guidance pertains to the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 but is still considered relevant. It should be noted that the term ES was replaced with EIA Report in the EIA Regulations and EIA Report is therefore the term used throughout this document with the exception of references to documents and guidance that pre-date this.

[12] Regulation 40(3) states that a scoping opinion adopted for an EIA report, is to be assessed by reference to the scope and level of detail of information which immediately prior to 16th May 2017 had to be included in an ES.

[13] LUC issued a letter (dated 31st July 2018) on behalf of SPEN to the Energy Consents Unit (ECU) which set out a detailed review of the comments in the Scoping opinion. The letter and also requested confirmation from the ECU whether a detailed assessment of the new topics could be excluded from the EIA. The ECU confirmed this via email on 18th September 2018.

[14] https://www.metoffice.gov.uk/research/collaboration/ukcp.

- **Representative Concentration Pathways (RCP)**: Four pathways have been adopted; RCP2.6, RCP4.5, RCP6.0 and RCP8.5. These pathways describe different greenhouse gas (GHG) and air pollutant emissions as well as their atmospheric concentrations and land use[15] with each one resulting in a different range of global mean temperature increases over the 21st century[16]. RCP2.6 represents a scenario which aims to keep global warming likely below 2°C compared to pre-industrial temperatures. RCP4.5 and RCP6.0 represent intermediate scenarios while RCP8.5 describes a very high GHG emission scenario. All scenarios are considered to be equally plausible.

3.34 For the purposes of considering implications for the KTR Project, the EIA Report has utilised projections for the 2080s and RCP6.0. It is assumed that the KTR Project will have a lifespan of 60 – 70 years once installation is complete (assumed to be by the end of 2025) therefore the 2080 scenario is considered to be appropriate for the design life of the project.

3.35 RCP6.0 is selected as a precautionary approach on the basis that it is an intermediate pathway that can be reached without additional efforts to constrain emissions ('baseline scenarios'). This RCP has been used to indicate the temperature, precipitation, wind speed and storms in the Solway River Basin region of Scotland, which encompasses the administrative boundary of Dumfries and Galloway.

Temperatures

3.36 Temperatures within the Solway River Basin are projected to increase, with projected increases in summer temperatures greatest. The central estimate of increase in winter mean temperature is 2.4ºC; it is very unlikely to be less than 0.9ºC and is very unlikely to be more than 4ºC. The central estimate of increase in summer mean temperature is 3.4ºC; it is very unlikely to be less than 1.4ºC and is very unlikely to be more than 5.5ºC.

Precipitation

3.37 Winter rainfall is projected to increase and summer rainfall is most likely to decrease. The central estimate of change in winter mean precipitation is 15%; it is very unlikely to be less than -6% and is very unlikely to be more than 34%. The central estimate of change in summer mean precipitation is -19%; it is very unlikely to be less than -36% and is very unlikely to be more than -4%.

3.38 With respect to the continued validity of UKCP18 projections for summer rainfall (see above), it should be noted that rainfall patterns across the UK are not consistent and will vary dependent on seasonal and regional scales and will continue to vary in the future (Met Office, 2018).

Wind Speed and Storms

3.39 Changes in wind speeds are not currently available at the regional level and there remains considerable uncertainty in the projections, with respect to wind speed. However, there are small changes in projected wind speed (Defra, DECC and Met Office, 2010). Across the UK, near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant impacts of winds (Met Office, 2018). This is accompanied by an increase in frequency of winter storms over the UK. However, the increase in wind speeds is projected to be modest.

Implications for Assessment Topics

3.40 In summary, the Solway River Basin is projected to experience conditions that are broadly consistent with projections for the UK as a whole, including hotter, drier summers and milder, wetter winters and these assumptions have informed the information presented in the assessments in relation to the implications of climate change on the KTR Project.

Human Health

3.41 The potential health effects of the KTR Project are considered in relation to noise and recreation and no specific effects on human health are considered likely to arise as a result of construction or operation of the KTR Project. It is also important to note that construction and operation of the KTR Project will be in accordance with relevant health and safety legislation as detailed further below. As such, it is considered that detailed consideration of potential effects on human health is therefore not required as part of the EIA.

Risk of Major Accidents and Disasters

3.42 The KTR Project is not located in an area with a history of natural disasters such as extreme weather events. Avoidance of flood risk areas was a key factor in the routeing process and crossing of floodplains has been minimised where possible. Nevertheless, modifications to natural drainage patterns, changes to runoff rates and volumes and a consequent increase in flood risk during construction and operation are assessed in **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**.

3.43 Peat is present in discrete areas across the route of the KTR Project and a targeted peat slide risk has been undertaken at these locations. This has identified six areas with a medium risk of peat slide however with the implementation of specific mitigation measures in these areas, the risk is reduced to low/none in all locations. As such, it is not considered that this represents a risk of major accident or disaster. Details of the peat survey and assessment work undertaken for the KTR Project are provided in **Chapter 9**.

3.44 The construction and operation of the KTR Project will be managed within the requirements of a number of health and safety related Regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974. As such, the risk of major accidents is not considered likely and not assessed in detail.

Consultation

3.45 As outlined in **Chapter 2**, while there are no formal pre-application requirements for consultation in respect of applications for section 37 consent/deemed planning permission, SPEN has embraced best practice as outlined in the Scottish Government Energy Consents and Deployment Unit's Best Practice Guidance (January 2013). This guidance encourages applicants to engage with stakeholders and the public to develop their proposals in advance of such applications being made and is also in line with good practice in EIA. Therefore during the routeing and EIA stages of the KTR Project SPEN carried out three rounds of consultation with statutory and non-statutory stakeholders and the public. The three rounds comprised:

- **Round One:** Public consultation on the preferred corridors was originally scheduled for seven weeks between June 8th and 24th July, but as a response to feedback it was extended for an additional five weeks. The twelve weeks of consultation ran between June 8 and August 31, 2015 and SPEN asked the public for its opinions on the preferred corridors June 9th to August 31st 2015 (as part of the wider Dumfries and Galloway Strategic Reinforcement (DGSR) Project).
- **Round Two:** Public consultation on preferred routes, which was carried out from October 31st to December 21st 2016[17].
- **Round Three:** Public consultation on detailed route alignment, which was carried out from November 20th 2017 to January 26th 2018.

3.46 **Chapter 2** provides a detailed overview of the consultation that was undertaken in relation to routeing of the KTR Project and where relevant this is also referred to below.

Statutory Stakeholder Liaison Group

3.47 As explained in **Chapter 2**, a Statutory Stakeholder Liaison Group (SSLG) was formed at the outset of the KTR Project. This comprised statutory consultees including Dumfries and Galloway Council (D&GC), Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA), and Historic Environment Scotland (HES). In addition, given the significant areas of forestry within the Study Area, Forestry Commission Scotland (now Scottish Forestry; SF) was also included. Chaired by the Scottish Government ECU, the SSLG met as necessary at key milestones throughout the project programme and members were sent copies of key project consultation documents as the KTR Project progressed. This process ensured that all statutory consultees were kept up to date with project progress, and that they had the opportunity to comment on and feed in to the routeing process.

3.48 The ECU undertook a 'pre application EIA gatecheck exercise' in March and April 2019. Following a meeting on 19th March 2019 and circulation of a previous version of **Appendix 3.1**, members of the

[15] Intergovernmental Panel on Climate Change, 2014, Climate Change Synthesis Report: Fifth Assessment Report.
[16] Met Office, 2018, UKCP18 Guidance: Representative Concentration Pathways.
[17] The deadline for consultation responses was extended until 13th January 2017 due to the festive holiday period.

SSLG were asked to provide their views on SPEN's response to comments provided in the EIA scoping opinion. Responses from the SSLG members are detailed in **Table 3.1** below.

Table 3.1: Summary of Responses from the Pre-Application EIA Gatecheck Review (April 2019)

Consultee	Summary of Response	Response / Action to be taken in the EIA Report
FCS (now Scottish Forestry)	No further comments, however note that early felling of adjacent and affected crops is normally sub optimal economically.	**Chapter 8: Forestry** sets out when felling will occur.
Marine Scotland Science (MSS)	MSS welcomed the approach to electrofishing surveys undertaken, noting that activities associated with construction can have direct and indirect (via water quality) effects on fish populations. Advised that consideration is given to effects on water quality in relation to the possible release of sediment, concrete, fuel, and nutrients leaching from felled material during construction.	Standard mitigation approaches will ensure protection of watercourses and will be detailed in **Chapter 9**. Electro-fishing surveys were undertaken by the Galloway Fisheries Trust and an assessment of effects on fish and this is included in **Chapter 10: Ecology**.
SNH	SNH was content with the actions proposed in response to the comments raised at scoping and noted that the assessments should allow them to respond in full to the EIA consultation, including in relation to the assessment of the effects of the KTR Project on nightjars.	Noted. The assessment of effects on nightjar is provided in **Chapter 11: Ornithology**.
HES	HES confirmed that the response provided by SPEN to the scoping opinion considered their advice and indicated that the information provided would be sufficient to allow them to respond fully to the EIA consultation.	Noted.
SEPA	SEPA requested that the following be considered in the EIA: • North American Signal Crayfish (NASC): Due to the presence of NASC in the catchment it is essential that strict biosecurity measures are put in place to prevent spread and cross-catchment transfer. Initial mitigation information should be outlined in any planning/EIA submission. • Private Water Supplies (PWS): Note that there have been issues with contamination of PWS from similar projects so it is essential that all PWS sources along the length of the KTR Project are identified within the EIA Report. • Construction Site Licences: Note that a licence and pollution prevention plan will likely be required the KTR Project which should take into consideration existing and new tracks and roads proposed for use as part of the project. • Restoration plans: Request assurance that a restoration plan for this project will be provided.	**Chapter 10** sets out mitigation for NASC. PWS are assessed in **Chapter 9**. A pollution prevention plan will be prepared for the KTR Project as detailed in the example Construction and Decommissioning Environmental Management Plan (CDEMP) provided as **Appendix 5.4**. A Construction Site License will be applied for at the appropriate time. The EIA Report assesses the effects of returning the land to its existing/former use and areas of landscape planting within the proposed wayleaves. Options for wider enhancement will also be considered but will not form part of the application for consent.
Royal Society for the Protection of Birds (RSPB)	The RSPB are broadly happy with the scope of survey work undertaken subject to survey for nightjar with the use of night vision equipment to more fully inform the assessment of risk through collision with OHLs in the Bennan and Laurieston area. This information will be provided as supplementary information to inform design specification. Maintain advice that the marking of above ground lines is investigated to reduce risk to nightjar through collision. Maintain that undergrounding of lines through nightjar core territory should be considered.	Further details of the consultation with RSPB and assessment of effects on nightjar is provided in **Chapter 11**. A separate undergrounding study was also published in July 2020.
Transport Scotland (TS)	Noted that SPEN had acknowledged the points made in TS's Scoping Response letter of 31st May 2017 and are content that no further comment is required at this stage.	Noted.

Wider Consultation

3.49 In addition to the SSLG, a Community Liaison Group (CLG), chaired by the ECU, was established prior to the second round of consultation. This forum provided representatives of communities who are directly affected by the KTR Project with the opportunity to be informed on the latest proposals and to raise points for discussion with SPEN. The CLG also met as necessary at key milestones throughout the project programme and feedback obtained from the CLG was used to inform the EIA as it progressed.

3.50 Throughout the consultation process various groups of stakeholders and organisations relevant to the KTR Project in addition those which form the SSLG and CLG were consulted. These included:

- Local communities and members of the public;
- Community councils;
- Local interest organisation and groups; and
- Local Member of Parliament (MP) and Members of the Scottish Parliament (MSPs).

3.51 **Table 3.2** below details some of the key meetings that were held throughout the routeing and EIA process. In addition to these meetings, a number of other meetings were held with topic specialists and consultees, and between SPEN and landowners and local elected members. Where relevant, further details of these meetings are provided in **Chapter 2** and the assessment chapters which follow.

Table 3.2: Record of Meetings

Stakeholder Organisation/Group	Meeting Date	Overview of Discussion
RSPB/SNH	16/09/2014	Discussion on obtaining ornithology data and around survey methodologies for schedule 1 species.
SSLG	16/03/2017	Overview and initial consultation on proposed assessment methodologies. Agreement on timing of scoping opinion submission.
CLG	18/04/2017	Confirmation that CLG members to be included in Scottish Ministers consultation on scoping request from SPEN.
SSLG	23/10/2017	SPEN acknowledgement of issues to be assessed following receipt of Scottish Ministers Scoping opinion (October 2017).
D&GC	10/12/2018	Update on Project and discussion around scoping opinion feedback.
FLS (Landowner)	27/12/2018	Discussion on windthrow areas to be included in forestry impact assessment.
Forest and Land Scotland (FLS) (Landowner)	07/02/2019	Review of potential windthrow areas to be included in forestry impact assessment. Agreement on extent of quarry areas to be considered in EIA Report.
FLS (Landowner)	28/02/2019	Site meeting to consider initial forest design concepts (FDCs) to be proposed as mitigation in EIA Report.
SSLG	19/03/2019	Initial 'gatecheck' discussions with members regarding SPEN's incorporation of scoping feedback to individual assessment chapters.

Stakeholder Organisation/Group	Meeting Date	Overview of Discussion
RSPB/SNH/FLS	19/03/2019	Review of initial findings of EIA surveys and requirement for further ornithological survey works in relation to schedule 1 species.
Woodlands Trust	25/04/2019	Discussion around proposed woodland mitigation (FDCs) being developed for EIA Report.
ECU	20th August 2018	Gatecheck meeting with the ECU to provide update on project progress.
ECU	20th May 2020	Final meeting with the ECU to discuss timescales to final submission of the Section 37 applications and logistics for provision of information and approach to consultation and advertising.

Baseline Conditions

3.52 The purpose of the EIA is to ensure that the likely significant effects of a development proposal (both adverse and beneficial) are properly understood before any development consent is granted. This requires that work is carried out within the KTR Project area to determine and describe the environmental conditions against which future changes (including those which may take place independently of the development) can be measured or predicted and assessed. These environmental conditions are referred to as the 'baseline' and are usually established through a combination of desk-based research, site survey, and empirical studies and projections. Together, these describe the current and future character of the KTR Project area and surroundings, and the value and vulnerability of key environmental resources and receptors.

3.53 Making predictions about how parameters such as land use, landscape, views and other environmental characteristics may change in the future relies on assumptions about future development and environmental trends. For this reason, where other development is not proposed in the vicinity of the KTR Project area, the baseline adopted for the EIA is normally taken as the current character and condition of the area and surrounds, and the likely significant environmental effects of development are then assessed in the context of the current conditions alone. It is accepted that the baseline conditions will gradually alter through time as a result of climate change which has the potential, for example, to alter the landscape and species of flora and fauna which are currently located within the Study Area. As outlined above, this is considered further in the relevant assessment chapters of the EIA Report.

3.54 Baseline conditions for each topic, and the means by which these have been established, are set out in **Chapters 7** to **16** of this EIA Report.

3.55 The presence of the existing 132kV OHL network in the vicinity of the KTR Project, which is subject to removal following commissioning of the KTR Project i.e. part of N and R routes, is included within the baseline for the construction and up to one year of operation. However, as N and R routes are due to be decommissioned and removed within one year of commissioning of the KTR Project, and their removal forms part of the mitigation and is the subject of an application for deemed planning, they will be assumed to not be present within the long-term baseline for the operational assessment of the KTR Project.

Future Baseline in the Absence of the Development

3.56 As natural processes and/or human activities can affect the baseline ('status quo'), it is important to establish future baseline scenario in the absence of the KTR Project, i.e. the likely environmental conditions that would exist in the absence of the particular development under construction. Establishing the future baseline scenario requires transparent decision making as to what natural process changes and/or changes as a result of human activity should be included or excluded from the future baseline scenario.

3.57 Consideration of the future baseline scenario which acknowledges the absence of the KTR Project is described in **Chapters 7** to **16** of this EIA Report. This assumes that the existing N and R routes would be removed as given the age and condition of this infrastructure, it is essential that these be replaced to ensure, as a minimum requirement, that the security and continuity of electricity supply is maintained in the region[18].

Identification and Assessment of Effects

Approach to Assessment of Effects

3.58 As detailed in **Chapter 1**, each OHL connection is the subject of a separate application for section 37 consent and therefore has been assessed in isolation. This means that connections Polquhanity to Glenlee via Kendoon (P-G via K), Carsfad to Kendoon (C-K), Earlstoun and Glenlee (E-G), the existing BG deviation (BG Deviation) and Glenlee to Tongland (G-T) have been assessed as separate schemes. A further assessment of the KTR Project as a whole has also been undertaken as detailed below.

Significant Effects

3.59 The identification of the significance of effects (whether adverse or beneficial) arising from the proposed development is a key stage in the EIA process. This judgement is vital in informing the decision-making process.

3.60 As the identification of significant effects will differ depending on the context and the receptors affected, there is no general definition of what constitutes significance, In EIA, the term significance reflects both its literal meaning of 'importance' and its statistical meaning where there is an element of quantification.

3.61 Each topic area chapter contains a section that identifies the likely significant effects on the environment that may arise as a result of the construction and/or operation of the KTR Project. The significance of environmental effects is typically assessed by considering both the character of the change (i.e. the size and duration of the effect) and the value/sensitivity of the environmental resource that experiences this effect (i.e. the receptor).

3.62 Effects may be direct, indirect, secondary or cumulative. Within these categories, they may also be short, medium or long-term, permanent or temporary, beneficial or adverse. Direct (or primary) effects are changes to the baseline arising directly from activities that form part of the KTR Project, for example, effects associated with felling of the wayleave to accommodate the OHLs. Indirect (or secondary) effects are those that arise as a result of a direct effect, for example effects associated with areas of 'windthrow' following felling of the wayleave. These are explained further below.

3.63 Effects and receptors have been described using quantitative criteria wherever possible in line with those listed below. Where different terminology has been used, this is stated clearly in the relevant chapter.

- the type of effect, described as adverse, neutral or beneficial;
- the extent and magnitude of the effect;
- the likelihood of the effect occurring, based on a scale of certain, likely or unlikely;
- the duration of the effect, based on a scale of long, medium and short term;
- the reversibility of the effect, being either reversible or irreversible;
- the value of the receptor;
- the sensitivity of the receptor to the effect, based on a scale of high, medium and low and in some instances negligible;
- the occurrence of the effect during the phased implementation of the project;
- consideration of legal requirements, policies and standards, and
- consideration of relevant environmental thresholds.

3.64 Each of the assessment chapters provides the specific criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria together with the use of value judgements and expert interpretations to establish to what extent an effect is environmentally 'significant'.

[18] The requirement to replace the existing network is set out in more detail in the Background to the Need Case document available at www.spendgsr.co.uk.

3.65 Using the criteria in each chapter, the significance of effects has been categorised, where possible and unless otherwise stated within the chapter, as follows:

- **Major**;
- **Moderate**;
- **Minor**; or
- **None**.

3.66 Unless stated otherwise in methodologies set out in the individual assessment chapters, effects of '**major**' or '**moderate**' significance are considered to be '**significant**' in the context of the EIA Regulations.

Direct and Indirect Effects

3.67 As outlined above, the KTR Project may result in both direct and indirect (or secondary) effects. These are primarily associated with the felling of the wayleave to accommodate the OHLs. A 'wayleave' or servitude right (40m either side of the steel tower OHL and 35m either side of the wood pole OHL), is required within woodland to safely construct and maintain the OHLs. The applications seeking deemed planning permission for the KTR Project will request that consent is granted for an 80m/70m wayleave including associated felling within this area, and therefore effects associated with the wayleave felling are considered 'direct' effects.

3.68 In some areas, the felling of forestry wayleave for the KTR Project will expose previously sheltered trees to the wind. These trees have previously been part of a larger forest compartment where there was an element of mutual support being provided. By felling the wayleave this support will be removed and a 'brown forest edge' will be created, rendering any unstable forest edges facing the prevailing wind susceptible to 'windthrow effects', with these trees either falling or failing to reach their full crop potential.

3.69 The area of proposed tree felling required to reduce the risk of windthrow has been identified for each for each connection of the KTR Project, totalling 113.52ha of forest for the KTR Project as a whole. As the areas vulnerable to windthrow are outwith the wayleave corridor, SPEN has no mechanism for felling and/or replanting these areas as part of any section 37 consent. However, SPEN is committed to liaising with landowners to agree that these areas be felled to mitigate the risk of forest damage through windthrow. The felling of these areas would require the agreement of the landowner, and would be delivered under a felling permission to be applied for by the landowner. It is anticipated that any felling permission would be granted on the basis that the felled woodland is replanted.

3.70 Should the landowner not agree to fell the trees and the trees subsequently suffer from windthrow, it is within the control of SF using the Scottish Government Forestry and Land Management (Scotland) Act 2018 to ensure that these areas are replanted (sections 34-37). The Act clearly states that should windthrow occur, SF has the authority to serve a 'Windblow Clearance Directive' to the landowner with an associated restocking direction. As such, the assessment has been undertaken on the basis that any windthrow resulting from the introduction of the OHL wayleave would require the relevant landowner to replant the same area of forest. Should the landowner agree to fell these same areas prior to windthrow occurring as part of the KTR Project then this would only possible with the appropriate felling permissions in place with SF. These permissions would include a similar restocking condition which would result in no net loss of forestry outside of the wayleave corridor.

3.71 The assessments within the topic chapters of this EIA Report make a distinction in the effects associated with felling *within* the wayleave corridor, and felling of windthrow areas *outside* of the wayleave, thereby ensuring that a realistic 'maximum-case scenario' has been assessed as part of a robust EIA. As the landowners in these areas will be required to replant these areas, the assessments have been undertaken on the basis that there will be no net loss of forestry, and that these areas will be replanted on a 'like for like' basis. Where possible, SPEN will seek to liaise with these landowners to maximise environmental benefits associated with the replanting, by increasing species diversity for wider ecological benefit and environmental enhancement. This is detailed further in **Appendix 5.2: Embedded and Additional Mitigation and Monitoring Measures**.

Interrelationships between Effects

3.72 The IEMA Guidelines for Environmental Impact Assessment (2006) states that "*A good practice EIA will also include some consideration of interactions between environmental topics and resources and the functional relationships involved (e.g. there are interactions between fauna, flora and water quality). Such consideration should be directly related to the potential impact of the proposal*."

3.73 Although the EIA Report is structured in standalone topic specific chapters, many of the considerations are interrelated, such as ecology and hydrology. As such, the interrelationship between potential effects between two topic areas are also considered in accordance with the EIA Regulations and addressed in **Chapters 7** to **16**. These effect interactions are considered separately from the combined effects from more than one topic on a common receptor where these do not result from functional relationships between topics e.g. construction disturbance leading to noise and visual impact on a residential receptors in a particular property, which is assessed in **Chapter 17: Intra-Connection and Intra-KTR Effects**.

3.74 **Table 3.3** below identifies where there are possible interactions between the topics considered in the EIA Report. These functional relationships are explored further in **Chapters 7** to **16** and are summarised in **Table 3.4**. It should be noted that the interrelationships noted in **Table 3.4** are summarised by receptor as it relates to each topic therefore these are not necessarily duplicated under each subheading.

Table 3.3: Summary of Effect Interactions by EIA Topic

Topic	Landscape and Visual	Forestry	Hydrology etc.	Ecology	Ornithology	Cultural Heritage	Traffic	Noise	Socio-economics	Other Issues
Landscape and Visual		■				■			■	
Forestry	■		■	■	■				■	
Hydrology etc.		■		■						
Ecology		■	■		■					
Ornithology		■		■						
Cultural Heritage	■								■	
Traffic								■	■	■
Noise							■			
Socio-economics	■	■				■	■			
Other Issues							■			

3.75 Of the potential interactions considered above, and having regard to the assessment results presented in the specialist assessment **Chapters 7** to **16** of the EIA Report, potential interactions between effects are set out in **Table 3.4** below, focussed on the key receptors for each assessment. The relevant specialist assessments consider these functional interactions within the individual assessments.

Table 3.4: Key Receptors and Functional Relationships and Interactions Assessed in the EIA

Receptor	Possible Interactions
Chapter 7: Landscape and Visual Amenity	
The physical landscape, landscape character, and landscape designations	The assessment of effects in **Chapter 7: Landscape and Visual Amenity** considers how changes to forestry will interact with the landscape.
Effects on views and visual amenity experienced by visual receptors (people)	The assessment in **Chapter 7** considers how views will be altered by changes to the forestry over the lifetime of the KTR Project, including during construction. Consideration has been given to a number of viewpoints that are important in terms of their cultural heritage value as detailed further in **Chapter 12: Cultural Heritage**. Effects on routes are considered in terms of recreation in the socio-economic assessment.
Chapter 8: Forestry	
The local forest resource	The felling requirements and changes to forestry have been taken into account in the assessment of effects detailed in **Chapter 7: Landscape and Visual Amenity**, **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**, **Chapter 10: Ecology**, and **Chapter 11: Ornithology**.
Loss of broadleaf woodland including ancient woodland and native woodland	Potential effects on broadleaf woodland habitat are considered in **Chapter 10**.
Forest management operations	Potential effects on the forestry sector during construction are considered in **Chapter 15: Socio-economics, Tourism and Recreation**.
Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat	
Watercourses/Surface Water Bodies	**Chapter 10: Ecology** considers the potential effects on watercourses in the context of change to habitats that may affect protected species, notably otter. Potential effects on fish during construction and operation of the KTR Project were scoped out of detailed assessment.
PWS (i.e. effects on properties)	Properties with affected PWS may also be affected by a number of other impacts as assessed in **Chapter 13: Traffic and Transport, Chapter 14: Noise**, and **Chapter 16: Other Issues** (which considers effects from dust).
Peat	Change in the hydrological regime of peatland habitats has been considered in the context of potential effects on habitats in **Chapter 10**.
Groundwater	PWSs may be groundwater fed and there may be other impacts associated with the KTR Project at relevant properties as noted above.
Groundwater Dependent Terrestrial Ecosystems	The habitat surveys undertaken for the ecology assessment presented in **Chapter 10** informed the assessment of potential effects on Groundwater Dependent Terrestrial Ecosystems presented in **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**.
Chapter 10: Ecology	
Designated sites	The potential for effects on sites designated for their ecological features during construction and operation was scoped out of detailed assessment (it should be noted that **Chapter 11: Ornithology** assesses potential effects on sites designated for bird interest).
Habitats of conservation concern	In addition to being assessed in the ecology chapter, potential effects on broadleaf woodland, including ancient woodland and native woodland, are considered in **Chapter 8: Forestry**. As noted above, potential effects on groundwater dependent terrestrial ecosystems are considered in **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**.
Protected species (Pine marten; Red squirrel; Badger; Otter; and Bats)	The assessment of effects on protected species in **Chapter 10: Ecology** has considered the potential effects associated with disturbance from noise and traffic.
Chapter 11: Ornithology	
Breeding/wintering birds	The assessment of effects on birds during construction presented in **Chapter 11: Ornithology** has given consideration to the effects arising from noise and traffic.
Effects on Loch Ken and River Dee Marshes Special Protection Areas (SPA) and Ramsar site	Potential effects on the SPA and Ramsar site are specific to ornithology.
Chapter 12: Cultural heritage	
Direct effects on cultural heritage assets during construction, and secondary effects as a result of tree fall in windthrow areas	As noted in the adjacent column, the assessment of direct effects on cultural heritage has given consideration to the implications of felling and tree fall which are detailed in **Chapter 8: Forestry**.
Chapter 13: Traffic and Transport	
Effects of felling and construction traffic on existing traffic flows and the local and trunk road network (driver delay and road safety)	**Chapter 15: Socio-Economics, Tourism and Recreation** has taken account of the findings of the traffic and transport assessment where routes are important for access and recreation.
Effects of felling and construction traffic on communities e.g. Laurieston (severance, pedestrian amenity / fear and intimidation, and pedestrian delay) and users of the Southern Upland Way and the 'core path' network and 'off-road tracks' which service associated worksites	As noted above, **Chapter 15** has taken account of the findings of the traffic and transport assessment where routes are important for access and recreation. It should be noted that effects associated with noise and air quality/dust from temporary construction traffic was scoped out of detailed assessment on the basis that the KTR Project will be accessed via a number of geographically distinct roads and access points. However, this is considered further in **Chapter 17: Intra-connection and Intra-KTR Effects**.
Chapter 14: Noise	
Residential properties during construction	Properties affected by noise during construction may also be affected by a number of other impacts, including from dust, traffic disturbance, or effects on PWSs.
Chapter 15: Socio-Economics, Tourism and Recreation	
Designated walking and recreational routes	As noted above, **Chapter 15: Socio-Economics, Tourism and Recreation** has taken account of the findings of the landscape and visual assessment and the traffic and transport assessment in considering effects on designated walking and recreational routes.
Outdoor tourist destinations	**Chapter 15** has taken account of the findings of the landscape and visual assessment where viewpoints are located in outdoor tourist destinations.
Hospitality	Where relevant, consideration has been given to the findings of **Chapter 7: Landscape and Visual Amenity**.
Visitor Accommodation	Where relevant, consideration has been given to the findings of **Chapter 7**.
Recreational activities in the open countryside	The socio-economic assessment has taken account of the findings of **Chapter 7** in considering effects on recreational activities in the open countryside.

Receptor	Possible Interactions
Tourists travelling (by road) through the open countryside	The socio-economic assessment has taken account of the findings of **Chapter 7** and **Chapter 13: Traffic and Transport** in considering effects on tourists travelling in the area.
Economic receptors including construction effects on the labour market, forestry sector, construction sector, visitor accommodation occupancy, tourism and recreation sector and operational effect on energy sector and tourism and recreation sector (assessed for KTR as a Whole only)	As noted above, effects on forestry operations have been assessed in **Chapter 8: Forestry**.
Chapter 16: Other Issues	
Dust effects on properties	Properties affected by dust during construction may also be affected by a number of other impacts, including from noise, traffic disturbance, or effects on PWSs.

Assessing Combined and Cumulative Effects

3.76 As required by the EIA Regulations and in accordance with good practice, the EIA considers the likely significant effects of the KTR Project, which *"cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development*[19]*"* (Schedule 4 Part 1 (3)).

3.77 Both 'inter-project' and 'intra-project' cumulative effects have been considered, as described in PAN 1/2013: *"Cumulative effects arising from different elements of a project on environmental receptors (intra-project effects) and from projects combined with other activities (inter-project) impacts are commonly identified."*

3.78 The assessment of combined and cumulative effects has been considered in five stages, as noted below. This approach has been adopted to ensure that both the intra-project and inter-project effects arising out of the each connection forming part of the KTR Project, as well as those arising out of the KTR Project as a whole, have been identified and assessed.

Stage 1: "Intra-Connection Effects" of each Connection Forming Part of the KTR Project

3.79 A cumulative assessment of effects arising from different elements of each individual connection ("intra-connection effects") has been undertaken for every one of the five individual connections forming part of the KTR Project. This assessment considers the combined effect of a number of effects caused by the particular connection on a single receptor, for example construction disturbance and visual impact on residents within a residential property.

3.80 As this assessment is focussed on the combined effects associated with different topics on particular receptors, the assessment of the intra-connection effects for each connection forming part of the KTR Project is presented in **Chapter 17**.

Stage 2: Combined Effects of the KTR Project as a Whole

3.81 In addition to assessing the potential effects of each of the five connections separately, given the interrelated nature of the connections which collectively comprise the KTR Project, an assessment has also been undertaken of any likely significant effects arising from the KTR Project as a Whole, i.e. the combined effects of P-G via K (and the removal of removal of the N route towers between Polquhanity and Kendoon and R route (north) between Kendoon and Glenlee) + C-K + E-G + BG Deviation + G-T (and the removal of the R route (south) between Glenlee and Tongland). Where a significant effect is predicted on a receptor for any of the individual connections, a significant effect is, as a matter of course, predicted for the same receptor as a result of the KTR Project as a Whole (albeit this may only relate to one connection). In addition, where any combination of connections which individually were not predicted to have significant effects may, in combination, lead to a significant effect for the KTR Project as a Whole, this has been identified, although it is recognised this is likely to be geographically concentrated e.g. at Glenlee where there is a concentration of infrastructure relating to a number of individual connections i.e. P-G via K, E-G, BG Deviation and G-T.

3.82 The combined effects of the KTR Project as a Whole are presented at the end of each assessment chapter.

Stage 3: "Intra-KTR Effects" of the KTR Project

3.83 In addition to the assessment of intra-connection effects for each individual connection forming part of the KTR Project, an assessment of effects arising from the KTR Project as a whole ("intra-KTR effects") has been undertaken. This assessment considers the combined effects of a number of effects caused by the whole of the KTR Project on a single receptor, for example construction disturbance and visual impact on a residential property. This is relevant for receptors located in proximity to more than one connection.

3.84 As this assessment is focussed on the combined effects associated with different topics on particular receptors, the assessment of intra-KTR effects of the KTR Project as a whole is presented in **Chapter 17**.

Stage 4: "Inter-connection effects" of each connection forming part of the KTR Project

3.85 An assessment of effects arising from the combination of each connection forming part of the KTR Project with other developments in the relevant Study Area ("inter-connection effects") has been undertaken. This includes other connections of the KTR Project, in addition to other schemes in the relevant Study Areas as illustrated on **Figure 3.1**[20].

3.86 The other schemes included in the cumulative assessment include unimplemented development proposals which benefit from unexpired consents, and those which have not yet been granted development consent, but which are subject to valid applications. Information on schemes subject to scoping applications is also presented, but these have not been assessed as part of the cumulative assessments for the purposes of the EIA.

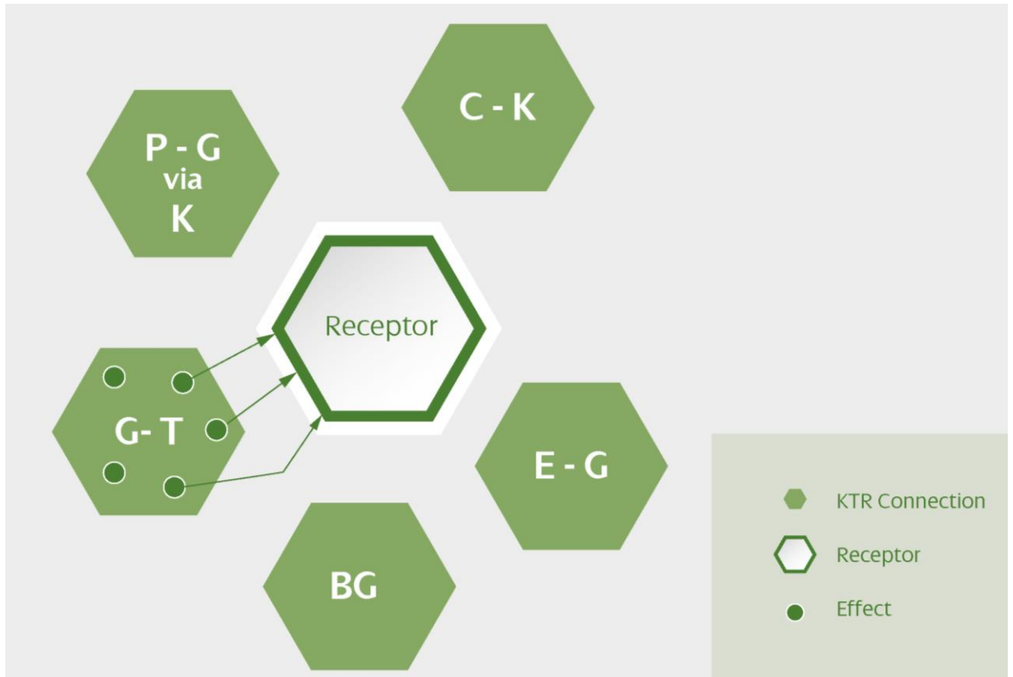
3.87 An assessment of inter-connection effects has been undertaken separately in respect of every one of the five individual connections forming part of the KTR Project. These assessments identify the likely significant effects of the addition of each of the individual connections to the baseline. As noted above, for the purposes of each of the assessments, the baseline includes the remaining four connections forming part of the KTR Project, as well as all of the other developments. Existing developments are considered part of the baseline.

3.88 This assessment is presented at the end of the assessment section for each connection of the KTR Project in the respective topic chapters. This is illustrated on **Diagram 3.1** below.

[19] As per the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000

[20] This list of schemes was finalised on Friday 31st May 2019 and agreed with Dumfries and Galloway Council, Scottish Natural Heritage and the Scottish Government Energy Consents Unit.

Diagram 3.1: Inter-Connection Effects

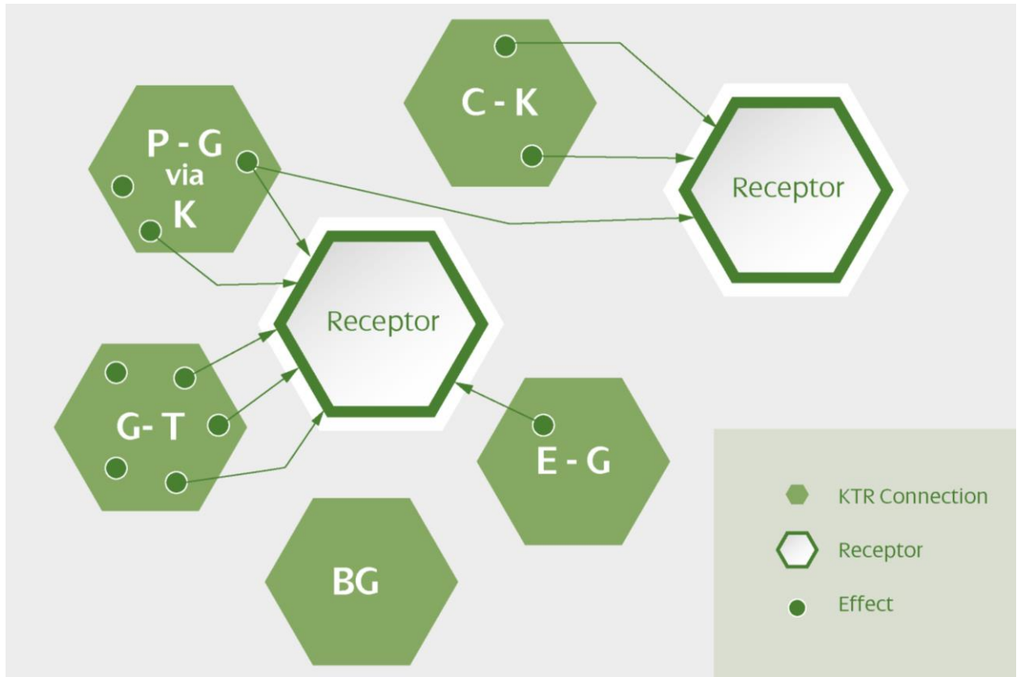


Stage 5: "Inter-KTR effects" of the KTR Project

3.89 In addition to the assessment of the intra-connection effects, intra-KTR effects and the inter-connection effects, a further cumulative assessment of the effects arising from the KTR Project as a whole in combination with other developments ("inter-KTR effects") has been undertaken. The assessment of the inter-KTR effects identifies the likely significant effects of the addition of the KTR Project as a whole (i.e. all of the five individual connections in combination), to the baseline. For the purposes of this assessment, the baseline includes the other developments.

3.90 The assessment of inter-KTR effects of the KTR Project as a whole is presented at the end of each assessment chapter. This is illustrated on **Diagram 3.2** below.

Diagram 3.2: Inter-KTR Effects



Topic-Specific Methodology

3.91 Whilst the scope of the cumulative assessment has been defined separately for each topic, the general approach set out in stages 1-5 above has been followed for all topics. This is based on the extent of likely significant effects and the corresponding survey area for each topic, and the stage of development at which cumulative effects are likely to arise e.g. during construction and/or operation. Details of the rationale for the cumulative assessment methodology for each topic are therefore included in the relevant assessment chapters.

Mitigation

3.92 As explained in **Chapter 2**, the main strategy for minimising adverse environmental effects of the KTR Project has been avoidance through careful routeing. While some environmental effects can be avoided through careful routeing, other effects are best mitigated through local deviations of the route, the refining of tower/pole locations and appropriate construction practices. Additionally, in certain cases, specific additional mitigation measures are required.

3.93 Schedule 4 of the EIA Regulations, which sets out 'Information for inclusion in Environmental Impact Assessment Reports', states that the EIA Report should include *"A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment"*. In EIA, these measures are typically termed 'mitigation measures' and must be described in the decision notice issued by the Scottish Ministers. They are further defined in Regulation 21 (5) of the EIA Regulations as *"any features of the development and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment including any such features or measures required by virtue of—*

a) *a condition imposed on the grant of Electricity Act consent or a condition subject to which any planning permission is deemed to be granted by virtue of a direction given under section 57(2) or (2ZA) of the 1997 Act; or*

b) *a planning obligation".*

3.94 Scottish Government Planning Advice Note 1/2013: Environmental Impact Assessment states that *"EIA can lead to improvements in design, including the integration of mitigation measures"* (paragraph 3.1) and goes on to state that *"Early action to embed mitigation measures fully into the project at design stage"* is *"undoubtedly one of the most important in ensuring the full value of EIA is realised"* (paragraph 6.5). Given the iterative design process described in **Chapter 2**, the KTR Project has adopted this approach to embedding mitigation. The embedded mitigation measures include changes that were made at the early routeing stage and during the design (e.g. avoiding areas of 'highest environmental value' from the outset of the project, and moving towers and tracks out of deep areas of peat, and away from archaeological features identified during field survey). In addition, mitigation embedded through the project design process includes adopting best practice and industry standard measures for construction of projects of this nature, such as treatment and attenuation of run off from construction working areas to ensure that this does not wash into watercourses and cause pollution downstream.

3.95 While mitigation has been embedded through the design process for a range of assessment topics, specific additional mitigation measures ('additional mitigation') are also proposed to prevent, reduce and offset likely adverse effects which could not be avoided through design. These additional mitigation measures have been identified through the EIA process. As an example, the monitoring of PWS before and during construction, the confirmation of location of PWS pipework and the provision of alternative water supplies if required have been identified as forms of additional mitigation. Each assessment chapter recognises:

- Embedded mitigation – items that are embedded through the design of the KTR Project and are described in the chapters relating to particular topics, and which will be delivered during the construction process; and
- Additional mitigation – items that are further required to mitigate the likely adverse effects of the KTR Project and which will be implemented to avoid, reduce or offset these effects identified in relation to particular topics.

3.96 The assessments presented in **Chapters 7** to **16** of the EIA Report have been undertaken on the basis that the embedded mitigation forms an integral part of the KTR Project. The best practice/industry standard measures which form the embedded mitigation to be implemented during the construction process across all topic areas are, by their nature, ones which are well understood, and for which there is a high degree of confidence as to their effectiveness. In other words, it is highly likely that these measures would be successful. The specialist topic chapters detail the additional mitigation identified during the assessment process to address localised site/issue specific likely adverse effects.

3.97 By making a distinction between embedded mitigation and additional mitigation, and with embedded mitigation forming an integral part of the KTR Project (i.e. being in place for assessment purposes), the EIA Report focuses on the likely significant effects of the KTR Project. Given the industry standard nature of the embedded mitigation measures identified, this approach prevents a series of unrealistic and unlikely effects from being reported in detail. It also provides clarity on the additional mitigation measures required to address likely significant as well as other adverse effects. In line with EIA good practice, including IEMA's guidance on 'Delivering Proportionate EIA' (2017), this approach will assist consultees and other stakeholders in focusing on the *"significant impacts* [which] *might realistically arise and how they could be mitigated"*[21]. This approach, which is standard practice in EIA for large infrastructure projects of this nature, also recognises the need for a balanced approach to risk, something which is considered fundamental to the preparation of a proportionate EIA Report.

3.98 The embedded mitigation measures forming an integral part of the KTR Project are set out in **Chapter 2**, **Chapter 4: Development Description**, and **Chapter 5: Felling, Construction, Operational Maintenance and Decommissioning** of the EIA Report. In addition, the relevant embedded measures are also described in detail in the specialist topic chapters. Applicable additional mitigation measures are also described in detail in the specialist topic chapters.

3.99 To provide a single reference source, all embedded measures forming an integral part of the KTR Project and those envisaged as additional mitigation are included on a topic by topic basis for each connection comprised in the KTR Project in the schedule of embedded and additional mitigation in **Appendix 5.2**. This schedule will be incorporated into the project CDEMP. The implementation of all measures noted in **Appendix 5.2** will be secured either through conditions attached to the section 37 Consent and/or deemed planning permissions for each connection comprised in the KTR Project, or through other regulatory mechanisms e.g. Construction Site Licence or a licence required in terms of the Water Environment (Controlled Activities) (Scotland) Regulations 2011.

3.100 By assuming that embedded mitigation is an integral part of the KTR Project and will be effective, and then making a professional judgement on the likely effectiveness of the additional mitigation measures proposed, the remaining likely effects are then documented within this EIA Report as 'residual effects'. This is considered to be a robust, proportionate and realistic approach to assessment, which allows consultees and the public to understand the likely significant effects arising from the KTR Project.

Potential Enhancement Measures

3.101 As noted above, the EIA Report includes information on proposals for restocking windthrow areas to reflect environmental objectives as detailed in **Appendix 5.2**. The assessments will be undertaken on the basis that there will be no net loss of forestry and that this will be replaced on a 'like for like' basis. However, where possible, SPEN will seek to agree with the landowners to increase species diversity in the replanted windthrow areas as an environmental enhancement measure.

3.102 Where relevant, other environmental enhancement measures are identified in the specialist assessments in **Chapters 7** to **16**.

Monitoring

3.103 The EIA Report sets out details of any post-consent monitoring which is proposed. This includes, where appropriate, proposals to measure the effectiveness of the identified mitigation measures.

Data Gaps and Uncertainty in Assessment

3.104 Paragraph 6 of Schedule 4 of the EIA Regulations requires that EIA Reports describe the forecasting methods or evidence used to identify and assess the significant effects on the environment, including "*details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved*".

3.105 Whilst any assessment limitations are discussed in **Chapters 7** to **16**, it is considered that this EIA Report contains sufficient information to enable the Scottish Ministers to form a reasoned conclusion on the significant effects of the KTR Project on the environment.

Preparation of the EIA Report

3.106 As explained above, the EIA for the KTR Project has been prepared under the transitional provisions of the EIA Regulations. Regulation 40(2)(c) of the EIA Regulations requires that the EIA Report is to include the information referred to in Part II of Schedule 4 to the 2000 EIA Regulations and such of the information as is reasonably required to assess the environmental effect of the development and this EIA Report has been prepared in accordance with these requirements.

3.107 Regulation 5(5)(a) states that to ensure completeness and quality of the EIA Report:

"*(a) the developer must ensure that the EIA report is prepared by competent experts;"*

3.108 Although regulation 5(5)(b) of the EIA Regulations which requires that *"the EIA report must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts"* does not apply to the EIA Report, as a matter of good practice this information has been included. A statement of competency, setting out the qualifications and experience of chapter authors is provided as an appendix to **Chapter 1**.

[21] Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice, IEMA, 2017. Available at https://www.iema.net/policy/ia/proportionate-eia-guidance-2017.pdf.

[i] Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, Available [online] at: http://www.legislation.gov.uk/ssi/2017/101/contents/made, Last accessed on 11/01/2019.

[ii] Guidance On The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000.

[iii] The Scottish Government, (2017), 'Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment (Revision 1)', Available [online] at: https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment, Last accessed on: 11/01/2019.

[iv] Institute of Environmental Management and Assessment (IEMA), (2017), 'Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice', Available [online] at: https://www.iema.net/policy/ia/proportionate-eia-guidance-2017.pdf, Last accessed on: 29/04/2019.

[v] Institute of Environmental Management and Assessment (IEMA), (2006), 'Guidelines for Environmental Impact Assessment', Available [online] at: http:www.iema.net, Last accessed on: 11/01/2019.

[vi] Institute of Environmental Management and Assessment (IEMA), (2016), 'Delivering Quality Development', Available [online] at: https://www.iema.net/assets/newbuild/documents/Delivering%20Quality%20Development.pdf, Last accessed on: 11/01/2019.

[vii] SNH, (2019), 'A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultation Bodies and others involved in the Environmental Impact Assessment Process in Scotland (Version 3)', Available [online] at: https://www.nature.scot/handbook-environmental-impact-assessment-guidance-competent-authorities-consultees-and-others, Last accessed on: 11/01/2019.

[viii] SPEN (2017) The Kendoon to Tongland Reinforcement Project, Environmental Impact Assessment: Scoping report, Available [online] at: https://www.spenergynetworks.co.uk/pages/dumfries_galloway_project_documents.aspx, Last accessed on: 30/04/2019.

[ix] Guidance on The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000.

[x] The James Hutton Institute (2019), 'Land Capability for Agriculture in Scotland' , Available [online] at: https://www.hutton.ac.uk/learning/exploringscotland/land-capability-agriculture-scotland, Last accessed on: 05/04/2019.

[xi] SPEN (no date), 'Grantor's Charter', Available [online] at: https://www.spenergynetworks.co.uk/userfiles/file/1_Grantors_Charter_20140729.pdf, Last accessed on: 05/04/2019.

Chapter 4
Development Description

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Figures

4 Development Description

Introduction

4.1 This chapter provides details of the development proposals for each of the connections comprising the Kendoon to Tongland 132 kilovolts (kV) Reinforcement Project (hereafter referred to as the KTR Project). In addition to delivering the new connections, the KTR Project will also enable SP Energy Networks (SPEN) to rationalise the electricity network through the decommissioning and removal of existing overhead transmission lines within the KTR Project area. **Chapter 2: The Routeing Process and Design Strategy** includes a description of the wider area within which the KTR Project is located.

4.2 A schematic diagram of the KTR Project in its entirety is provided as **Figure 4.1**. The individual overhead line (OHL) connections and associated infrastructure are described in more detail below, with corresponding detailed figures provided.

4.3 The routeing and EIA process has been used in combination with technical design work and digital terrain modelling to identify the type of tower, profile and heights required for each connection, upon which the assessment has been based. However, post consent, following detailed topographical surveys, it is anticipated that it may be necessary and desirable to refine the final design of the OHLs on an individual tower/pole basis to reflect detailed topography, ground conditions and to provide further scope for effective mitigation of any likely environmental effects. The modifications would be assessed to ensure that they are not varied to such a degree as to cause an increase in the significance of likely environmental effects as outlined in this EIA Report. The implementation of this design process and that of appraising any likely changes to environmental effects identified in the EIA Report is outlined in the Infrastructure Location Allowance (ILA) section in **Chapter 5: Felling, Construction and Operational Maintenance.**

4.4 An overview of the permanent components of each connection of the KTR Project is outlined below, and for the purposes of assessment, details of the components of each individual connection for which separate applications for section 37 consent and for deemed planning permission are being submitted, collectively comprising the KTR Project are subsequently provided.

4.5 Details of the temporary components of the KTR Project e.g. quarries, construction compounds, working areas, and access tracks, which comprise ancillary development along with the forestry felling (all of which is included in the applications for deemed planning permission), are provided in **Chapter 5**.

Overview of Overhead Line Infrastructure

4.6 With an OHL, conductors (or wires) are suspended at a specified height above ground and supported by wooden poles or lattice steel towers, spaced at intervals. Conductors can be made either of aluminium or steel strands. Double circuit OHLs at 132kV and above carry two 3-phase circuits, with one circuit strung on each side of a tower. For towers, an earth wire will be required to provide lightning protection. The single circuit lines at 132kV are supported on wooden poles, as seen in **Photo 4.1** below.

Photo 4.1: Typical Intermediate 'Trident' Wood Pole (left) and Angle Structure (right)[1]

4.7 The proposed steel tower OHLs on the KTR Project will carry two circuits (double circuits) with each circuit being made up of three phases. The two main tower 'suites' being used are the L7 and L4, both of which are capable of supporting 132kV conductors with the key difference being that the L7 supports the use of 'twin' phase conductors. This means that the proposed L7 towers will carry 13 wires and the proposed L4 will carry seven wires. A typical L7 and L4 tower can be seen in **Photo 4.2** below.

Photo 4.2: Typical L7 Tower (Left) and Typical L4 Tower (Right)

4.8 Conductors are strung from insulators attached to the lower cross-arms or pole steel work and prevent the electric current from crossing to the tower or pole body.

[1] typically higher due to conductor 'jumper' arrangement required to maintain safety clearance to pole steelwork when changing alignment

Tower Types

4.9 The towers proposed for the KTR Project are of a lattice steel construction fabricated from high tensile steel which is assembled using galvanised high tensile steel bolts with nuts and locking devices.

4.10 There are three types of tower:

- Suspension or Line: where the tower is part of a straight line section.
- Tension or Angle: where there is a horizontal or vertical deviation in line direction of a specified number of degrees. There are three main types of angle tower 30 degrees, 60 degrees and 90 degrees.
- Terminal: where the OHL terminates into a substation or on to an underground cable section via a separate cable sealing end compound or platform.

Tower Heights and Span Lengths

4.11 The section of OHL between towers is known as the 'span', with the distance between them known as the 'span length'. Span lengths between towers average between 200m and 300m but can be above 350m if there is a requirement to span something such as a river or a loch. Details of the maximum, minimum and average span for each double circuit connection of the KTR Project are detailed in **Table 4.1**.

4.12 Towers are used to regulate the statutory clearances required for conductor height, which is determined by the voltage of the OHL (the higher the voltage, the greater the safety clearance that will be required) and the span length required between towers.

Tower Colour

4.13 Towers are constructed using galvanised steel which, depending on prevailing weather conditions, will turn a dull grey colour after about 18 months. It is not possible to colour towers to camouflage them for all times of day or all seasons. However, the colour of towers can only be recognised from a short distance. Beyond this, the colour is generally not distinguishable from the backdrop, and appears as grades of light and dark. Where towers are viewed against the sky, colour cannot be relied upon to diminish visibility, since the lighting characteristics of the sky vary greatly. The majority of OHL components are maintenance free, although periodic painting of towers will be required in order to prevent corrosion and deterioration of steelwork. The requirement for painting will be identified through regular inspection of towers but is generally required at 15-20 year intervals.

Wood Pole Types

4.14 Wood poles are proposed for the single circuit lines operating at 132kV. Wood poles are fabricated from pressure impregnated softwood, treated with a preservative to prevent damage to structural integrity.

4.15 There are three types of pole:

- Intermediate: where the pole is part of a straight line section.
- Angle: there is only one type of angle pole which can support changes in direction up to a maximum of 30 degrees. All angle structures will require to be back stayed.
- Terminal: where the OHL terminates into a substation or on to an underground cable section via a cable sealing end.

Wood Pole Heights and Span Lengths

4.16 Whilst wood poles have a standard height above ground of 15m, these have been extended or reduced in height, as required to meet statutory clearance requirements. Pole heights may require to be increased where extreme circumstances dictate, e.g. electrified railway crossings, over elevated land, structures or features. Span lengths between wood poles average between 80m and 120m and can be increased or decreased to accommodate environmental or technical/topographical conditions as required. Details of the maximum, minimum and average span for each single circuit connection of the KTR Project are detailed in **Table 4.1** below.

Wood Pole Colour

4.17 New wood poles are dark brown in colour and weather over the years to a light grey.

Underground Cables

4.18 A short section of single circuit 132kV underground cable is required for the Earlstoun connection where it enters the existing Glenlee substation. With an underground cable, the conductors are encased in insulated material and buried in a backfilled trench of suitable depth and width. Further details of the underground cable section are provided in the Earlstoun section below.

Table 4.1: Summary of Tower and Wood Pole Heights and Span Lengths by Connection[2]

Connection	Polquhanity to Glenlee (Via Kendoon)	Carsfad to Kendoon	Earlstoun to Glenlee	Glenlee to Tongland	BG Route
Max Tower/Pole[3] Height (m)	39.09m	17.24m	16.74m	35.13m	32.13m
Min Tower/Pole Height (m)	23.16m	9.8m	10.8m	25.8m	24.99m
Average Tower/Pole Height (m)	31.24m	13.99m	13.99m	29.49m	29.7m
Max Span Length (m)	340.75m	180.70m	150.45m	345.69m	247.92m
Min Span Length (m)	213m	45m	83.34m	178.61m	238.43m
Average Span Length (m)	280.9m	106.78m	106.13m	274.05m	243.03m

Polquhanity to Glenlee (via Kendoon)

4.19 An overview of the Polquhanity to Glenlee via Kendoon (P-G via K) connection of the KTR Project is shown in **Figure 4.2.** Details of the components comprising the P-G via K connection are shown in **Figure 4.7.1 to Figure 4.7.4.**

4.20 A new 132kV double circuit OHL is required between Polquhanity (approximately 3km north of the existing Kendoon substation) and the existing Glenlee substation, via the existing Kendoon substation. This proposed OHL, of approximately 10.1km in length, will connect to the recently consented and constructed OHL line which runs from Polquhanity to the existing New Cumnock substation, 3km north-east of Dalmellington.

Overhead Line Components

Overhead Line Route

4.21 The P-G via K route runs south-eastwards from the Polquhanity T-in point before entering forestry east of Barlae Hill and continuing broadly south through the forestry. The route emerges from forestry to the south-west of Dundeugh where the OHL deviates eastwards to cross the A713 and the Water of Ken to access Kendoon substation via a new L7 terminal tower which will sit within the Kendoon substation compound.

4.22 From the Kendoon substation the P-G via K route follows the alignment of the existing 132kV OHL between the Kendoon and Glenlee substations, running southwards along the western slopes of the Glenkens Valley, and broadly parallel with the A713. South of Knocknalling Wood, the route crosses the Forest estate public road near Polharrow Bridge, continuing broadly south and south-east paralleling the existing 132kV OHL to the west of the A713. The OHL route contours across the mid-slopes of the Glenkens valley, avoiding the highest ground, before passing through Hag Wood and descending towards, and crossing, Coom Burn, where the OHL then connects into Glenlee substation. The OHL will terminate on to a new gantry within the existing Glenlee substation compound.

[2] Any changes in stated structure heights and span lengths will be controlled via the Infrastructure Location Allowance (ILA) process. Such changes would be reviewed by the appointed Environmental Manager to ensure no change to the assessment of effects reported within this EIAR.

[3] Note that maximum wood pole heights stated include for vertical 'post' insulators and conductor 'jumpers' which are only applicable to angle structures (refer to photo 4.1 above).

Tower Type

4.23 The 132kV OHL will be supported on 37 steel lattice L7 towers as shown on **Photo 4.2.** The towers proposed for this connection are the 132kV L7(C) series. Whilst these towers have a standard design height of 27m, these have been extended or reduced in height, as required, to meet statutory clearance requirements or to address factors such as sloping ground. As a consequence, the heights of the towers for the P-G via K connection of the KTR Project range from 23.16m to 39.09m with an average height of 31.24m. The largest tower at 39.09m in height is utilised where a localised reduction in ground level at one tower results in the adjacent tower being located on relatively higher ground. The increased tower height is to maintain statutory ground safety clearances.

4.24 The spans range from 213m to 340.75m to accommodate environmental and technical constraints and variations in topography.

4.25 The line will carry two 3-phase circuits, which means that the towers will support 12 conductors and an earth wire designed to provide lightening protection.

Conductors

4.26 These will consist of twin-phase conductors made of aluminium alloy, each with an approximate cross section of 300mm^2. The associated earth wire will have an approximate cross section of 160mm^2 and will incorporate a fibre-optic telecommunication wire for control purposes. Twin bundled conductors will be connected by industry standard spacers to avoid clashing of conductors and vibration dampers throughout each span to minimise conductor oscillation (movement).

Insulators

4.27 Insulators attached to the tower cross-arms support the conductors and prevent the electric current from crossing to the tower body. The insulators are likely to be made from glass or ceramic.

Kendoon Substation Works

4.28 The existing switchgear arrangement within Kendoon substation will be retained, with only minor modifications required to accommodate the new and repositioned terminal tower locations and 132kV trident wood pole entry from Carsfad. The size and positioning of the new L7 terminal tower will also require a minor extension to the existing fence line at Kendoon (as shown on **Figure 4.8a**).

4.29 During the construction period it will be necessary to create a temporary crane pad to erect the proposed L7 Terminal tower. This will require a temporary diversion of the existing access road into Kendoon to ensure unrestricted access for residents during the works. It is proposed that the temporary road diversion would have a tarmac surface and be in place for up to nine months during the construction works. The existing pedestrian access leading to the footbridges and bus stop and A713 will remain open at all times. The proposed temporary construction works are shown in **Figure 4.8b.**

Carsfad to Kendoon

4.30 An overview of the Carsfad to Kendoon (C-K) connection of the KTR Project is shown in **Figure 4.3.**

4.31 Details of the components comprising the C-K connection are shown in **Figure 4.7.2**.

4.32 A new 132kV single circuit OHL, of approximately 2.6km in length, is required between the hydroelectric power station at Carsfad and the existing substation at Kendoon. The OHL will be supported on a 'trident' design wood pole.

Overhead Line Components

Overhead Line Route

4.33 From the Carsfad hydroelectric power station at the southern end of Carsfad Loch, the OHL route crosses the A713 westwards before remaining west of the road and running in a northwards direction across the western slopes of the Glenkens Valley. At the head of Carsfad Loch, the route crosses eastwards over the A713 towards and crossing the Water of Ken to connect into Kendoon substation. The OHL will terminate within the existing Kendoon substation using a 'slack span' between two new terminal wood poles.

Wood Pole Types

4.34 The 132kV OHL will be supported on 24 'Trident' wood poles. Whilst these wood poles have a standard height above ground of 15m, these have been extended or reduced in height, as required to meet statutory clearance requirements or to address factors such as sloping ground. As a consequence, the heights of the poles above ground for the C-K connection of the KTR Project (to the top of the insulators mounted on the poles), range from 9.8m to 17.24m with an average height of 13.99m. The largest pole is used where a localised reduction in ground level occurs and the increased pole height is required to maintain statutory ground safety clearances.

4.35 The spans between poles range from 45m to 180.70m with an average span length of 106.78m to accommodate environmental and technical constraints and variations in topography.

4.36 The line will carry one 3-phase circuit, which means that the poles will support three conductors.

Conductors

4.37 These will consist of one circuit including three phase conductors made of aluminium alloy, each with an approximate cross section of 200mm^2. The trident design has no earth wire however the middle phase conductor will incorporate a fibre-optic telecommunication wire for control purposes.

Insulators

4.38 Insulators attached to the pole cross-arms support the conductors and prevent the electric current from crossing to the pole body. The insulators are likely to be made from a polymeric compound (grey plastic). The steelwork and insulators are approximately 1.76m in height.

Carsfad Substation Works

4.39 The existing switchgear arrangement within Carsfad substation will be retained, with only minor modifications required to accommodate the new 132kV trident pole entry from Kendoon. The works will require the removal of the existing terminal tower within the substation which will be replaced with a new gantry within the substation compound. As a result of this it is proposed to remove and realign a short section of the existing palisade fence at the western corner of the existing compound (as shown in **Figure 4.9**).

Earlstoun to Glenlee

4.40 The Earlstoun to Glenlee (E-G) connection of the KTR Project is shown in **Figure 4.4.**

4.41 Details of the components comprising the E-G connection are shown in **Figure 4.7.4**.

4.42 A new 132kV single circuit OHL, of approximately 1.6km in length, is required between the hydroelectric power station at Earlstoun and the existing substation at Glenlee. The OHL will be supported on a 'trident' design wood pole. A short section of approximately 250m of underground cable will be required to connect into the Glenlee substation.

4.43 During construction, three wood poles will require to be erected on a temporary basis to facilitate safe removal of the existing R route. Following its removal the line will be diverted onto the final alignment.

Overhead Line Components

Overhead Line Route

4.44 The OHL route heads south-westerly, and then southerly from Earlstoun hydroelectric power station, following the existing 132kV OHL across the western slopes of the Glenkens Valley, to the west of the A762. The OHL then routes south-westerly where it passes through Hag Wood, before crossing Coom Burn in parallel with the existing 132kV OHL. Once adjacent to the Glenlee hydroelectric power station, the 'trident' wood pole OHL will terminate and an underground cable will follow the alignment of the minor public roads to access the south-westerly extension to Glenlee substation.

Wood Pole Types

4.45 The 132kV OHL will be supported on 15 'Trident' wood poles. Whilst these wood poles have a standard height above ground of 15m, these have been extended or reduced in height, as required to meet statutory clearance requirements or to address factors such as sloping ground. As a consequence, the heights of the poles above ground for the E-G connection of the KTR Project (to the top of the insulators

mounted on the poles), range from 10.8m to 16.74m with an average height of 13.99m. The largest pole is used where a localised reduction in ground level occurs and the increased pole height is required to maintain statutory ground safety clearances.

4.46 The spans between poles range from 83.34m to 150.45m with an average span length of 106.13m to accommodate environmental and technical constraints and variations in topography.

4.47 The line will carry one 3-phase circuit, which means that the poles will support three conductors.

Conductors

4.48 These will consist of one circuit including three phase conductors made of aluminium alloy, each with an approximate cross section of 200mm^2. The trident design has no earth wire however the middle phase conductor will incorporate a fibre-optic telecommunication wire for control purposes.

Insulators

4.49 Insulators attached to the pole cross-arms support the conductors and prevent the electric current from crossing to the pole body. The insulators are likely to be made from a polymeric compound (grey plastic). The steelwork and insulators are approximately 1.76m in height.

Earlstoun Substation Works

4.50 The existing switchgear arrangement within Earlstoun substation will be retained, with only minor modifications required to accommodate the new 132kV trident pole entry from Glenlee. The works will require the removal of the existing terminal gantry within the substation which will be replaced with a new gantry within the substation compound.

132kV Underground Cable Components (Earlstoun to Glenlee only)

4.51 The 132kV cable circuit will comprise three cables in tri-foil arrangement with a multi-celled duct laid alongside to allow for telecommunications control and monitoring cables. Each cable will comprise a copper or aluminium central conductor encased in XLPE insulation material, overlaid with a metallic sheath and final outer sheath of graphite coated polythene. The cables will be surrounded with well compacted, thermally selected sand and backfilled with suitably screened excavated material. Concrete cable markers will be deployed approximately every 25m to 50m along the route as a warning and indication that high voltage cable exists in the vicinity. A typical 132kV underground cable cross-section is provided as **Figure 4.11a.** Where connected to an OHL, an underground cable may also involve the creation of a fenced compound for the siting of terminal supports and sealing end compounds above ground.

BG Route Deviation

4.52 The 'BG' route comprises an existing 132kV OHL between the existing Glenlee substation and the existing substation at Newton Stewart. The OHL is currently supported on lattice steel towers. The 'BG' connection of the KTR Project is shown in **Figure 4.5.**

4.53 Details of the components comprising the B-G connection are shown in **Figures 4.7.4** and **4.7.5**.

4.54 To facilitate construction and operation of the proposed OHL for the Glenlee to Tongland connection (G-T), existing towers BG098-BG102 are proposed to be removed and replaced with five new L4m towers located approximately 40m north of those towers to be removed. Existing tower BG097 would remain in its existing location and strengthened to accommodate an increased angle onto new tower BG098. The relocation of these towers will result in an approximate 1.2km deviation of the existing BG OHL which will connect into the proposed extension to the Glenlee substation. The existing BG route terminal tower will remain in situ within the existing substation compound and will form part of the proposed new Glenlee to Tongland circuit. The proposed configuration for both the B-G route deviation and proposed new Glenlee to Tongland route to the Glenlee substation are shown in **Figures 4.7.4 and 4.7.5**.

Glenlee to Tongland

4.55 The Glenlee to Tongland (G-T) connection of the KTR Project is shown in **Figure 4.6.**

4.56 Details of the components comprising the G-T connection are shown in **Figure 4.7.4**. to **Figure 4.7.18**.

4.57 A new 132kV double circuit OHL, of approximately 32.3km in length, is required between the existing/extended Glenlee substation and the existing Tongland substation. The OHL will be supported on L4 lattice steel towers, which have six cross-arms (three on each side) and have a standard design height of 26m.

Overhead Line Components

Overhead Line Route

4.58 From the south-western extension to Glenlee substation, the route ascends the western slopes of the Glenkens Valley utilising the existing alignment of the 132kV OHL (comprising 'BG' route which connects Glenlee and Newton Stewart substations), see above for further details on BG route deviation. The route then runs south until deviating south, south-eastwards at the public road west of Bucks Linn Bridge to cross the lower slopes of Gallows Knowe before crossing the A712 (also known as the Queensway) and Knocknairling Burn. The route then enters forestry heading south-westwards around the western lower flanks of Peal Hill, before heading south and then south-eastwards to contour around the southern slopes of Cairn Edward Hill and Bennan Hill, before passing east of Stroan Loch and crossing the old railway line.

4.59 The route then heads broadly southwards after crossing the River Dee, passing along the lower eastern slopes of Slogarie Hill within commercial forestry, before continuing south, south-eastwards around the western flanks of Kenick Hill and crossing the minor road running west from Laurieston at Kenick Wood to Gatehouse of Fleet. The route continues south-eastwards before emerging from the forestry at the south-eastern extent of Laurieston Forest, to cross the A762 and passing to the west of Bargatton Loch. From here the OHL route meets and crosses the alignment of the existing 132kV OHL south-west of Dunlop and follows a closely parallel alignment to the existing OHL southwards, passing east of Upper Balannan before crossing the A75 to the north-east of Ringford.

4.60 The OHL route continues to follow a closely parallel alignment to the existing 132kV OHL as it crosses relatively higher ground between the valleys of Tarff Water to the west and the River Dee to the east, before running adjacent to the existing quarry north of Tongland and then descending to Tongland substation, west of the A711.

Tongland Substation Works

4.61 The existing switchgear arrangement within Tongland substation will be retained, with modifications required to accommodate the removal of the existing terminal tower and the installation of a new terminal tower to accommodate the two new circuits from Glenlee. This will also include the installation of a new gantry. These works will also include the realignment of the existing palisade security fence to bring the existing plant building within the boundary of the 132kV compound. All proposed works at Tongland substation are shown within **Figure 4.10**.

4.62 The existing 'quad booster' compound, located to the south and east of the main substation compound, associated switchgear, structures and terminal tower, will also be removed on completion of the new Glenlee to Tongland works. The existing surface water drainage will be cut and sealed below ground level and Class 1 oil water separator removed and the outlet sealed at a suitable location (as shown in **Figure 4.10**).

L4 Tower Types

4.63 The 132kV OHL will be supported on 119 steel lattice towers. The towers proposed for this connection are the 132kV L4 series, which are currently in use across the electricity network. Whilst these towers have a standard height of 27m, these have been extended or reduced in height, as required, to meet statutory clearance requirements or to address factors such as sloping ground. As a consequence, the heights of the towers for the G-T connection of the KTR Project range from 25.8m to 35.13m with an average height of 29.49m. The largest tower at 35.13m in height is utilised where a localised reduction in ground level at one tower results in the adjacent tower being located on relatively higher ground. The increased tower height is to maintain statutory ground safety clearances.

4.64 The spans range from 178.61m to 345.69m with an average span length of 274.05m to accommodate environmental and technical constraints and variations in topography.

4.65 The line will carry two 3-phase circuits, which means that the towers will support six conductors and an earth wire designed to provide lightening protection.

Conductors

4.66 These will consist of single-phase conductors made of aluminium alloy, each with an approximate cross section of 200mm^2. The associated earth wire will have an approximate cross section of 160mm^2 and will incorporate a fibre-optic telecommunication wire for control purposes. Conductors will be connected by industry standard vibration dampers throughout each span to minimise conductor oscillation (movement).

Insulators

4.67 Insulators attached to the tower cross-arms support the conductors and prevent the electric current from crossing to the tower body. The insulators are likely to be made from glass or ceramic.

Ancillary Development

4.68 In addition to the KTR components detailed above, which are considered to be permanent for the purposes of the applications for section 37 consent and deemed planning permission and the EIA process, other ancillary development will be required during the felling and construction phase. This ancillary development will be in situ on a temporary basis, during the felling and construction phases only and will be reinstated once the KTR Project is commissioned.

4.69 Deemed planning permission is sought for these ancillary components comprising:

- 80m/70m wayleave through woodland (for the steel tower and wood pole respectively);
- Timber stacking areas;
- Accesses and access tracks (including passing places and turning bays);
- Quarries;
- Construction compounds;
- Watercourse crossings;
- Working areas (around towers and wood poles);
- Winching areas; and
- Undergrounding of sections of existing 11kV OHLs[4].

4.70 Further details of each temporary component, and forestry felling, are provided in **Chapter 5**.

4.71 The location of all ancillary development is shown on **Figure 4.7.1** to **Figure 4.7.18** and **Chapter 5** figures.

Proposed Undergrounding of 11kV Distribution Overhead Lines (P-G via K)

4.72 A number of sections of existing 11kV OHLs in the vicinity of the P-G connection were identified by SPEN as being required to be temporarily undergrounded, and in some cases re-located, to facilitate the construction and operation of the P-G via K connection. SPEN originally proposed that these temporary underground 11kV sections would be re-instated as OHLs following commissioning of the P-G via K connection.

4.73 However, the preliminary findings of the landscape and visual impact assessment (LVIA) identified that the presence of the new P-G via K connection, in combination with the new C-K and E-G connections, plus the existing 11kV OHLs would result in a wirescape[5] which would contribute to a greater magnitude of potentially significant effects in the local area. This would remain the case, even following the subsequent decommissioning and removal of the N and R routes (north). On this basis, as direct mitigation for significant effects associated with this wirescape, SPENs landscape advisors identified a number of sections of existing 11kV OHLs which, if they remained permanently undergrounded, would avoid and/or minimise the localised wirescape.

4.74 The majority of these existing 11kV OHLs are owned and operated by SP Distribution (SPD)[6] and agreement has been reached with SPEN for these sections to be permanently undergrounded as embedded mitigation for landscape and visual wirescape effects.

4.75 The total number of wood poles to be removed from the existing distribution OHL is 251 (including 54 associated stay wires). The total length of the OHL to be removed is approximately 12km. The existing wood poles are approximately 8-10m above ground. These locations are shown on **Figure 4.12.**

4.76 Approximately 13km of underground cable will be installed to replace the 12km of OHL being removed as above (see **Figure 4.12**). The 11kV underground cable circuit will generally comprise one single three core cable arrangement and two three core cable arrangements (where SPEN need to configure existing network and customer transformers). Ducting shall be a single celled duct laid in the cable trench where required. No telecommunications or monitoring cables are required. Each cable installed will comprise of a copper or aluminium 3 core cable encased in plastic material. The cables will be surrounded with well compacted, thermally selected sand and backfilled with suitably excavated material. A 11kV marker tape will be installed 75mm above the 11kV underground cable in the trench. A typical 11kV underground cable cross-section is provided as **Figure 4.11b.** There will also be the requirement for three ground mounted switching stations along the underground cable route to effectively manage the supply to customers whose properties the cable will supply (locations are shown on **Figure 4.12**). Each site will house the electrical equipment and a plastic 'kinpar' glass-reinforced plastic (GRP) enclosure. The area of land required will be 5m x 5m with the concrete plinth and enclosure typically being 2.6m x 3.1m. There will also be approximately 0.46 hectares (ha) of woodland likely to be required to be felled to accommodate the UGC.

4.77 Further details of the process for removing the wood pole OHLs and constructing the underground cables and the proposed timings of the works are provided in **Chapter 5**.

4.78 The undergrounding of the existing 11kV OHLs is required to facilitate construction of the P-G via K connection, and to subsequently mitigate potentially significant LVIA effects during operation of the P-G via K connection. For that reason, these works are included as ancillary development to the P-G via K connection for which deemed planning permission is being sought.

Infrastructure Location Allowance

4.79 The EIA process has been used in combination with technical design work to develop the detailed development footprint upon which the assessments are based. However, it is anticipated that, post consent, it may be necessary and desirable to refine the final vertical and horizontal profile of conductors and tower/pole positions and heights, as well as the lines of access tracks, to reflect the following:

- pre-construction confirmation of dynamic environmental conditions, e.g. the location of protected species;
- more detailed technical survey information, particularly for unconfirmed ground conditions such as the heavily forested areas;
- to provide further scope for the effective mitigation of any likely environmental effects; and
- minor alterations requested by landowners.

4.80 To ensure that the final positions of the OHLs and associated works are not varied to such a degree as to cause an increase in the significance of likely environmental effects outlined in this EIA Report, an ILA is proposed. This would permit the siting of a tower/pole to be adjusted within a 50m radius of the indicative tower/pole locations and a 50m tolerance either side of the indicative access track locations. Potential variances to the vertical profile of individual towers/poles will also be managed via the ILA process as described below.

4.81 Implementation of the ILA would be controlled through the proposed detailed Construction and Decommissioning Environmental Management Plan (CDEMP). Should a request to vary a tower/pole location or height or access track position within the ILA be raised, the relevant environmental baseline surveys undertaken to inform the EIA would be reviewed in the first instance as these surveys extend beyond the proposed 50m ILA tolerance. Should this review 'flag up' any potential issues, further environmental advice would then be sought from retained specialists as appropriate. A procedure for notifying relevant statutory consultees of proposed ILA movements would also be agreed with these bodies prior to construction commencing.

[4] These are proposed on a permanent basis.

[5] The effect on views (and landscape character) from the presence of a number of overhead lines

[6] One of the existing 11kV OHLs, of which a small section is proposed to be undergrounded, is owned by Drax.

Removal of N and R Routes

4.82 The N and R routes comprise the existing 132kV OHLs between Polquhanity and Kendoon (N route) and Kendoon and Tongland, via Glenlee (R route). For ease of identification and assessment, R route has been divided into R (north) and R (south). R (north) represents the existing R route from Glenlee substation to Kendoon substation and R (south) represents the existing R route from Glenlee to Tongland substation. The N and R route OHLs are currently supported on steel lattice towers. An overview of the N and R components of the KTR Project are shown in **Figure 4.1, Figure 4.2** and **Figure 4.6.**

4.83 Details of the existing N and R route are summarised in **Table 4.2**:

Table 4.2 Summary of Tower Heights for N and R Connections

Connection	Tower Count	Max Tower Height (m)	Min Tower Height (m)	Average Tower Height (m)
N Route	11	28.7	22	24.03
R Route	158	29.9	18.2	23.47

4.84 Following commissioning of the KTR Project, the existing network, comprising N and R routes will be decommissioned and removed. The decommissioning is part of the mitigation associated with the KTR Project and it is proposed that the decommissioning will be completed within 18 months of commissioning the new OHL components of the KTR Project (see **Chapter 5** for decommissioning programme details).

4.85 It should be noted that some sections of the existing N and R routes towers will require to be decommissioned and removed earlier in the overall programme to facilitate construction of the new OHLs comprising the KTR Project. For example, some towers on the existing R route between Earlstoun and Glenlee will need to be removed in advance, to facilitate the temporary connection for the Earlstoun to Glenlee circuit. However, full decommissioning of these OHLs cannot take place until after the new lines are commissioned and brought into service.

4.86 The N and R routes proposed to be decommissioned and removed as part of the KTR Project total approximately 43.3km of existing 132kV OHLs, consisting of 169 towers in total, 11 towers for the N route and 158 towers for the R route. This comprises:

- 2.5km of existing 132kV steel tower OHL from Polquhanity to Kendoon (N route);
- approximately 7.6km of existing 132kV steel tower OHL between Kendoon, Carsfad, Earlstoun and Glenlee (R route (north)); and
- approximately 33.1km of existing 132kV steel tower OHL between Glenlee and Tongland (R route (south)).

4.87 As outlined in **Chapter 1**, deemed planning permission is being sought for the removal of the N route towers between Polquhanity and Kendoon (comprising towers N230 to N240), and R route (north) between Kendoon and Glenlee (comprising towers R000A-R29) alongside the application for section 37 consent for the P-G via K connection, as shown on **Figure 4.2** and detailed in **Figure 4.7.1** to **Figure 4.7.4**.

4.88 Deemed planning permission is also being sought for the removal of the other section of R route (south) between Glenlee and Tongland (comprising towers R30 – R153) alongside the application for section 37 consent for the G-T connection, as shown on **Figure 4.6** and detailed in **Figure 4.7.4** and **Figure 4.7.19** to **4.7.27**.

Chapter 5
Felling, Construction, Operational Maintenance and Decommissioning

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5. Felling, Construction, Operational Maintenance and Decommissioning

Introduction

5.1 This chapter describes:

- the proposals for forestry felling, including the wayleave requirements and anticipated areas of associated windthrow;
- the construction process for the new overhead lines (OHLs) of the Kendoon to Tongland 132 kilovolt (kV) Reinforcement Project ('the KTR Project'), including details of the indicative construction programme, and the proposed environmental management procedures;
- the operational maintenance requirements associated with the new OHLs of the KTR Project;
- the process for decommissioning and removal of the existing N and R route OHLs; and
- health and safety procedures.

Forestry Felling

5.2 This section provides details of the felling requirements, the felling process, proposed locations for timber stacking and routes for timber transportation. The proposed approach to the Forestry Design Concept for replanting within the wayleave corridor and the windthrow areas is presented in **Appendix 5.1: Forest Design Concept**.

5.3 The consideration of likely felling requirements has formed an integral part of the KTR Project. As a consequence, the following can be found elsewhere in the EIA Report:

- **Chapter 2: The Routeing Process and Design Strategy** explains how the strategic routeing process took account of existing forestry, and discusses the design of the KTR Project, possible replanting, and the objectives underlying the proposed Forest Design Concept (FDC);
- **Chapter 3: Approach to the EIA** outlines the references to forestry in the EIA Scoping Opinion and sets out the process for assessing forestry effects;
- **Chapter 6: Planning Policy Context** identifies the Local Development Plan (LDP) policies of relevance to the felling proposed as part of the KTR Project;
- **Chapter 8: Forestry** provides an assessment of the likely effects of the KTR Project on forestry activities;
- Each specialist topic chapter (**Chapters 7** to **16**) includes an assessment of the felling proposals within the construction sections, on the basis of the information provided in this chapter.

Wayleave Requirements

5.4 An 80m/70m wayleave or servitude right (i.e. 40m either side of the centre line for the steel tower and 35m either side for the wood pole respectively) will be required to safely construct and maintain the OHLs. To achieve this, the minimum clearance corridor (wayleave) required through commercial forestry is 80m/70m however, where an OHL is proposed to go through other woodland areas, such as broadleaf, the extent of tree clearance within the wayleave is determined based on a detailed assessment of the type, age and condition of trees in that location to minimise loss of trees. SP Energy Networks (SPEN) will undertake annual inspections throughout the lifetime of each of the OHLs within the KTR Project, to ensure that no clearance infringements occur (see **Figure 5.1).** Should these be identified then SPEN would undertake necessary assessments to ensure that clearance works are undertaken in line with SPEN's statutory and licence duties.

5.5 The felling of approximately 242.97 hectares (ha) of forestry is required for the KTR Project, with the majority of the trees proposed for felling comprising Sitka spruce, the dominant species in Scottish forestry. The required felling area to accommodate the KTR Project is detailed in **Table 5.1** below and shown on **Figure 5.2**.

Table 5.1: Felling Requirements by Connection

Connection	Wayleave Felling Area (ha)	Quarries(ha)	Compounds (ha)	Access Tracks (ha)	Total (ha)
Polquhanity to Glenlee (via Kendoon) (P-G via K)	20.69	8.09	-	1.03	**29.81**
Carsfad to Kendoon (C-K)	0.98	-	-	-	**0.98**
Earlston to Glenlee (E-G)	1.70	-	-	0.20	**1.90**
BG Route deviation (BG Deviation)	2.12	-	-	-	**2.12**
Glenlee to Tongland (G-T)	137.98	61.24	2.46	6.29	**207.97**
N and R route removal		-	-	0.19	**0.19**
Total	**163.47**	**69.33**	**2.46**	**7.71**	**242.97**

5.6 It is important to note that this approximates the felling based on the existing forest baseline as in some areas the trees may already have been harvested by the landowner by the time felling and construction of the KTR Project takes place. Similarly, areas recently felled may have been replanted by the time the KTR Project is constructed. As outlined in **Chapter 8**, the baseline for forestry comprises the existing woodland cover and structure as at 2019, i.e. when the assessment and EIA was undertaken, on the basis that this represents the baseline situation with the highest degree of certainty. This is on the basis that it has been normal practice to use the existing status of the forest and not allow for the proposals in the long-term forest plan, which simply identify within which five year period, the landowner anticipates felling the forest.

Windthrow Effects

5.7 In some areas, the felling of forestry for the KTR Project wayleave will be only part of a forest compartment and as such expose those remaining, and previously sheltered, trees to the wind. Where these trees are semi-mature or mature this is described, within the forest industry, as creating a "brown edge". The remaining trees in these forest compartments in many cases will be less stable and as such prone to future windthrow. Due to the site specific conditions in terms of exposure, soils, drainage, altitude and aspect, encountered within many part of the KTR Project, there is a real risk of these trees either falling or failing to reach commercial maturity.

5.8 SPEN's forestry advisors, identified, in consultation with the individual forestry landowners (primarily Forestry and Land Scotland as the largest forest owner[1]), those areas considered likely to be subject to windthrow effects following felling of trees within the wayleave corridor. These areas are shown on **Figures 5.2.1** to **5.2.18.**

5.9 The total area considered likely to be subject to windthrow is 113.52ha (this is in addition to the felling area in **Table 5.1**) with the breakdown by connection provided in **Table 5.2** below.

Table 5.2 Predicted Windthrow by Connection

Connection	Predicted Windthrow Felling Area (ha)
P-G via K	20.90
C-K	0
E-G	0.68
BG Deviation	0
G-T	91.94
Removal of N and R Routes	0

[1] Previously Forest Enterprise Scotland (name changed on 1st April 2019)

5.10 As outlined in **Chapter 3,** as these areas (subject to windthrow) are outwith the 80m/70m wayleave corridor, SPEN has no mechanism to control felling and/or replanting under either the section 37 consents or deemed planning permissions. However, SPEN is committed to liaising with landowners to agree that these areas will be felled to mitigate the risk of forest damage through windthrow. The felling of these areas would require the agreement of the relevant landowners and would be delivered in line with a felling permission to be applied for by the forest landowner/manager to Scottish Forestry (SF[2]) on behalf of the Scottish Ministers. It is anticipated that each felling permission would be granted subject to a condition, to ensure that the felled woodland is replanted.

5.11 It is considered that the felling (or loss due to windthrow if not felled) of the areas outwith the 80m/70m wayleave will result in indirect effects on the wider environment, therefore effects associated with the predicted windthrow areas have been assessed within the specialist topic chapters as appropriate. **Chapter 8** provides further details of the implications of the KTR Project on forestry.

Felling Process

5.12 Tree felling and timber extraction will be undertaken using conventional machinery for the felling of mature and semi-mature accessible timber as detailed below. Key stages in the felling process comprise:

- Access track formation;
- Felling (including environmental protection measures);
- Timber stacking;
- Timber transportation;
- Post harvesting site treatment; and
- Replanting (where appropriate).

Felling

5.13 Felling will be undertaken using a mixture of mechanical harvesting, mulching and hand felling techniques. These operations will require access tracks to be installed to allow the felling contractor to facilitate timber extraction. The roads to be installed for this purpose will be for use by timber felling and forwarding machinery only and as such the requirements are very basic (see access track section for further details).

5.14 Mechanical harvesters are custom built machines designed to minimise ground and soil structure damage; they have either six or eight wheels, or are tracked vehicles. The machine harvesting head is mounted on a hydraulic boom. This grips the tree trunk and severs it as close to the ground as possible using a powered chainsaw. The whole tree is laid on its side and delimbed by driving the stem through mounted, adjustable delimbing knives with powered drive wheels. The stem is cross cut into appropriate lengths to suit the end use of the timber according to length, diameter and straightness, using electronic measuring devices. The timber is stacked on the ground by category to await extraction to roadside. In support of the harvester there will be a small team of manual chainsaw operators who will fell and process those trees which are either too large or heavily branched for the harvester. A typical mechanical harvester is shown in **Photo 5.1** below.

5.15 When trees are felled within a wayleave, the root system will be left in place to reduce possible adverse effects on soil structure/stability. The exception to this will be in the identified tower/pole working areas where the surface will need to be levelled prior to introduction of the required installation equipment.

Photo 5.1: Mechanical Harvester

5.16 Where access or maturity of timber dictates that a mechanical means of felling the timber is not practical, it may in some cases be necessary to mulch the standing timber. Mulching is carried out using mulching machinery; a typical example of which is illustrated in **Photo 5.2** below.

Photo 5.2: Typical Mulcher

[2] As of the 1st of April 2019 Forestry Commission Scotland, as the statutory forestry authority, changed its name to Scottish Forestry (SF). At the same time Forest Enterprise Scotland, as the land-owning element of the Forestry Commission in Scotland, changed name to Forest and Land Scotland (FLS). In this chapter the new names and their abbreviations are used for both organisations.

5.17 Where the access or maturity of timber dictates that a mechanical means of felling the timber is not practical, it may in some cases be necessary to hand fell the timber as illustrated in **Photo 5.3**.

Photo 5.3: Hand Felling

Timber Extraction

5.18 Timber extraction to roadside will be by custom built six or eight wheeled 'forwarders'. Vehicles may be fitted with band tracks in soft ground conditions to reduce ground pressure. The timber is lifted using a hydraulic grapple mounted on a telescopic boom and is placed on the vehicle's timber bunk. The timber is carried to roadside and stacked according to market category to await transportation. A typical forwarding vehicle is shown in **Photo 5.4**.

Photo 5.4: Timber Forwarding Vehicle

Timber Stacking

5.19 The timber having been extracted by the forwarder it is stacked at the forest roadside to await uplift by timber lorry to the appropriate market. The final market will be determined by the quality and size of the timber. The higher quality and larger timber sizes will go to the sawmill for a range of uses including construction. The smaller diameter and lower quality timber will tend to go to pulp, chipwood or biomass markets. Timber stacking areas (also known as timber extraction spurs) have been identified for the KTR Project (see 'Timber Extraction Spurs' on **Figure 5.2**).

Timber Transportation

5.20 The timber required to be felled is set out in **Table 5.3** and will be transported from the areas of felling/timber stacking to a range of end users including sawmills, chipboard and pulp mills and also woodfuel processing depots via the extraction route access points shown in **Figure 5.5**.

Table 5.3: Timber Yield in Tonnes

P-G via K	C-K	E-G	BG Deviation	G-T
11,204.5T (of which 6,237 is windthrow)	**204T**	**576T** (of which 227 is windthrow)	**209T**	**41,213.5T** (of which 22,920.2 is windthrow and 31T is decommissioning R route (south)

5.21 Where appropriate, load going timber HGV lorries will be used to uplift the felled timber directly from the timber stacking areas and transport it to the end user. Within the industry most timber lorries are fitted with Central Tyre Inflation (CTI) systems which enables the tyre pressures to be reduced. This is seen as an important advantage in terms of providing increased traction and also improved weight distribution over the forest road reducing road damage. A typical vehicle is shown in **Photo 5.5**.

Photo 5.5: Typical Timber Lorry

5.22 If the use of HGV lorries is deemed unsuitable in any locations, specialised in-forest haulage machines will be used which are designed to minimise damage to the forest roads and also the number of trips required to remove the timber from site. These machines will transfer timber from the initial stacking area where the Forwarder has deposited the timber to an area known as a 'landing area' located at a suitable point within the forest complex to allow transfer onto road going HGV's for final transportation. A typical I -forest haulage vehicle is shown in **Photo 5.6**.

Photo 5.6: In-Forest Haulage Vehicle

Post Harvesting Site Treatment

5.23 The treatment of the woodland areas post harvesting and post construction of the relevant OHL will require agreement with the individual landowners. For that area within the 80m/70m wayleave corridor there will continue to be a requirement from SPEN to maintain safe operation of the relevant OHL. In particular there is a need to retain a safe separation distance between the infrastructure (towers, poles and conductors) and any vegetation which may be introduced to the wayleave corridor (as shown on **Figure 5.1**). This vegetation may either be introduced by the natural reseeding, regrowth of existing trees and shrubs or in certain areas by active replanting. There are a range of environmental and landscape advantages to the active management of such vegetation within the wayleave, in particular where this vegetation is of shrub type species which tend to be lower growing with less risk to the safe operation of the OHL. For example, the introduction of such shrub species to areas can create linkage pathways for wildlife across the wayleave corridor. An outline of areas where this is deemed to be of high environmental benefit, such as in areas where protected species are known to be present, has been be developed in preliminary discussion with the relevant forest landowner. This is provided as **Appendix 5.1**.

5.24 The treatment of land felled to address windthrow risk, out with the wayleave corridor will be at the discretion of the landowner. SPEN will work with the landowner to encourage a design of those replanted areas which addresses the impact of the OHL's introduction to the local landscape and/or on ecology. The redesign of the forest area outside the wayleave will require to be acceptable to Scottish Forestry as the statutory body. As such there is a reasonable level of control to that design albeit out with the direct control of SPEN. Further information in relation to the FDC is provided in **Appendix 5.1**.

5.25 The brash (tree-tops and branches) resulting from tree felling operations will be left onsite to degrade and slowly release nutrients back into the soil, in keeping with the normal forest practice. No brash will be left in or adjacent to watercourses. In access routes required for the construction of the OHL the brash will either be moved to the sides of the access route or mulched. This mulched material can then either be incorporated into the soil as part of the access track building process or left in-situ to be covered with the temporary roading surface. In both cases the slow nutrient release as the material decomposes is deemed beneficial to the forest sites nutrient status.

5.26 Where replanting is undertaken this will normally follow a process starting with ground preparation in advance of replanting, in accordance with current best practice[3].This involves the creation of spaced planting platforms ('mounds') at a predetermined spacing using a tracked excavator, to ensure satisfactory re-establishment. The spacing of mounds will depend on the type of planting proposed (species and replanting objectives). Trees will then be manually planted and then tended through a maintenance period when weeding, beating up and applications of fertiliser will be undertaken as needed to ensure the establishment of the replanted woodland/shrubland.

Construction of the Overhead Lines

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

- Undergrounding of sections of existing 11 Kilovolts (kV) OHLs;
- Felling where required (see section above);
- Working of quarries;
- Construction of temporary construction compounds;
- Preparation of accesses;
- Provision of watercourse crossings for access track construction;
- Preparation of temporary working areas including excavation and construction of tower/pole foundations;
- Delivery, assembly and erection of towers/poles;
- Tower/pole conductor 'stringing' and commissioning of the OHL;
- Removal of temporary infrastructure and reinstatement.

5.28 With the exception of felling (see section above) these construction activities are described further in the following paragraphs.

[3] Including Forests and Water – UK Forestry Standard Guidelines 5th Edition (2011)

Undergrounding of 11kV Overhead Lines

5.29 As set out in **Chapter 4: Development Description** (and shown on **Figure 4.12**), a number of sections of existing 11kV OHLs in the vicinity of the P-G via K connection are proposed to be undergrounded to facilitate construction of the KTR Project and as embedded mitigation for landscape and visual wirescape effects (see **Chapter 7: Landscape and Visual Amenity** for assessment findings). The removal of these OHLs and underground cable installation will take place as part of the enabling works for the P-G via K connection and will commence in March 2022 and be completed by November 2022.

5.30 The total number of wood poles to be removed from the existing HV OHL is 251 (including 54 associated stay wires). The total length of the OHL to be removed is approximately 12km. The existing wood poles are approximately 8-10m above ground.

5.31 Removal of existing lower voltage poles will be undertaken through the following sequence of activities.

- **Access** – access to pole locations will generally be undertaken using low ground pressure plant and machinery and will largely utilise the accesses proposed as part of the P-G via K, E-G and C-K connections. Typical plant which may require access at each pole location include a JCB or tracked excavator, lorry with high-ab and 4x4 for staff transfer. The removal of poles will not require the installation of stone roads however, given these works will happen concurrently with access installation for the KTR Project enabling works e.g. felling and stone track access installation, the pole removal works may also utilise some of the stone roads to be built for the Project.
- **Conductor removal** – conductors will be removed in sections (generally between suitable section poles). The conductors will be released of tension and lowered to the ground. The conductors shall be cut into manageable lengths and coiled then removed from site by lorry. Conductor shall be processed for recycling as necessary.
- **Pole removal** – wood poles shall be typically felled with a chainsaw or removed in full by use of a JCB or tracked excavator, pulling chains used remove the pole butt or full pole where necessary. The resulting pole hole in the ground shall be filled with suitable material (generally earth). The pole will then be attached by steel chain/or webbing straps to the lorry high-ab before being removed from site. Poles, steelwork and insulators will be sorted offsite with these fittings and parts either being reused or recycled.
- **Site reinstatement** – following the works land will typically be reinstated to its former use in agreement with the landowner.

Open-Cut Trench Construction for 11kV Cables

5.32 Open cut trenching is proposed for the majority of the proposed 11kV voltage undergrounding. The majority of the cable routes are proposed within the existing road corridor of the A713 and will require lane closures and associated traffic management works during construction with the remainder of the sites requiring open-cut trench excavation in agricultural land. For open-cut trench installation, the trench will be excavated using a mechanical excavator with the cable being laid at a typical depth of 650mm within road structures and 1000mm within agricultural land. The cable trench width is typically 30cm with a 3m width temporary working width adjacent to the trench to facilitate access and soil storage etc. Once the cable has been laid, it will be marked with a protective warning tape before the trench is backfilled with sand and native material and surface reinstatement. A typical cable installation rate is up to 160m-200m per team week, depending on the terrain, with up to three to four teams potentially working at one time (subject to the Council roads department agreement).

5.33 Construction vehicles for laying the underground cable will comprise a grab lorry, three tonne excavator, JCB with cutting and Peaker equipment, two tipper lorries with grab and two dumper trucks. Delivery of the underground cabling will be via articulated lorry to set location, taken to site with small pickup with cable drum trailer.

5.34 There will be some limited woodland felling of approximately 0.46ha[4] to accommodate the new underground cabling and temporary access track etc.

Directional Drill Construction Description for 11kV Cables

5.35 Directional drilling (DD) is required at five watercourse crossings (as shown on **Figure 4.12**) as the existing structures at the two Hydro-station locations (Glenlee power station tailrace crossing and Coom burn tailrace crossing at Glenlee) do not have ducts installed for utilities and do not have sufficient depth to install cables/ducts. The structures at the Hydro stations are also listed structures. The two watercourses with the existing road bridge structures on the A713 (Polharrow Burn and Polmaddy) have no suitable ducts or sufficient depth to install cable ducts within them.

5.36 Typical stages involved in the DD process include:

- Establishment of temporary compounds at the launch and reception ends of the drill to provide space for temporary storage of plant and materials required for use during the drilling works, along with welfare facilities for the drill operators. In addition, establishment of these compounds ensures the drilling works area can be kept secure from members of the public for health and safety. Typically, a drill launch site compound would measure approximately 30m x 30m, and a drill reception site compound 20m x 20m.
- Excavation of launch and reception pits within the compounds.
- Setup and anchoring of drilling rig at launch site.
- Drilling of a pilot bore along the planned drill alignment from launch pit to reception pit.
- On arrival of the pilot drill head at the reception pit, the drill head is removed and replaced with a larger back head which is pulled back towards the launch pit, widening the pilot hole bore diameter as it passes
- Once the required bore diameter has been achieved, the drill head is returned to the reception pit, connected to the duct string by a pulling head and pulled back to the launch pit, pulling the duct string into the drill hole as it goes.
- At either end of the completed drill, the ducts are cut to length at the correct installation depth and connected via adaptive collars to the standard cable ducts used along the rest of the cable route.

Quarries

Stone Requirements

5.37 Stone is required for the construction/upgrading of the access tracks and for the temporary pulling areas. An estimated 890,685 tonnes of stone is required for the KTR Project. Estimates of the volumes of stone required to construct each new connection of the KTR Project are shown in **Table 5.4** below. **Chapter 13: Traffic and Transport** presents the likely vehicle movements associated with the transport of these stone requirements.

Table 5.4 Estimated Stone Requirements

Connection	P-G via K	C-k	E-G	BG Deviation	G-T
Total Estimated Stone Requirement (Tn)	154,421	15,610	24,027	13,630	682,997

Working of Quarries

5.38 To provide stone for the construction/upgrading of the accesses, seven quarries have been identified where stone will be excavated and processed prior to transportation to the point of use. The sizes of the quarries and excavation volumes are detailed in **Table 5.5** below and the locations of the quarries are illustrated on **Figure 5.3**. The sizes of the quarries presented below include the working area around the actual stone abstraction area and therefore represent the 'maximum case' scenario for temporary land take.

5.39 SPEN aim to source the majority of stone for the KTR Project from the seven onsite quarries. However, it is not expected that 100% of the KTR Project's likely total stone requirements can be met from these sites, with the exact amount of stone to be sourced from the onsite quarries will only be confirmed once further detailed ground investigation works have been undertaken at each site. Therefore, as this cannot

[4] Based on desk-based assessment. The Root Protection Area (RPA) for final felling will be calculated prior to construction in consultation with D&GC.

be confirmed in advance of ground investigation data being obtained, for the purposes of the EIA[5], it has been assumed that:

- Stone will be sourced entirely from offsite locations for P-G via K, C-K and E-G connections; this is primarily due to the presence of only one onsite quarry to the north of Glenlee (Q1). Stone will be sourced either from Sorn Quarry or Tongland Quarry.
- For G-T and the BG Deviation connections, it has been assumed that 50% of stone will be sourced from the onsite quarries (Q2-Q7). This is considered to be a robust scenario for assessment on the basis that there are six local quarries identified in proximity to these OHLs. In this scenario it is assumed that the remaining 50% of stone will be sourced from both Sorn Quarry and Tongland Quarry.

Table 5.5: Quarry Details

Quarry No.	Quarry Name	OS Grid Reference	Size (m^2)	Excavation Volume (tonnes)
Q1	Barlae Hill Quarry	258617, 588853	80,891	194,058
Q2	Gallows Knowe Quarry*	260240, 578241	44,998	103,155
Q3	Will's Hill Quarry*	258226, 577871	274,843	110,576
Q4	Hind Craig Quarry*	260954, 575476	123,940	98,347
Q5	Lochenbreck Quarry*	264032, 566080	64,447	139,135
Q6	Craigelwhan Quarry	265530, 563917	49,587	78,214
Q7	Craigelwhan West Quarry*	265004, 563739	106,304	78,214

* existing quarries

5.40 A number of the proposed quarries are either in use or have been worked previously and these will be excavated following current excavation practices at each site. For new quarries, site clearance (including felling where required) will be required to establish each site and any material to be reused in the reinstatement works will be stockpiled within the site working area with any unsuitable materials being disposed to a suitably licensed disposal facility at appropriate time. Following site clearance, the stone will be excavated and processed using a combination of excavators, dump trucks, mobile crushing and screening plant; **Photo 5.7** shows a typical quarry processing plant.

Photo 5.7: Typical Quarry Processing Plant

Construction of Temporary Construction Compounds

5.41 Temporary construction compounds will be required for the storage of materials, and the siting of staff offices and other facilities. Six temporary construction compounds will be required to construct the KTR Project, as shown on **Figure 5.3**. The location and size of each construction compound is shown in **Table 5.6** below.

Table 5.6: Temporary Construction Compound Locations

Construction Compound (No.)	OS NGR	Size (ha)	Associated Main KTR Component
1	259029, 590090	1.71	(P/G)
2	260245, 585547	0.54	(P/G)
3	261107, 575175	2.25	(G/T)
4	263109, 572029	1.98	(G/T)
5	265478, 572333	2.90	(G/T)
6	268384, 563399	1.0	(G/T)

5.42 The construction compounds have been identified via site visits from the SPEN construction team. Key criteria for site selection include, where possible: previously used sites, open, flat sites with good access to the existing road network and proposed OHL working areas. The selection of the sites has been further informed by an environmental appraisal of site options, taking cognisance of the factors considered in siting the KTR Project infrastructure, as outlined in this EIA Report, further informed by survey work and consultation with landowners as necessary.

5.43 The construction compounds will accommodate temporary cabins, staff welfare facilities and staff parking places. The compounds will be lit during normal working hours as required. In addition, for site security reasons, the compounds will be fitted with electrical sensors to activate the compound lighting during the hours of darkness should movement be detected. An indicative temporary construction compound layout is shown in **Figure 5.4**. Each temporary construction compound will be fenced off during construction and will be restored fully once the corresponding phase of construction is complete and the connection is commissioned.

[5] In relation to a 'maximum realistic case scenario' for traffic movements

5.44 Due to the size of the KTR Project a number of smaller mobile welfare units will be temporarily established at working areas along the routes and satellite storage areas will be utilised for storage of construction plant and materials local to the area of construction i.e. working areas.

Fuel Storage

5.45 In accordance with the CAR Regulations and SEPA Guidance for Pollution Prevention (GPP) 2 '*Above ground oil storage tanks'*, fuel storage facilities will be provided within bunded areas within the construction compounds. Where fuels are taken from storage to site, this will be restricted to the amount required for the plant and equipment onsite.

Accesses

Site Accesses

5.46 To facilitate construction of the KTR Project, and reduce effects on the local transport network, access will be via a number of different access points from the public road network. These temporary access points will be confirmed by the contractor following appointment; however, based on SPEN's experience of constructing similar OHLs, a series of access points have been identified (labelled from Access 01 to Access 121). An overview of the access points is shown on **Figure 5.5.1** and **Figure 5.5.2**. Based on the indicative construction programme, each tower/pole location has been allocated one of these access points. It is anticipated that construction plant requiring access to a tower/pole area will then use the corresponding access point (see **Chapter 13**).

5.47 Traffic management measures on the public road network during construction are outlined in **Chapter 13**.

Bellmouths

5.48 Some of the access points will require access via bellmouths from the public road. These will be designed in accordance with the approved Traffic Management Plan (TMP), appropriate legislation, and consent sought within the applications for deemed planning permission. Details of a typical bellmouth design are presented in **Chapter 13 (**see **Appendix 13.2: Construction Access Routes and Temporary Access Locations Review)**.

5.49 The main items of plant required for construction of the bellmouths include:

- crawler tractors with scrapers for cut / fill operations;
- bulldozers to grade banks in cuttings;
- front loading bucket excavators and dump trucks in cuttings;
- bulldozers with ripping blades or tracked excavators with a hydraulic breaker for rock excavations;
- HGV Lorries for off-site disposal of unsuitable and surplus;
- bulldozers to layer and grade soil deposited in embankments;
- smooth or vibrating rollers to compact the fill in layers; and
- motor graders to plane and trim the formation.

Access Tracks

5.50 Access to every steel tower and wood pole of the KTR Project is required during construction. As outlined in **Chapter 2**, the overall design objective for the access tracks has been to avoid and/or reduce effects upon natural and cultural heritage interests and to cause least disturbance to current land use and land management practices. The principle method employed to achieve this has been to maximise the use of existing tracks (and bridges), with upgrading of these tracks where necessary. Where this is not possible, or where the use of existing tracks would result in unnecessarily long connecting tracks, two options for temporary access tracks have been considered as follows

- the construction of temporary spurs from existing roads/tracks to each tower/pole;
- the construction of temporary tracks between towers/poles which connects to an existing road or track.

5.51 For the purposes of assessment all temporary tracks are considered to be removed after commissioning.

5.52 All access tracks will have a width of 5m to permit access by the largest construction vehicles, including a 60 tonne multi-axle crane. Stone from the quarries proposed as part of the KTR Project will be used where existing forest and farm tracks require upgrading. Reinstatement along the verges of the upgraded existing tracks will be undertaken as construction progresses.

5.53 Following the same design objective as for the access tracks, suitable locations for the construction of turning bays and passing places will be identified during the pre-construction stage. Turning bays will have a width of 15m-25m at the access track end and length of 10-15m (with the narrow end 5m width) and passing places a standard width of 10m to 15m respectively**.**

5.54 The type of temporary track required will depend on a variety of factors including the sensitivity of the location, the type of land use and the ground conditions, with the latter confirmed through pre-construction ground investigations. Access to individual wood pole locations (for C-K and E-G wood pole connections) will be via low pressure vehicle and/or matting, no stone roads are proposed.

5.55 **Table 5.7** indicates the different temporary track options which are likely to be utilised and how these relate to ground conditions and land use. The Construction and Decommissioning Environmental Management Plan (CDEMP) will contain a detailed requirement for the appropriate phased re-instatement and restoration of all temporary track types. Photographs of each track type are also provided below.

Table 5.7: Temporary Track Types

Temporary Track Type (Fig ref)	Ground Conditions/Land Use
Low pressure vehicle use (no track required) (A)	When the use of heavy plant and machinery is not required and the volume of traffic to carry out the works is not substantial, use can be made of low ground pressure vehicles which do not require a track. It is important to note however, that the movement of these vehicles will still be restricted to the access routes identified. See **Photo 5.8.**
Stone Tracks: - Cut and fill tracks (B1) - Floating tracks (B2)	Stone tracks will be required when heavy plant and a substantial volume of traffic is anticipated. (B1) - **Cut-and-fill tracks.** These tracks are usually utilised where the ground is competent (i.e. not in peat >1m). The topsoil is stripped and stockpiled onsite. The topsoil will be used during the restoration phase to reinstate the land to the original condition. If the ground requires to be levelled, then material is cut on one side of the slope and used to fill the other side of the slope. Stone is then laid and compacted on top of this surface to build the access track. Geotextiles and geogrid will be placed on the existing surface then stone placed and compacted as required. See **Photo 5.9**. (B2) - **Floating tracks.** A floating track is used during the construction of temporary tracks on less competent materials such as peat, where the depth of peat is greater than 1m deep. Geotextiles and geogrid will be placed on the existing surface then stone placed and compacted as required. See **Photo 5.10**.
Wood/Aluminium/Plastic Matting (C)	In areas identified as sensitive, temporary matting would be used for access, provided that the ground is relatively level. See **Photo 5.11**.

Photo 5.8: Low Pressure Vehicle Use (No Track Required) (A)

Photo 5.9(a and b): Stone Tracks - Cut and Fill Tracks (B1)

Photo 5.10(a and b): Stone Tracks - Floating Tracks (B2)

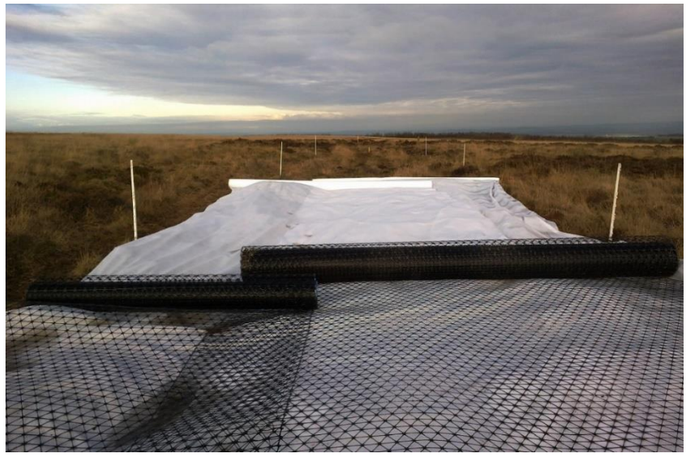

Photo 5.11(a and b): Plastic and Aluminium Matting (c)

Watercourse Crossings

5.56 Where a new temporary access track is required to cross a watercourse, a temporary bridge will be utilised. The type of bridge will depend on the width of the watercourse as follows:

- narrow burns: a mat of timbers will be used, supported by steel beams; and
- larger watercourses: a steel plate decking including safety barriers either side will be used, supported by main support beams with steel cross members.

5.57 Photographs of these watercourse crossings and details of proposed watercourse crossings are provided in **Appendix 9.1: Watercourse Crossings**.

5.58 Where a watercourse is required to be crossed during conductor stringing, steel bond wire will be pulled by hand across watercourse. Where this is not possible then boats will be used to pull bond wire (attached to the conductor on a drum), and thereafter used to pull conductors through under continuous tension. No works will take place within the watercourse.

Temporary Working Areas

Temporary Working Areas

5.59 Temporary working areas around towers / poles will be prepared prior to foundation excavation, with average dimensions of typical working areas for steel towers of 25m x 25m for standard towers and 50m x 50m for angle towers and 30m x 15m for wood poles. **Photo 5.12** shows a typical working area.

Photo 5.12: Typical Working Area

5.60 Each working area will be taped off to delineate the area for environmental protection reasons. The proposed working areas are illustrated in **Figure 4.7** however in accordance with the proposed infrastructure location allowance (ILA), further consideration will be given to varying the shape of the working area at each tower/pole further to avoid environmental constraints identified prior to construction.

5.61 Following the completion of the construction works, the temporary working areas will be reinstated and restored.

Excavation of Tower and Wood Pole Foundations

Tower Foundations – Pad and Column Formation

5.62 The foundation type and design for each tower will be confirmed following detailed ground investigations at each tower location. Photographs of typical tower foundation construction for 'pad and column' foundations are provided in **Photo 5.13**.

5.63 The majority of the foundations of each tower leg are likely to be of a concrete pyramid type. However, depending on particular geological conditions, there may be a requirement to use mini-piled, auger or rock foundations, which generally requires less ground disturbance but greater volumes of concrete. These require the drilling or auguring of several holes for each leg of the tower. These holes are then reinforced with steel and concreted or grouted. The tower steelwork connection points to foundations are known as 'stubs' and these are located and fixed by means of a pile cap at each leg position.

5.64 Excavations will be undertaken for each leg of the tower. The dimensions of the excavation will vary depending on the tower type to be constructed. A typical L4 leg excavation will be 14m^2 by 3.5m deep for the line towers, increasing up to approximately 20m^2 by 4.55m deep for angle towers. For an L7 tower, a typical leg excavation will be 16m^2 by 4m for the line towers, increasing to 25m^2 by 5m deep for angle towers. Some breaking of rock using a hydraulic pecker may be required to achieve the required depths for the tower foundations. The excavated material will be sorted in appropriate layers and used for backfilling purposes.

5.65 Once the excavations are formed, the tower legs will be fixed in accordance with the foundation design before assembling the 'pyramid' formwork around the stub. The foundation will then be concreted. The average concrete requirements are 4x6m^3 for an L4 suspension tower and 4x15m^3 for an L4 angle tower and 4x10m^3 and 4 x 25m^3 for a suspension and angle L7 tower respectively. The total estimated concrete requirements for each OHL are provided later in this chapter.

Photo 5.13: Typical Pad and Column Foundation

Tower Foundations – Piled Formation

5.66 The compressible nature and potential water content of peat means that it has a low load bearing capacity. Construction on peat is therefore likely to require the use of different types of tower foundations to those used elsewhere along the connections. This is particularly the case for steel tower foundations which have little tolerance for ground movement.

5.67 The choice of foundation solution for construction on peat will be determined following pre-construction ground investigations in areas where peat is known to be present.

5.68 Where the construction of steel towers on peat is required, two alternative types of foundations are likely to be employed: piling in areas of deep peat and rock anchorages in areas of shallow peat.

5.69 The sequence for using piling in areas of deep peat is generally as follows:

- formation of a stable piling platform;
- driving of piles down to solid/stable ground level;
- formation of a shutter around piles of each tower leg;
- formation of steelwork to form tower leg stubs;
- pouring of concrete into shutters to form concrete pile cap (incorporating foundation stub); and
- removal of shuttering when concrete is cured.

5.70 The type, construction and quantity of the piles required at each tower leg will be determined by the ground conditions encountered at each tower location.

5.71 The sequence for using rock anchorages in areas of shallow peat is generally as follows:

- formation of square or circular box/shutters made from sheet piles;
- excavation within the sheet piling through the peat until rock is reached, with the sheet piling able to withstand any pressure from the external peat;
- excavation of approximately 500mm of rock to provide a key for the rock anchor footings;
- placement of stubs and reinforcements and pouring of concrete against the sheet pile shuttering to just above ground level;
- installation of rock anchors after concrete is suitably cured; and
- retention of the sheet piling within the peat as 'sacrificial shuttering'[6].

5.72 Anchors are typically 100-150mm in diameter and would be connected to the tower legs via a small reinforced concrete block similar to the pile cap. See **Photo 5.14** for a typical piled foundation.

Photo 5.14: Typical Piled Foundation

[6] The piling would be made from inert material to avoid any potential contamination of the surrounding peat.

5.73 After a minimum of 24 hours to allow the concrete to partially cure, the formwork will be removed, and the excavation backfilled using the original materials and compacted. Although SPEN anticipate there to be little surplus material, it will be removed from site and treated in accordance with the site waste management plan.

Wood Pole Foundations

5.74 The erection of the wood poles will require an excavation to allow the pole brace block and /or steel foundation braces to be positioned in place, as shown in **Photo 5.15**. A typical pole excavation will be $3m^2$ by 2m deep. The excavated material will be sorted in appropriate layers and used for backfilling purposes. No concrete is required. Although SPEN anticipate there to be little surplus material, it will be removed from site and treated in accordance with the site waste management plan.

Photo 5.15: Typical Wood Pole Foundation

5.75 Techniques for construction of wood poles on peat can include the use of 'floating' foundations, or soil mixing techniques which stabilise the peat.

Underground 132kV Cable (Earlstoun to Glenlee only)

5.76 Open cut trenching is proposed for the short section of 132kV underground cable for the Earlstoun to Glenlee connection, from the terminal pole into the Genlee substation. Works commonly consist of the construction of a haul road, the excavation of the cable trench by mechanical excavators, cable laying, the backfilling of the trench with sand and native material and surface reinstatement. A typical cable installation rate is up to 160m per week, depending on the terrain.

Assembly and Erection of Towers/Poles

Steel Towers

5.77 Steelwork for each tower will be delivered to site in sections via HGV. Tower assembly will commence by either setting up a derrick crane and building up the tower in steel sections or, alternatively, assembling the tower in part at ground level and lifting the tower in sections by crane to complete assembly. Erection of a steel tower is shown on **Photo 5.16**.

Photo 5.16: Erection of a Steel Tower

Wood Poles

5.78 The cross braced steelwork, insulator fittings, and wood poles forming the pole support will be assembled local to the pole site and lifted into position utilising the tracked excavator which excavated the foundations. The pole foundation holes will then be backfilled and the pole stay wire supports attached in preparation for conductor stringing. Erection of a pole is shown on **Photo 5.17**.

Photo 5.17: Erection of a Wood Pole

Stringing of Conductors and Commissioning of the Overhead Line

5.79 Once a sufficient number of sequential sections of towers/poles have been erected, stringing of the conductors can commence. This requires temporary 'pulling' (or 'stringing') areas at tower/pole locations approximately every 3-4km along a line, or where a deviation in the route occurs. In some cases, the temporary pulling areas overlap with the temporary working areas, and elsewhere, they are located outwith the working areas. The typical pulling area comprises approximately 25m x 15m for wood poles and 20m x 50m for steel towers.

5.80 The temporary pulling areas will be formed using one of the following:

- stone laid on a membrane (as similar to the floating road access track);
- timber matting; and
- aluminium panels.

5.81 All temporary surfacing materials will be removed from site on completion of the stringing operations.

5.82 Where stringing of conductors requires to cross a watercourse, steel bond wire will be pulled by hand across watercourse. Where this is not possible then boats will be used to pull bond wire (attached to the conductor on a drum), and thereafter used to pull conductors through under continuous tension. No works will take place within the watercourse.

Steel Towers

5.83 At each tower pulling area, a winch will be positioned and set up at one end of the stringing section, with a 'tensioner 'set up similarly at the other end of the section. Pilot wires will be placed in blocks hanging from the insulators on the towers and connected around the winch and tensioner at either end. Using the winch to pull the pilot wires, the conductor will then be drawn through the section, using the tensioner to maintain a constant tension. This allows the conductor to be controlled without touching the ground, avoiding damage to both the conductor and the underlying ground. The stringing of a tower is shown on **Photo 5.18**.

Photo 5.18: Stringing of Steel Tower

Wood Poles

5.84 The same process will be adopted for the stringing of the wood poles, with the exception that the pilot wires will be placed in blocks fitted to the top of the insulator strings on the poles.

Road and Rail Crossings

5.85 Where the conductor needs to be strung over existing roads and railways, protection in the form of scaffolding will be erected prior to the commencement of stringing, in consultation with the appropriate rail/road authorities. Scaffolding will be erected at either side of the crossing, with the span in between the scaffolding netted. Examples of typical scaffolding are shown in **Photo 5.19**.

Photo 5.19: Typical Scaffolding

Crossing Existing Overhead Lines

5.86 Where the proposed OHLs cross other existing OHLs (11kV, 33kV, or 132kV), works will be required to the existing OHL, to enable the proposed 132kV OHLs to be constructed without health and safety risks to construction workers. Where possible, the supply to customers will be maintained, which may necessitate the temporary erection of 'live line' protective scaffolds over the existing lines. Whilst these locations are within the environmental survey area for this Project a mechanism for further consideration of these works will be set out within the CDEMP.

Use of Helicopters

5.87 Helicopters may be used during construction for conductor stringing. Before helicopters are used, risk assessments relating to the following will be undertaken to identify any constraints which should be taken into account:

- safety issues;
- possible annoyance to people;
- disturbance to sensitive wildlife and livestock;
- danger to motorists from distraction;
- the presence of flight obstacles;
- proximity to prohibited and restricted danger areas;
- proximity to hazardous areas; and
- proximity to occupied dwellings, congested and sensitive areas.

5.88 All affected landowners will be contacted in advance and notified of flying dates and times. General notices will also be displayed in local newspapers.

5.89 Should helicopters be used, temporary landing areas will be required in proximity to the connection but outwith the wayleave and working areas. The selection of these areas will be informed by an environmental appraisal of site options, taking cognisance of the factors considered in siting the KTR Project infrastructure, as outlined in this EIA Report, informed by further survey work and consultation as necessary. The landing areas would be constructed using aluminium trackway similar to the track laid down for temporary access areas. The landing areas would be fenced off for security and to keep out livestock, with the trackway removed and the site reinstated after construction.

Removal of Existing N and R Route 132kV Overhead Lines

5.90 Towers to be decommissioned will be removed from site with materials being recycled, where possible. Removal of towers will involve attaching a steel bond wire between the earth wire peak and a mobile winch (typically attached to a tractor) after which the steel legs of the tower are cut (using a disc saw) above the concrete foundations. The tractor winch is then used to fell the tower in a controlled manner. Towers are then cut into sections on the ground and removed from site.

5.91 In areas where sensitive conditions exist and it is not possible to fell the tower, the tower will be unbolted and lifted off in sections using a mobile crane. The sections will then be transported offsite to be broken down.

5.92 Foundations are removed to a minimum depth of 1m below ground level. This work is undertaken using a tracked excavator which will dig around the concrete 'muff' to a depth of approximately 1m. The excavator will then be used to break the concrete around the steel 'raker' bar within the concrete. All concrete will then be removed from the excavation and the remaining steel raker bar cut with a disc saw to a depth of approximately 1m. This action will be repeated for the remaining tower legs. Following this, the area will be cleared and the ground reinstated to its former use.

5.93 Wherever possible, access for tower removal will be undertaken using low ground pressure plant and vehicles to avoid the requirements for stone roads. However, dependent on weather conditions prior to access being required, there may be a requirement to stone some sections of the proposed accesses for removal. These would be identified via pre-removal surveys and through discussions with affected landowners prior to works being undertaken.

5.94 A summary of the indicative activities and timescales for removal of an individual tower is provided in **Table 5.8 below**. It should be noted that the exact timings are dependent on contractor methods, weather conditions and ground conditions during the removal process. The activities may also not happen in one continuous process, i.e. access preparation through to access removal over the course of ten straight days.

5.95 There are 13 towers of the existing R route (south) located within 500m of the Loch Ken and River Dee Marshes Special Protection Area (SPA), towers 46-48 and towers 95 to 103 (of which towers 99, 100 and 100A are within the SPA). To avoid potential effects on the qualifying species of the SPA (wintering Greenland white-fronted geese), these towers will be removed between 1st August and 15th October, commencing with towers 99, 100 and 100A.

Table 5.8: Summary of time per tower*

Activity	Timescale
Access preparation (assuming no stone road)	2 days
Tower preparation for conductor removal (fitting stays, anchor blocks etc)	2 days
Conductor removal (per section i.e. there needs to be personnel on each tower during conductor pull)	3 days
Remove tower and concrete base down to 1m below ground level	2 days
Access removal	1 day
TOTAL	**10 days**

* Within the programme there will be localised timing restrictions associated with breeding periods for protected species (including birds).

Additional Construction Information

Concrete Requirements and Delivery

5.96 The estimated combined volumes of concrete required for each of the new steel tower connections are provided in **Table 5.9** below.

Table 5.9: Total Concrete Requirements per Connection

Connection	Concrete Volume (m^3)
P-G via K	2,394
BG Deviation	414
G-T	7,950

5.97 Concrete will be transported to site by ready-mix lorry (assumed at $6m^3$ truck) and delivered directly to the required excavated tower foundation position. Alternatively, the ready-mix lorry would stop at a predetermined point where the concrete would be loaded into a tracked dumper, which could then track to the tower position if the ground conditions were suitable.

5.98 Following the delivery of concrete, the wash-out of vehicles onsite will be restricted to the concrete chute only. The residue will be directed into a suitable container for disposal at a suitably licensed facility after it has settled. The concrete delivery vehicles will be directed to washing areas where excess concrete and washings from the delivery trucks will be contained within identified bunded settling areas to allow solids to settle and liquids to filter through a straw bale wall.

Construction Personnel

5.99 It is anticipated that approximately 980,232 man-hours will be required during the construction period to undertake tree clearance activities, construction of the OHLs and decommissioning of the existing lines. A breakdown of the estimated number of man-hours per connection and the likely average and peak construction staff onsite is provided in **Table 5.10** below.

Table 5.10: Estimated Construction Phase Person-Days

Connection	Man Hours (incl. forestry felling)	Construction Staff (average)	Construction Staff (peak)
P-G via K	208,870	64	150
C-K	11,108	27	40
E-G	9,148	27	40
BG Deviation	37,252	32	40
G-T	670,060	92	200
N and R Routes Removal	63,724	52	80

5.100 At any one time it is estimated that approximately 294 personnel will be employed on sites along the routes. At the height of construction, when foundation work, tower/pole erection and stringing could all be occurring concurrently, the number of personnel employed onsite could rise to approximately 550. It is likely that personnel working on OHL (and cable) construction will travel to site by crew carrier, however this will be contractor led.

5.101 Further consideration is given to the likely employment generation associated with the KTR Project in **Chapter 15: Socio-economics, Tourism and Recreation** and associated traffic and transport effects in **Chapter 13**.

Construction Working Hours

5.102 A 48 week working year and construction over a seven day working week has been assumed for assessment purposes. Construction activities will be undertaken during daytime periods only, between approximately 07.00 to 19.00 for felling and access installation activities and in summer (April to September) and 08.00 to 17.00 (or as daylight allows) for all other activities and in winter (October to March).

5.103 It is anticipated that any variations to the hours stated here will be agreed in advance with Dumfries and Galloway Council (D&GC).

Construction Programme

5.104 Subject to the granting of consent and the fulfilment of any associated conditions, construction is programmed to commence in month one of the construction programme shown in **Table 5.10**. Construction is anticipated to commence in March 2022 and be completed in December 2026. The construction period for the entire KTR Project is anticipated to be up to 58 months from start to commissioning and removal of remaining temporary access tracks, removal of N and R routes and reinstatement.

5.105 The estimated construction periods for each connection are summarised in **Table 5.11** below.

Table 5.11: Summary of Provisional Construction Programme (including reinstatement)

Connection	Construction Period*	
P-G via K	1/03/2022 to 22/05/2025 (38 months)	
C-K	24/08/2023 to 03/08/2025 (24 months)	
E-G	01/03/2022 to 03/08/2025 (41 months)	
BG Deviation	27/02/2024 to 20/09/2025 (19 months)	
G-T	01/03/2022 to 6/12/2026 (58 months)	
N and R Routes Removal	N: 01/09/2023 to 17/05/2026 (32 months)	R: 02/09/2022 to 31/12/2026 (51 months)

* Within the programme there will be localised timing restrictions associated with breeding periods for protected species (including birds).

Connection	Construction Activity	Indicative construction programme 2022 / 2023 / 2024 / 2025 / 2026 Month (March 2022= Month 1) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58
Polquhanity to Glenlee via Kendoon		
	Enabling works (felling, access installation)	
	Foundation installation	
	Tower erection	
	Conductor pulling	
	Commissioning	
	Reinstatement	
Carsfad to Kendoon*		
	Enabling works (felling, access installation)	
	Wooden pole erection	
	Conductor pulling	
	Commissioning	
	Reinstatement	
Earlstoun to Glenlee*		
	Enabling works (felling, access installation)	
	Wooden pole erection	
	Conductor pulling	
	Commissioning	
	Reinstatement	
BG route re-alignment		
	Enabling works (felling, access installation)	
	Foundation installation	
	Tower erection	
	Conductor pulling	
	Commissioning	
	Reinstatement	
Glenlee to Tongland		
	Enabling works (felling, access installation)	
	Foundation installation	
	Tower erection	
	Conductor pulling	
	Commissioning	
	Reinstatement	
N route removal (Polquhanity to Kendoon)		
	Enabling works (felling, access installation)	
	Dismantling of conductor and towers.	
	Reinstatement	
R route removal (Kendoon – Glenlee – Tongland)		
	Enabling works (felling, access installation)	
	Dismantling of conductor and towers.	
	Reinstatement	

*** Foundation installation is not applicable for these connections since the wooden poles are directly buried in the ground.**

Table 5.12: Detailed Construction and Decommissioning Programme

5.106 The indicative construction (and decommissioning) programme is shown in **Table 5.12** above. As is shown, construction of each connection will be undertaken concurrently and construction activity is likely to be taking place throughout the KTR Project area at any one time.

5.107 Each new OHL connection will be constructed on a rolling programme. For the towers, specific construction teams will move from one area of the connection to the next as sections are completed. For example, the foundation construction team will start at towers one to six and then move to seven to 13 when the team's work at towers one to six has been completed. The next team, the tower fabrication workers, will then commence work at towers one to six whilst the foundation team are working on towers seven to 13. Whilst the total duration of construction activity at any one tower site will be approximately five working weeks, this is likely to be spread over a longer time period.

5.108 Construction of the wood pole connections (C-K and E-G) will take less time, with each pole likely to be constructed in a single operation, i.e. the hole dug, and the pole erected within the same day.

5.109 It should be noted that some sections of the existing N and R route towers will require to be decommissioned and removed earlier in the overall programme to facilitate construction of the new OHLs of the KTR Project. For example, some towers on the existing R route (north) between Earlstoun and Glenlee will need to be removed in advance, to facilitate the temporary connection for the Earlstoun to Glenlee circuit. However, full decommissioning of these OHLs cannot take place until after the new lines are commissioned and brought into service. The wider decommissioning period is shown as starting at the point that these initial towers are removed to facilitate the temporary Earlstoun connection.

Environmental Management

Construction and Decommissioning Environmental Management Plan

5.110 Prior to the construction of the KTR Project, SPEN will develop a detailed CDEMP with its appointed contractors. The CDEMP will identify those responsible for the management and reporting on the environmental aspects during the construction and decommissioning (of N and R route) works. The CDEMP will be used to ensure a commitment to meeting all relevant conditions attached to the section 37 consents and deemed planning permissions and delivering the environmental mitigation measures identified in the EIA Report during construction (and decommissioning of N and R routes) of the KTR Project. Adherence to the CDEMP will be a contractual requirement of each contractor that SPEN engages on the Project.

5.111 The purpose of the CDEMP will be to:

- provide a mechanism for ensuring that construction methods avoid, minimise and control potentially adverse significant environmental effects, as identified in the EIA Report;
- ensure that good construction practices are adopted and maintained throughout the construction of the KTR Project;
- provide a framework for mitigating unexpected effects during construction and decommissioning;

- provide assurance to third parties that agreed environmental performance criteria are met;
- establish procedures for ensuring compliance with environmental legislation and statutory consents; and
- detail the process for monitoring and auditing environmental performance.

5.112 The CDEMP will be updated when necessary to account for changes or updates to legislation and good practice methods throughout the construction (and decommissioning) phases. The CDEMP will also be amended to incorporate information obtained during detailed ground investigations which will be undertaken post consent and prior to construction activities. Compliance with the CDEMP (including procedures, record keeping, monitoring and auditing) will be overseen by a suitably qualified and experienced Environmental Manager from SPEN.

5.113 The CDEMP will contain the following information:

- Policies and objectives;
- Regulatory controls and guidance to be followed;
- A completed register of contacts confirming the contact details for all key personnel for managing environmental issues, including SPEN representatives, the Ecological Clerk of Works (ECoW), Principal Contractor contacts, Scottish Water contacts and appropriate regulator contacts;
- Construction Programme and detailed working method statements;
- A site-specific actions plan, providing a register of environmental risks and outlining the requirement for accompanying site specific mitigation, monitoring and management system reporting procedures;
- Audit and inspection procedures;
- Training plans;
- Communication (onsite, key stakeholders, neighbours and community).

5.114 In addition, the CDEMP will contain the following documents, which the Principal Contractor and their sub-contractors will be required to adhere to throughout the construction process:

- a Pollution Prevention Plan (PPP);
- Construction Method Statements (CMS);
- a Peat Management Plan (PMP);
- a Water Protection Plan (WPP)
- a Site Waste Management Plan (SWMP); and
- a Traffic Management Plan (TMP).

5.115 The CDEMP and associated plans will be submitted to D&GC, and others as appropriate, prior to the commencement of works. A copy of the CDEMP will be kept in the construction site office for the duration of the works and will be available for review at all times.

5.116 The Principal Contractor will be responsible for the continual development of the CDEMP to take account of monitoring and audit results during the construction phase and changing environmental conditions and regulations.

5.117 The services of other specialist advisers will be retained as appropriate, to be called on as required to advise on specific environmental issues.

5.118 Performance against these documents will be monitored by SPENs Construction Project Manager and the ECoW throughout the construction (and decommissioning) phases. They will ensure that the works carried out are in accordance with the relevant best practice guidance documents. An extract from a previous CDEMP prepared by SPEN is provided as **Appendix 5.4: Example Environmental Management Plan.** This contains the sections that would be expected to be included within the final CDEMP, which will be agreed subject to an appropriately worded planning condition.

5.119 Regular meetings will be held throughout the construction period to discuss environmental management, providing updates on the performance of the environmental mitigation measures and identifying any actions for performance improvement. The meetings will be attended by the ECoW, the SPEN Construction Project Manager, the Principal Contractor, Site Manager and any other relevant personnel or regulatory agency representative as required.

5.120 All site staff will be given appropriate environmental training before starting work onsite. The CDEMP will also include a series of specialist information packs, 'toolbox talks', to inform site operatives of the sensitivity of particular sites and of wider safeguards to protect natural and cultural heritage. An example toolbox talk relating to cultural heritage is provided as **Appendix 5.3: Example Toolbox Talk**.

Embedded Felling and Construction Measures

5.121 As outlined in **Chapter 3**, embedded mitigation measures will be employed on the KTR Project as adopted best practice and industry standard techniques during the tree felling and the construction (and decommissioning of N and R routes) phases of the KTR Project. Therefore, these are not considered to be 'additional' mitigation as such, but an integral part of the felling, construction and decommissioning (of N and R route) phases. This is considered a realistic scenario given the current regulatory context and accepted good practice across the industry.

5.122 A schedule of embedded measures are provided as **Appendix 5.2: Embedded and Additional Mitigation and Monitoring Measures** and will be incorporated into the CDEMP.

5.123 The assessment in **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat** and **Chapter 8**, assumes the implementation of these embedded measures. Any further additional mitigation measures are identified in the assessment of likely significant effects within each chapter of the EIA Report.

5.124 Embedded measures will include (but are not limited to) measures associated with:

- Flood Risk and Increased Run-Off;
- Pollution and Accidental Spillage Incidents;
- Sedimentation and Erosion;
- Watercourse Crossings; and
- Peat Management.

Drainage

5.125 The project hydrology specialists have undertaken a study to delineate and analyse catchments to estimate flows and volumes of water generated during different rainfall events. The results of this analysis were used to identify the sizing of sustainable urban drainage systems (SUDS) where required, associated with the access tracks, to avoid potential drainage issues. The study and associated maps are presented as **Appendix 9.2: Catchment Areas Draining to Access Tracks and Initial SUDS Sizing**.

5.126 The final requirement for, and design of, SuDS will be undertaken post-consent during the detailed design stage. Standard drainage measures will be deployed for other components of the KTR Project.

Waste Management

5.127 Materials will be generated, and will require management, at a number of construction stages including:

- excavation of materials for construction of tower/pole foundations;
- construction of ancillary works, including access tracks and temporary construction compounds;
- occupation of temporary construction premises.

5.128 The Principal Contractor will be required to prepare a Waste Management Plan to ensure best practice principles are applied to reduce, re-use or recycle all materials as part of the CDEMP.

5.129 Measures to reduce possible environmental effects associated with the storage and transportation of wastes will include:

- the careful location of stockpiles and other storage areas;
- the use of good practice in the design of waste storage areas and the use of suitable waste containers;
- the use of sheeting, screening, and damping where appropriate and practicable;

- the control and treatment of runoff from soil and waste soil stockpiles;
- minimising storage periods;
- minimising haulage distances; and
- the sheeting of vehicles.

5.130 All materials will be identified, classified, quantified and, where practicable, appropriately segregated. Any materials that cannot be reused will be disposed of according to relevant waste management legislation which will serve to address a number of possible environmental effects. This includes:

- the Duty of Care imposed by Section 34 of the Environmental Protection Act 1990;
- the Waste Management Licensing (Scotland) Regulations 2011 (as amended), particularly provisions relating to registered exemptions from waste management licensing.

5.131 All materials removed from site will be handled in accordance with relevant waste and environmental regulations. Waste will be transferred using a registered waste carrier to a licensed waste disposal site or recycling centre.

5.132 On completion of the construction works, stone used for the temporary access tracks will be removed and reused, in the first instance, on existing underlying forest tracks. Any excess stone will be removed from site to a licensed waste facility. The underlying geotextile and geofabric will also be removed and transported to a licensed waste facility.

Resource and Energy Use

5.133 It is good practice to consider energy usage during the construction of a proposed development, including associated emissions of greenhouse gases. It is recognised that energy will be used during the construction phase, including the fuel for construction plant and the energy required for the transportation of personnel. The materials used to construct the OHLs will also incorporate embodied energy, i.e. energy required to manufacture construction materials, including the energy used in the transport of the material from its source to the site, via processing plant where applicable.

5.134 The current scope to reduce the consumption of energy and associated CO^2 emissions by selecting energy efficient equipment, and fuels and materials with low embodied energy is considered to be limited, for example biodiesel fuel could not be used at present for all construction vehicle trips as it is not commercially available to large scale users at the present time. However, work to progress the practical application of emerging technologies is ongoing will be given further consideration prior to construction.

Peat Management

5.135 Whilst the KTR Project has been designed to minimise disturbance to peatland, it has not been possible to avoid areas of peatland entirely. The assessment of potential effects on peat is presented in **Chapter 9**. An Outline Peat Management Plan (PMP) is presented at **Appendix 9.5: Outline Peat Management Plan** and includes the following information:

- estimation of the volume of soil and peat likely to be excavated during construction;
- identification of opportunities to minimise excavation volumes;
- options for onsite reuse of excavated material; and
- good practice methods to be employed in relation to handling and storage of excavated soil and peat.

5.136 Adherence to the PMP will ensure that excavated soil and peat is appropriately managed and re-used onsite. It is anticipated that all excavated peat can be reused for reinstatement of ground, at the point of excavation. Prior to construction and on completion of ground investigations and micrositing, the PMP will be refined and agreed with Scottish Environmental Protection Agency (SEPA) and Scottish Natural Heritage (SNH).

5.137 Prior to construction and on completion of ground investigations and micrositing, a SWMP shall be produced, including for site soil and peat management good practice. It will ensure that excavated peat is appropriately managed and re-used.

5.138 Whilst the KTR Project has been designed to minimise disturbance to peatland, it has not been possible to avoid areas of peatland entirely. On this basis, where the KTR Project passes through peatland environments, best practice has been followed to identify, mitigate and manage potential peat landslide hazards and their associated risks in accordance with Scottish Government Guidance[i]. A summary of the methodology and findings of the Peat Landslide Hazard and Risk Assessment (PLHRA) is presented in **Chapter 9** and the full details provided as **Appendix 9.6: Peat Landslide Hazard and Risk Assessment**.

Community Liaison

5.139 In partnership with SPEN, the appointed contractors will be required to maintain close liaison with local community representatives, landowners and statutory consultees throughout the construction period. This is likely to include circulation of information about ongoing activities, particularly those that could potentially cause disturbance. A telephone number will be provided and persons with appropriate authority to respond to calls and resolve any problems made available.

5.140 SPEN and the appointed contractors will liaise with the local councils and communities to identify any major events in the area and to programme construction works to ensure that these do not disrupt the local road network on those days.

Reinstatement

5.141 Upon completion of the construction and N and R decommissioning works, the contractor shall remove the temporary roadways, tracks/accesses and make good any damage. This will include removal of all surfacing material and geotextile materials.

5.142 This will be undertaken as soon as possible after construction is completed and temporary road materials are removed. This will enable the subsoil to be sealed preventing sediment run-off. As described previously, topsoil will have been stripped and stored adjacent to the works in a manner which ensures that the soil quality is retained. Restoration of moorland, arable and pasture areas will aim to achieve original soil profiles. The topsoil will be transported from the topsoil storage locations to the works and will be placed by a tracked excavator. Appropriate seeding if deemed necessary by the project may be by hand or by machine spreading.

Operational Maintenance

Steel Towers

5.143 Whilst most steel tower OHL components require little maintenance, periodic maintenance painting of tower steelwork is required. Exposed elements which suffer from corrosion, wear, deterioration and fatigue also need to be inspected on a regular basis.

5.144 OHLs require refurbishment after approximately 20 to 40 years. Whilst towers are expected to have a lifespan of approximately 80 years, the condition of the tower steelwork and foundations will be monitored regularly. If deterioration cannot be remedied, a tower will be dismantled carefully, either for re-use or complete removal and replacement (see decommissioning of N and R routes section of this chapter for details of the process).

Wood Poles

5.145 Whilst most wood pole OHL components are maintenance free, exposed elements which suffer from corrosion, wear, deterioration and fatigue need to be inspected on a regular basis. OHLs supported on wood poles require refurbishment or replacement after approximately 30 to 40 years.

Underground Cables

5.146 Annual maintenance checks on foot are commonly required during operation. The cable section will also be kept clear of all but low growing vegetation. In the unlikely event that there is a fault along the cable, the area around the fault is excavated and the fault repaired, or a new section of cable inserted as a replacement. If lines are decommissioned, cables can either be left in situ or carefully excavated and removed.

Wayleaves

5.147 It is likely that there will be an inspection of the wayleave for each connection every year, with one year the inspection being by foot and the alternate year inspection being by helicopter.

5.148 Appropriate tree clearance at the outset should minimise the likelihood of any major secondary undergrowth in the wayleave. However, should secondary growth be identified during the inspection visits, a maintenance team will be required to re-establish the statutory wayleave clearances to the line. Unnecessary felling or removal of vegetation will be prohibited.

5.149 It is not considered likely that temporary tracks will need to be re-instated for wayleave maintenance purposes as access is likely to be by vehicles which have tracked or low ground pressure. The wayleave would then be walked, and mechanical saws used to clear the secondary growth. It is likely that the volume of cut timber would be such that it could be left to decay naturally.

Decommissioning of KTR Project

5.150 When the operational life of the new OHLs comes to an end, the lines may be i) re-equipped with new conductors and insulators, or if the towers are 80 years old (30 to 40 years for poles), ii) the towers/poles replaced, or iii) the towers/poles dismantled and removed. On this basis, the operational environmental effects of the KTR Project are assumed to be long term.

5.151 An assessment of the decommissioning of the connections has not been undertaken as part of the EIA process as i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage and ii) the proposals for refurbishment /decommissioning are not known at this stage.

Health and Safety

5.152 Health and safety is of primary importance to SPEN, with commitment from the highest levels. In constructing and operating the KTR Project, SPEN will take account of the health and safety of all those who could potentially be affected, including construction workers, felling operatives, SPEN company operatives and the general public.

Construction

5.153 All construction activities will be managed within the requirements of The Construction (Design and Management) Regulations 2015 and will not conflict with the Health and Safety at Work etc Act 1974. To further reduce possible health and safety risks, a Health and Safety Plan for the project will also be drawn up. All staff and contractors working on the Project will be required to comply with the safety procedures and work instructions outlined in the Plan at all times.

5.154 To ensure that hazards are appropriately managed, risk assessments will be undertaken for all major construction activities, with measures put in place to manage any hazards identified.

5.155 Current industry standards will be followed to manage the risks posed by heavy equipment, falls from heights and rough and dangerous terrain. Information will be made available to the public with respect to any possible safety hazards and open excavations will be fenced off

Operation and Maintenance

5.156 OHL components, including conductors, insulators, towers and all conductor joints and fittings will be designed and tested at the manufacturers to ensure compliance with relevant UK and European Standards. This will include testing the performance of insulators under stress, the carrying capability of conductors and the effects of voltage and current on the mechanical strength of the fittings.

5.157 In accordance with standard practice, the public will be advised of the possible danger presented by OHLs and substations. A warning notice will be placed on each tower and pole and anti-climbing devices incorporated on each tower leg. Existing substations are surrounded by security fencing and warning notices displayed about possible dangers.

[i] The Scottish Government (2017), Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments.

Chapter 6
Planning Policy Context

Contents

6 Planning Policy Context

Introduction

6.1 This chapter of the EIA Report provides an overview of the planning and regulatory framework for consideration of the applications for the Kendoon to Tongland 132 kilovolt (kV) Reinforcement Project ('the KTR Project')[1], and the planning consultation undertaken to date. It also details the national and local planning policy and guidance taken into account when considering the likely significant environmental effects of the KTR Project.

6.2 For the reasons outlined below, this chapter begins by considering national planning policy and advice. It refers in detail to the National Planning Framework 3 (NPF3), Scottish Planning Policy 2014 (SPP), particularly to the energy transmission and EIA topic related provisions contained therein and to national guidance and advice. A table listing additional relevant government guidance and Planning Advice Notes (PANs) is also provided. Consideration is also afforded to the relevant aims and objectives of the statutory development plan, as this constitutes an important aspect of the overall policy framework and identifies the development plan policies of relevance to the KTR Project by EIA topic area. The full wording of relevant development plan policies is provided.

6.3 The chapter also includes a description of other material considerations which include supplementary planning guidance.

6.4 A final section on committed development[2] in proximity to components to the KTR Project is also included at the end of the chapter.

6.5 It is important to note that this chapter does not include an assessment of the KTR Project's accordance with relevant planning policy and other material considerations. The Scottish Minsters as competent authority will consider the question of accordance in making their determinations on the applications as well as the discharge of the duties regarding the preservation of amenity etc. under Schedule 9 of the Electricity Act 1989 as set out in detail in **Chapter 2: The Routeing Process and Design Strategy**.

The Planning and Regulatory Framework

6.6 Under section 37 of the Electricity Act 1989 ('the 1989 Act'), consent is required from the Scottish Ministers to install (and keep installed) an electric line exceeding 20 Kilovolts (kV) above ground. At the point of submission of the applications for section 37 consent required for the five overhead line (OHL) connections included within the KTR Project, SP Energy Networks (SPEN) will also request that Scottish Ministers direct that planning permission be deemed to be granted under section 57(2) of the Town and Country Planning (Scotland) Act 1997 (the 1997 Act) for the OHLs and ancillary development below:

- A new 132kV double circuit steel tower OHL, of approximately 10.1km in length between Polquhanity (approximately 3km north of the existing Kendoon substation) and Glenlee substation, via the existing Kendoon substation (P-G via K).
- A new 132kV single circuit wood pole OHL, of approximately 2.6km in length, between Carsfad and Kendoon (C-K).
- A new 132kV single circuit wood pole OHL, of approximately 1.6km in length, between Earlstoun and Glenlee (E-G).
- A new 132kV double circuit steel tower OHL deviation of the existing BG route, at Glenlee substation approximately 1.2km in length (BG Deviation).
- A new 132kV double circuit steel tower OHL, of approximately 32.3km in length, between Glenlee and Tongland (G-T).

6.7 In addition to the five new connections above, the EIA Report also considers ancillary developments and the removal of the existing 132kV OHLs between Polquhanity, Kendoon, Carsfad, Earlstoun, Glenlee and Tongland. This will involve the decommissioning of approximately 43.3km of existing OHL infrastructure. The removal of the N route towers between Polquhanity and Kendoon, and R route (north) between Kendoon and Glenlee is included within the P-G via K section 37 application. The removal of R route (south) between Glenlee and Tongland is included within the G-T section 37 application. Further details are provided in **Chapter 4: Development Description**.

6.8 There is a distinction to be drawn between the grant of an application for section 37 consent and a direction that planning permission is deemed to be granted under section 57(2) of the 1997 Act. Deemed planning permission can only be given upon the granting of consent under section 37 of the 1989 Act. It is a matter for the discretion of the Scottish Ministers as to whether they consider it appropriate to make such a direction. The decision to grant section 37 consent is the principal decision.

6.9 With applications for section 37 consent and deemed planning permission, there is no 'primacy' of the development plan. The provisions of section 25 of the 1997 Act do not apply. However, the development plan is a relevant consideration to the decisions along with considerations such as those identified under Schedule 9 of the 1989 Act, national policy, the environmental effects of proposals and the views of consultees.

6.10 Development plan policies do not specifically address a development like the KTR Project. The weight to be afforded to the development plan in the decision-making process must therefore be considered in this context and the specific considerations arising from Schedule 9 to the 1989 Act. The duties imposed by Schedule 9 are addressed in detail in **Chapter 2**.

6.11 Consideration of the applications will involve striking a balance between the need for the KTR Project, technical and economic considerations and the mitigation of likely environmental effects.

6.12 As demonstrated in this EIA Report, SPEN has sought to conserve, where possible, the natural heritage and features of interest, and where environmental effects are envisaged, mitigation is proposed to seek to further reduce residual adverse effects. In this regard, SPEN consider that it has fulfilled its duties under Schedule 9 to the 1989 Act.

6.13 As the entirety of the KTR Project is situated within the Dumfries and Galloway Council (D&GC) administrative area, the relevant development plan comprises the D&GC Local Development Plan 2 (LDP2) (2019) which was adopted on 3rd October 2019. Details of the LDP policies relevant to the KTR Project are set out below.

Overview of Consultation Undertaken to Date

Statutory Stakeholder Liaison Group

6.14 A Statutory Stakeholder Liaison Group (SSLG) was set up at the outset of the KTR Project in 2014, consisting of statutory consultees including D&GC, Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA), and Historic Environment Scotland (HES). While not a statutory consultee, the Scottish Government also invited Scottish Forestry[3] to join the Group given the extent of forestry within the KTR . Chaired by the Scottish Government Energy Consents Unit (ECU), the SSLG met as necessary at key milestones throughout the project providing a forum for considering the planning, environmental, and cultural and natural heritage issues that arise from the KTR Project. This process ensured that all statutory consultees were kept up to date with project progress, and that they had the opportunity to comment on and feed in to the routeing process. Full details of consultation undertaken with the SSLG are provided in **Chapter 2**.

Community Liaison Group

6.15 In addition, a Community Liaison Group (CLG), chaired by the ECU was established prior to the second round of consultation. This forum provided representatives of communities who are directly affected by

[1] Applications for 1) consent for the new overhead lines under section 37 of the Electricity Act 1989 and 2) seeking directions that planning permission is deemed to be granted for the new overhead lines, ancillary development and the decommissioning of N and R routes under section 57(2) of the Town and Country Planning (Scotland) Act 1997.

[2] Considered to be development that has either detailed planning permission or planning permission in principle, or is allocated in an approved strategic development plan or an adopted local development plan.

[3] Forestry Commission Scotland is known as Scottish Forestry from 1st April 2019.

the KTR Project with the opportunity to be informed on the latest proposals and to raise points with SPEN.

Wider Consultation

6.16 Throughout the consultation process various groups of stakeholders and organisations relevant to the KTR Project in addition those which form the SSLG and CLG were consulted. These included:

- Local communities and members of the public;
- Community councils;
- Local interest organisation and groups; and
- Local Member of Parliament (MP) and Members of the Scottish Parliament (MSPs).

6.17 Further information on the on the consultation process, including the routeing stage, can be found in **Chapter 2** as well as **Chapter 3: Approach to the EIA**.

National Planning Framework for Scotland (NPF3)

6.18 NPF3, which was laid in the Scottish Parliament on 23rd June 2014, is the long-term spatial expression of the Scottish Government's Economic Strategy and plans for infrastructure investment and development priorities over the next 20 to 30 years with a focus on supporting sustainable economic growth and the transition to a low carbon economy.

6.19 The classes of development considered to be national development and that fulfil this need are defined in NPF3: paragraph (2) (a) of Annex A's fourth development priority statement:

"2 – Description of Classes of Development: Development consisting of:

a. new and/or upgraded onshore electricity transmission cabling of or in excess of 132 kilovolts, and supporting towers

b. new and/or upgraded onshore sub stations directly linked to electricity transmission cabling of or in excess of 132 kilovolts."

6.20 On the basis of the above, the KTR Project is considered as a 'National Development' within NPF3.

6.21 **Chapter 3** focuses on the promotion and achievement of a low carbon economy and the ambition to reduce greenhouse gas emission by 80% by 2050. NPF3 acknowledges that:

"electricity grid enhancements will facilitate increased renewable electricity generation across Scotland" (NPF3, para 3.28)";

"an updated national development focusing on enhancing the ***high voltage transmission network*** *supports this"* (NPF3, para 3.28)" and;

"strengthening the electricity grid will be essential in unlocking renewable resources, both onshore and offshore" (NPF3, para 3.40).

6.22 NPF3 identifies that *"both terrestrial and marine planning have a key role to play in reaching these ambitious targets[4] by facilitating development, linking generation with consumers and guiding new infrastructure to appropriate locations"* (NPF3, para 3.12).

6.23 NPF3 strengthens the link between strategy and delivery through 14 national development priorities identified within Annex A (of NPF3). 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."

6.24 The Planning (Scotland) Act 2019 elevates the status of the National Planning Framework from material consideration to being part of the development plan and will incorporate Scottish Planning Policy (SPP). The Act also includes a planning purpose for the preparation of the NPF being *"to manage the development and use of land in the long-term public interest"*. Work has already begun on National Planning Framework 4 (NPF4) and the Government expects to publish an Interim Position Statement in Autumn 2020. The draft version of NPF4 is expected to be laid before the Scottish Parliament autumn 2021 with the final version being adopted in spring/summer 2022.

Scottish Planning Policy (SPP)

6.25 The updated Scottish Planning Policy (SPP) document was published in June 2014 and is a statement of Scottish Government policy on nationally important development and land use planning. In general terms, SPP seeks to direct the right development to the right places and guide new infrastructure to appropriate locations.

6.26 Of relevance to the KTR Project, SPP notes that:

"Our spatial strategy facilitates the development of generation technologies that will help to reduce greenhouse gas emissions from the energy sector" (SPP, para 152).

"Efficient supply of low carbon and low cost heat and generation of heat and electricity from renewable energy sources are vital to reducing greenhouse gas emissions" (SPP, para 153).

"The planning system should support the development of a diverse range of electricity generation from renewable energy technologies – including the expansion of renewable energy generation capacity" (SPP, para 154).

"The planning system should:…

- *guide development to appropriate locations…*
- *help to reduce emissions and energy use…from new infrastructure by enabling development at appropriate locations that contributes to:*
  - *Energy efficiency;*
  - *Heat recovery;*
  - *Efficient energy supply and storage;*
  - *Electricity and heat from renewable sources"* (SPP, para 154).

"Strategic development plans should support national priorities for the construction or improvement of strategic energy infrastructure, including generation, storage, transmission and distribution networks" (SPP, para 156)".

6.27 With regard to the built and natural environment (cultural heritage, landscape, ground conditions, ecology, woodland/forestry, flooding and drainage), the SPP guidance detailed below is relevant for consideration in the assessment of the KTR Project and aligns with the policies considered at the Local level through the LDP.

Cultural Heritage

6.28 The following SPP guidance is relevant for consideration in the cultural heritage assessment of the KTR Project and aligns with the policies considered at the Local level through the LDP:

"The siting and design of development should take account of all aspects of the historic environment" (SPP, para 140).

"Where planning permission and listed building consent are sought for development to, or affecting, a listed building, special regard must be given to the importance of preserving and enhancing the building, its setting and any features of special architectural or historic interest. The layout, design, materials, scale, siting and use of any development which will affect a listed building or its setting should be appropriate to the character and appearance of the building and setting" (SPP, para 141).

"Proposals for development within conservation areas and proposals outwith which will impact on its appearance, character or setting, should preserve or enhance the character and appearance of the conservation area. Proposals that do not harm the character or appearance of the conservation area should be treated as preserving its character or appearance" (SPP, para 142).

"Where there is potential for a proposed development to have an adverse effect on a scheduled monument or on the integrity of its setting, permission should only be granted where there are exceptional circumstances" (SPP, para 145).

[4] Targets as detailed in paragraph 3.8 of NPF3 including electricity consumption from renewables

"Planning authorities should protect and, where appropriate, seek to enhance gardens and designed landscapes included in the Inventory of Gardens and Designed Landscapes and designed landscapes of regional and local importance" (SPP, para 148).

"There is also a range of non-designated historic assets and areas of historical interest, including historic landscapes, other gardens and designed landscapes, woodlands and routes such as drove roads which do not have statutory protection. These resources are however, an important part of Scotland's heritage and planning authorities should protect and preserve significant resources as far as possible, in situ wherever feasible" (SPP, para 151).

Landscape

6.29 The following text from SPP is relevant for consideration in the LVIA and aligns with the policies considered at the Local level through the LDP:

"The siting and design of development should take account of local landscape character. Development management decisions should take account of potential effects on landscapes and the natural and water environment, including cumulative effects. Developers should seek to minimise adverse impacts through careful planning and design, considering the services that the natural environment is providing and maximising the potential for enhancement" (SPP, para 202).

"Planning permission should be refused where the nature or scale of proposed development would have an unacceptable impact on the natural environment. Direct or indirect effects on statutorily protected sites will be an important consideration, but designation does not impose an automatic prohibition on development" (SPP, para 203).

Hydrology, Hydrogeology and Water Resources and Peat

6.30 The following text from SPP is relevant in the context of the assessment of potential effects on hydrology, hydrogeology, water resources and peat, and aligns with the policies considered at the Local level through the LDP:

"Where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO_2) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO_2 to the atmosphere. Developments should aim to minimise this release" (SPP, para 205).

"Borrow pits should only be permitted if there are significant environmental or economic benefits compared to obtaining material from local quarries; they are time-limited; tied to a particular project and appropriate reclamation measures are in place" (SPP, para 243).

"Flood Risk Assessments (FRA) should be required for development in the medium to high category of flood risk, and may be required in the low to medium category in the circumstances described in the framework above, or where other factors indicate heightened risk. FRA will generally be required for applications within areas identified at high or medium likelihood of flooding/flood risk in SEPA's flood maps" (SPP, para 266).

"Drainage Assessments, proportionate to the development proposal and covering both surface and foul water, will be required for areas where drainage is already constrained or otherwise problematic, or if there would be off-site effects" (SPP, para 267).

"Proposed arrangements for Sustainable Drainage System (SuDS) should be adequate for the development and appropriate long-term maintenance arrangements should be put in place" (SPP, para 268).

Ecology and Ornithology

6.31 The following text from SPP is relevant for consideration in the ecological and ornithological assessments and aligns with the policies considered at the Local level through the LDP:

"Where non-native species are present onsite, or where planting is planned as part of a development, developers should take into account the provisions of the Wildlife and Countryside Act 1981 relating to non-native species" (SPP, para 206).

"Sites designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) make up the Natura 2000 network of protected areas. Any development plan or proposal likely to have a significant effect on these sites which is not directly connected with or necessary to their conservation management must be subject to an "appropriate assessment" of the implications for the conservation objectives. Such plans or proposals may only be approved if the competent authority has ascertained by means of an "appropriate assessment" that there will be no adverse effect on the integrity of the site" (SPP, para 207).

"All Ramsar sites are also Natura 2000 sites and/or Sites of Special Scientific Interest (SSSI) and are protected under the relevant statutory regimes" (SPP, para 211).

"Development that affects a National Park, National Scenic Area, Site of Special Scientific Interest or a National Nature Reserve should only be permitted where:

- *the objectives of designation and the overall integrity of the area will not be compromised; or*
- *any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance"* (SPP, para 212).

6.32 In January 2019, the Scottish Government prepared a guidance note on the *'Implementation of Scottish Government policy on protecting Ramsar sites'*[5] which sets out how the Government expects the policy on the protection of Ramsar sites to be implemented.

6.33 The guidance note references the policy on the protection of Ramsar sites (and other nationally or internationally important sites) as detailed in SPP (details of which are covered in paragraph 6.26 above). The guidance note states that the protection is achieved through co-designation of Ramsar sites with Natura sites and/or Sites of Special Scientific Interest are protected under the relevant statutory regime. The guidance note provides the following clarifications in relation to the implementation of the policy:

"Where Ramsar interests coincide with Natura qualifying interests protected under SPA or an SAC, as the case may be, the interests are thereby given the same level of (legal) protection as Natura sites"

"Where Ramsar interests are not the same as Natura qualifying interests but instead match SSSI features, these receive protection under the SSSI regime".

6.34 When making a decision which affects a SSSI, the Scottish Ministers must consult and have regard to the advice of SNH. Additionally, they have to take reasonable steps to further the conservation and enhancement of the features specified in the SSSI notifications.

Forestry and Woodland

6.35 The following text from paragraph 218 of SPP is relevant for consideration in the assessment of effects on forestry and woodland and aligns with the policies considered at the Local level through the LDP:

"The Scottish Government's Control of Woodland Removal Policy includes a presumption in favour of protecting woodland. Removal should only be permitted where it would achieve significant and clearly defined additional public benefits. Where woodland is removed in association with development, developers will generally be expected to provide compensatory planting. The criteria for determining the acceptability of woodland removal and further information on the implementation of the policy is explained in the Control of Woodland Removal Policy, and this should be taken into account when preparing development plans and determining planning applications" (SPP, para 218).

6.36 In February 2019, Scottish Forestry published guidance on implementing the Scottish Government's policy on control of woodland removal[6].

Traffic and Transport

6.37 The following text from SPP is relevant for consideration in the traffic and transport assessment and aligns with the policies considered at the Local level through the LDP:

"Consideration should be given to appropriate planning restrictions on construction and operation related transport modes when granting planning permission, especially where bulk material movements are expected" (SPP, para 291).

Additional Relevant National Planning Guidance

6.38 At national level, planning policy is supported by Scottish Government guidance on a range of planning matters, including PANs, Design Advice and Web Advice. The nationally produced guidance considered relevant to the KTR Project is provided in **Table 6.1** below.

[5] https://www.gov.scot/publications/implementation-of-scottish-government-policy-on-protecting-ramsar-sites/

[6] Scottish Government's Policy on Control of Woodland Removal: Implementation Guidance (https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance/viewdocument)

Table 6.1: Scottish Government Guidance

PANs and Additional Planning Guidance
Development Control and Design
PAN 68 Design Statements (2003)
Landscape and Visual Amenity
PAN 60 Planning for Natural Heritage 2000 (amended 2008)
Hydrology, Hydrogeology and Water Resources and Peat
PAN 51: Planning, Environmental Protection and Regulation (2006)
PAN 61 Planning and Sustainable Urban Drainage Systems (2001)
PAN 69: Flooding Risk (2015)
PAN 79: Water and Drainage (2006)
Ecology and Ornithology
PAN 60 Planning for Natural Heritage 2000 (amended 2008)
Traffic and Transport
PAN75: Planning for Transport (2005)
Transport Assessment Guidance (Transport for Scotland) (2012)
Construction Noise
PAN 1/2011 Planning and Noise (2011)
PAN 51: Planning, Environmental Protection and Regulation (2006)
Cultural Heritage
PAN 2/2011 Planning and Archaeology (2011)
Other Issues (including Coal, Telecommunications and Air Quality)
PAN 51: Planning, Environmental Protection and Regulation (2006)
Assessment of Development
PAN 1/2013 Environmental Impact Assessment (2013)
Circular 1/2017; The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017[7]

Statutory Development Plan Policy

Dumfries and Galloway Council Local Development Plan 2 (October 2019)

6.39 As noted in paragraph 6.13 above, the statutory development plan for Dumfries and Galloway is the recently adopted LDP2. LDP2 sets out a spatial strategy in which to guide the future use and development of land in towns, villages and is structured around the themes of economic development, housing, historic environment, natural environment, community services and facilities, infrastructure and transport.

6.40 LDP2 recognises the importance of delivering supporting infrastructure and that provision of infrastructure is fundamental to the deliverability of development proposals and ensuring that infrastructure and service improvement requirements can be met.

6.41 LDP2 is guided by the overarching principle that all development should support sustainable development, including the reduction of carbon and other greenhouse gas emissions. Of the broad principles to be incorporated into all development outlined within the LDP (page 9), those of relevance to the KTR Project are:

- the provision of efficient and effective energy management solutions, having regard to the energy demands of the area and the sources of renewable generation available;
- use of sustainable construction techniques;
- use of a SuDS scheme;
- maximise the use of existing infrastructure;
- enhance the environment of, and protect access to, open space, green networks and recreational opportunities; and
- consider future proofing development to accommodate any future changing requirements such as waste management regimes, technological advancement in telecommunications infrastructure etc.

6.42 Key elements of the D&GC's overall 20-year vision for the region are set out on page 10 of LDP2:

- promote a thriving region with a sustainable economy built on sustainable principles which recognise the importance of the landscape, natural and historic environment, promote growth, maximise the use of existing infrastructure and enhance connectivity;
- have maximised its location to attract investment to create employment and investment opportunities which will in turn attract people of working age to the region;
- towns across the region will occupy niche positions making the most of their geographical locations; and
- there will be opportunities in the rural area for economic development, housing and recreation.

6.43 As well as the overarching 20-year vison, the LDP2 sets out further aspects of the wider vision for achieving a viable rural economy and community; vibrant towns and villages; and a successful Regional Capital in Dumfries.

6.44 Transposing the vision to a spatial context, LDP2 outlines its Spatial Strategy with the aim of situating the right type of development in the right place and meeting the needs of the community, whilst promoting a more sustainable pattern of development, creating opportunities for sustainable economic growth and active travel, reducing carbon emissions, and minimising the need to travel. The Spatial strategy is set out under seven distinct headings, namely: Economic Strategy, Business and Industry Land Requirement (2017-2037), Energy Strategy, Retail Strategy, Housing Strategy, Transport Strategy, Active Travel and Green Networks, and Waste Management Strategy.

6.45 LDP2 includes a new energy strategy, outlining the Council's commitment to the development of a Regional Energy Strategy to reflect the Climate Change Bill and the decarbonisation of nation energy through:

"a combination of energy efficiency measures and changes of energy supplies from fossil fuels to those generated by renewable sources and low carbon supplies such as hydrogen, biomass, bioethanol or methane gas." (LDP2, para 3.20)

6.46 The Energy Strategy further notes that:

"National Planning Framework 3 identifies a need for an enhanced high voltage energy transmission network to facilitate renewable electricity development and its export, including improvements to the network that lies in Dumfries and Galloway. Significant investment in the network is anticipated during the plan period, which the council supports in principle in appropriate locations. Proposals will be assessed against the provisions of policies OP1 AND IN1" (LDP2, para 3.22)

6.47 The LDP sets out its policies under eight key policy headings, namely Overarching Policies (OP), Economic Development (ED), Housing (H), Historic Environment (HE), Natural Environment (NE), Community Services and Facilities (CF), Infrastructure (IN) and Transport (T).

6.48 **Table 6.2** identifies the LDP2 policies of relevance to the KTR Project. This is structured by EIA topic area. These policies have also been considered by the EIA topic specialists to inform their assessments.

6.49 It is important to note that as a consequence of the routeing work outlined in **Chapter 2**, many of the areas designated in the statutory development plan for their natural or cultural heritage value have been avoided.

[7] Circular 1/2017 relates to the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 however it is still of some relevance to the KTR Project in terms of the EIA process even though it relates to a different consenting regime.

Table 6.2: Development Plan Policies of Relevance to the KTR Project

Topic Area	Dumfries and Galloway Local Development Plan 2 (adopted 2019)
Development Control and Design (including Noise)	OP1 - Development Considerations
Landscape and Visual Amenity	NE2 – Regional Scenic Areas
Hydrology, Hydrogeology, Water Resources and Peat	NE11 - Supporting the Water Environment
	NE12 - Protection of Water Margins
	IN7 - Flooding and Development
	IN8 - Surface Water Drainage and Sustainable Drainage Systems (SuDS)
	ED13 – Minerals
	NE15 - Protection and Restoration of Peat Deposits as Carbon Sinks
	NE13 - Agricultural Soil
Ecology and Ornithology	NE4 - Sites of International Importance for Biodiversity
	NE5 - Species of International Importance
	NE6 - Sites of National Importance for Biodiversity and Geodiversity
Traffic and Transport	CF4 - Access Routes
	T1 - Transport Infrastructure
	T2 - Location of Development / Accessibility
Cultural Heritage	HE1 - Listed Buildings
	HE2 - Conservation Areas
	HE3 – Archaeology
	HE4 - Archaeologically Sensitive Areas
	HE6 - Gardens and Designed Landscapes
Forestry	NE7 - Forestry and Woodland
	NE8 - Trees and Development
Socio-economics, Tourism and Recreation	ED10 - Galloway and Southern Ayrshire Biosphere
	ED11 - Dark Skies
	CF2 - Green Networks

Adopted LDP2 Policies of Relevance to the KTR Project

6.50 The wording of related adopted LDP policies set out in **Table 6.1** is detailed in full below and areas designated on the LDP2 Proposals Maps within which components of the KTR Project are located are also identified.

Development Control and Design

6.51 Policy **OP1: Development Considerations** within LDP2 is an overarching policy setting out some of the key considerations taken into account when assessing development proposals. These considerations are set out under seven main headings, namely: a) General Amenity; b) Historic Environment; c) Landscape; d) Biodiversity and Geodiversity; e) Transport and Travel; f) Sustainability; and g) Water Environment as outlined below:

"a) General Amenity

Development proposals should be compatible with the character and amenity of the area and should not conflict with nearby land uses. The following issues which may result from the development will be a material consideration in the assessment of proposals:

- *noise and vibration;*
- *odour and fumes;*
- *potential loss of privacy, sunlight and daylight on nearby properties;*
- *emissions including dust, smoke, soot, ash, dirt or grit or any other environmental pollution to water, air, or soil; and*
- *light pollution.*

b) Historic Environment

Development proposals should protect and/or enhance the character, appearance and setting of the region's rich historic environment principally by ensuring they are sympathetic to nearby buildings, sites and features, integrate well and complement the surrounding area. The information contained within the Council's Historic Environment Record and Scottish Historic Environment Policy, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.

c) Landscape

Development proposals should respect, protect and/or enhance the region's rich landscape character, and scenic qualities, including features and sites identified for their landscape qualities or wild land character as identified on the 2014 Scottish National Heritage map (or any subsequent revised or amended map) of wild land areas. They should also reflect the scale and local distinctiveness of the landscape. The detailed guidance set out in the Dumfries and Galloway Landscape Assessment, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.

d) Biodiversity and Geodiversity

Development proposals should respect, protect and/or enhance the region's rich and distinct biodiversity, geodiversity and sites designated for their contribution to the natural environment at any level including ancient and semi-natural woodland. The guidance contained within the Local Biodiversity Action Plan, and any subsequent revised or amended document, will be a material consideration in the assessment of proposals.

e) Transport and Travel

Development proposals should minimise the need for travel by car and encourage active and other more sustainable forms of travel whilst avoiding or mitigating any adverse impact on the transport network or road safety.

f) Sustainability

Development proposals should limit the impacts of climate change and promote sustainable development by:

- *assisting the development of the local economy through sustainable economic growth;*
- *minimising adverse impacts on water, air and soil quality;*
- *reusing and/or regenerating previously used land and property, including derelict and contaminated land;*
- *making the most efficient use of land. This means looking for and where practical making use of opportunities to reduce greenhouse gas emissions, including low carbon district heating networks;*
- *integrating with existing infrastructure where possible;*
- *supporting the Council's waste resource management objectives;*
- *avoiding areas of significant flood risk;*
- *using sustainable drainage systems;*
- *supporting reduction in carbon emissions through:*
  - *a reduction in carbon dioxide emissions through the introduction of energy efficiency measures and, where feasible, the installation of on-site renewable energy generation technology (information on this matter is provided in supplementary guidance: Design Quality and Placemaking);*
  - *passive aspects of design, including consideration of: location, layout, orientation, massing, materials, detailed design, topography, and vegetation; and*

- *all new buildings being required to demonstrate that a proportion of the carbon emissions reduction standard set by Scottish Building Regulations will be met through the installation and operation of low and zero carbon technologies. The relevant building standards and percentage contribution required is set out in supplementary guidance. The supplementary guidance will be kept under review to ensure that the proportion of the carbon emissions reduction standard to be met by these technologies will increase over time.**

** Supplementary guidance provides further detail on this including its application to existing buildings and the circumstances where exceptions should apply*

g) Water Environment

Development proposals should maintain or enhance water quality, and take account of the need to manage water quantity, including flooding. In securing these objectives they should also seek to contribute positively to the general environmental quality of their area.

Landscape and Visual Amenity

6.52 All of the connections included within the KTR Project pass through the Galloway Hills, identified as a Regional Scenic Area (RSA) within the LDP Proposal Maps. The southern reaches of the G-T connection also pass through the Solway Coast RSA. The corresponding Policy **NE2: Regional Scenic Areas** states that:

"The siting and design of development within a Regional Scenic Area should respect the special qualities of the area. Development within, or which affects Regional Scenic Areas (RSAs), may be supported where the local Council is satisfied that:

- *the factors taken into account in designating the area would not be significantly adversely affected; or*
- *there is a specific need for the development at that location."*

Geology, Hydrology, Hydrogeology, Water Resources and Peat

6.53 All of the new connections included within the KTR Project pass over, or are in proximity to, several major tributaries of the River Dee including the Water of Deugh, Water of Ken, Coom Burn, Tarff Water and the Kenick Burn, as well as numerous other smaller watercourses or surface water bodies. Surface runoff during and after construction will be managed by SuDS (as discussed further in this EIA Report in **Chapter 5: Felling, Construction, Operational Maintenance and Decommissioning** and **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**) and the direct and indirect disturbance of peat during construction has been assessed. Borrow pits and mineral working will also be required and have therefore also been considered within the assessment.

6.54 The corresponding policies **NE11: Supporting the Water Environment**, **NE12: Protection of Water Margins IN7: Flooding and Development**, **IN8: Surface Water Drainage and Sustainable Drainage Systems, ED13: Minerals, NE15: Protection and Restoration of Peat Deposits as Carbon Sinks and NE13: Agricultural Soils** are outlined below.

6.55 **NE11: Supporting the Water Environment** states that:

"The Council will not permit development which would result in deterioration in the status of a waterbody or which would likely impede the improvements in waterbody status as set out in the Solway Tweed River Basin Management Plan (2015) or any update or adopted review of it, unless there are exceptional justifying circumstances. This includes minor watercourses draining into the waterbodies identified in the Solway Tweed plan. Development proposals should not normally include the culverting of any waterbody. If culverting would be the only way to enable a proposed development, then permission could be granted if the Council is satisfied that there would be acceptable mitigation measures to protect habitats, passage of fauna, and river form and flow.

Other physical alterations and changes to waterbodies should, if possible, and in general be avoided. An exception to this is where re-naturalisation or natural flood management is proposed. Thus, existing culverted or canalised watercourses or barriers to fish movement in redevelopment and land rehabilitation schemes should be restored when this is practical, neutral or positive in respect of flood risk elsewhere, and consistent with the relevant Regulations.

Development proposals which could adversely affect Drinking Water Protection Areas identified by the Scottish Government will be subject to consultation with SEPA. Where the likely adverse effect cannot be avoided or mitigated against, the development will not be permitted".

6.56 **NE12: Protection of Water Margins** states that:

"Where new development is proposed adjacent to or in the vicinity of waterbodies, the water margins will, subject to Policy NE11 and Section 18 of the Flood Risk Management (Scotland) Act 2009, be protected unless there are compelling reasons to justify why this should not be done."

6.57 **IN7: Flooding and Development** states that:

"The avoidance principle is the most sustainable form of flood management, in accordance with the policy principle for managing flood risk of SPP and the Flood Risk Management (Scotland) Act 2009. Where proposed development could lead to an unacceptable on-site or off-site flood risk[1], as defined by the Risk Framework in SPP, then it will not be permitted. Where a proposed development could lead to an unacceptable flood risk, it may be that a Flood Risk Assessment (FRA) is able to clarify to the satisfaction of the Council and SEPA that the level of risk both on and offsite would be acceptable. For any site a Drainage Impact Assessment (DIA) may be required to ensure that surface water flows are properly taken into account in the development design. Consideration should be given to pluvial flows[2] especially those which exceed the capacity of the proposed drainage systems. Design of development must avoid flood risk from exceedance flows[3]. (See also Policy IN8 for Surface Water Drainage and SuDS.)

In order to satisfy the Council in respect of FRAs and DIAs, parties will be expected to provide independent verification of their professional competence, unless it is clear that this is not required.

Supplementary guidance provides further detail on the levels and requirements for Flood Risk Assessments".

[1] Note: The meaning of 'flood risk' is from SPP. It is 'the combination of the probability of a flood and of the potential adverse consequences, associated with a flood, for human health, the environment, cultural heritage and economic activity'

[2] Pluvial flooding is a result of rainfall runoff flowing or ponding over the ground before it enters a natural drainage system (e.g. watercourse) or an artificial one (e.g. sewer) because for example the system is already full to capacity or the drainage inlets have limited capacity.

[3] Those which exceed the capacity of any formal drainage system.

6.58 **IN8: Surface Water Drainage and Sustainable Drainage Systems** states that:

"With the exception of single houses and those with direct discharges to coastal waters, SuDS will be a required part of all proposed development as a means of treating the surface water and managing flow rates. Surface water management arrangements must form part of any planning in principle proposal.

Consideration of drainage issues is a planning requirement for every planning proposal. This consideration should be initiated as part of any preliminary site assessment and should progressively inform the generation of schemes as they develop. For any site a Drainage Impact Assessment (DIA) at the appropriate level may be required to ensure that surface water flows are properly taken into account in the development design.

Planning applications must include appropriate and proportionate details of the proposed SuDS to show how they will:

- *ensure the system is designed to avoid flood risk from exceedance flows;*
- *be accommodated within the proposed site4, and understood as an essential factor in determination of the overall capacity of any site;*
- *be based on a unified approach to cover surface water drainage from on-site roads and from the remainder of the site;*
- *contribute positively to the biodiversity, general amenity and water quality of the area of the proposal;*
- *include a coordinated approach between new developments that are adjacent to one another;*
- *include the arrangements for its long-term maintenance.*

There should be appropriate arrangements for surface water drainage during the construction phase of a development site. This could be by way of a SuDS scheme or some alternative interim solution.

Supplementary guidance provides further detail on the levels and requirements for Drainage Impact Assessments. "

6.59 **ED13: Minerals** states that:

"Permanent development that would result in the sterilisation of mineral resources that are viable at present or that may become viable in future and which either could be extracted in accordance with LDP policy or which are the subject of extraction interest will not be permitted.

Proposals for new mineral workings or the extension of existing workings will be supported where the following have been addressed to the satisfaction of the Council:

- *disturbance and disruption from noise, blasting and vibration and potential pollution of land, air and water;*
- *the impact on local communities and residential property, landscape, visual amenity, the historic environment and areas of nature conservation interest during and after development;*
- *the impact on surface and ground water resources, drainage and fishery interests and soil (see Policy NE13 and NE14);*
- *effective and sustainable waste solutions in the reuse of mineral waste or any secondary material;*
- *the cumulative effect of all of the above, especially if there are already two or more consented sites that could raise similar impacts within 5km of a nearby settlement;*
- *transport assessment demonstrating that the development will not have a significant negative impact on local communities;*
- *a site restoration scheme where appropriate including an aftercare programme and a financial guarantee to ensure the programme can be fully implemented; and*
- *an appropriate method statement.*

Proposals for surface coal mining should address all of the criteria set out in the bullet points above, to show that the proposal is environmentally acceptable (or can be made so by planning conditions) and, if relevant, provide evidence to show that there are local or community benefits which clearly outweigh the likely impacts of extraction.

This policy is supported by supplementary guidance. The guidance includes maps showing consented extraction sites that are underlain by the mineral reserves that make up the landbank of mineral reserves. It also identifies areas where surface coal extraction is most likely to be acceptable".

6.60 **NE13: Agricultural Soil** states that:

"Developments proposed on areas of good quality agricultural soil will only be supported where they conform to the Spatial Strategy of the Plan and there is no alternative on less good quality land.*

All developments should adopt:

- *means of minimising impact on soil resources;*
- *Soil management measures; and*
- *opportunities to re-use soils necessarily excavated from the site.*

(Defined for the purposes of this policy as Land Capability for Agriculture (LCA) Classification 3.2 or better)."*[8]

6.61 **NE14: Carbon Rich Soil** states[9]:

"Support for the role of soils as natural carbon sinks will be material in development decisions. Developments proposed on areas of carbon rich soil[2] will need to clearly justify the loss of the carbon sink. Development may be permitted if it can be demonstrated that in accordance with the Scottish Government's 'carbon calculator' or other equivalent independent evidence the balance of advantage in terms of climate change mitigation lies with the development proposal.

All developments should take account of soil carbon content and, as appropriate, should adopt:

- *means of minimising impact on carbon rich soil; and*
- *management measures relative to carbon rich soil.*

Any proposal affecting peat accumulations will be subject to Policy NE15."

[2] Categories 5 and 6 (over 12% organic carbon concentration) on Scotland's Soils website Map 'topsoil organic carbon concentration.

6.62 **NE15: Protection and Restoration of Peat Deposits as Carbon Sinks** states that:

"The role of natural carbon sinks in retaining carbon dioxide will be maintained by safeguarding and protecting peat deposits[3], including those not already designated for habitat conservation.

The Council will support peatland restoration, including rewetting.

Developments proposed affecting peat deposits not already designated for habitat conservation reasons may be permitted in the following circumstances.

(a) In areas of degraded peatland where all of the following apply.

- *The deposits have been significantly damaged by human activity; and*
- *The conservation value is low; and.*
- *Restoration to functioning peatland is not possible*.

In all such cases appropriate site restoration measures, to something other than functioning peatland, will be required; or

(b) Where renewable energy generating development is proposed and it can be demonstrated (in accordance with the Scottish Government's 'carbon calculator' or other equivalent independent evidence) that the balance of advantage in terms of climate change mitigation lies with the energy generation proposal; or

(c) Where surface coal extraction requires removal of peat as an overburden to access the coal and where, following extraction of the coal, the site will be restored to a wetland habitat with a biodiversity value that is no less than the biodiversity value of the site prior to development. Grassland and woodland should not be considered as restoration options. If these requirements cannot reasonably be achieved within the development site, creation of a wetland within the vicinity of the site may be an acceptable alternative."

[3] As identified by Scotland's Soils website Map 'carbon_and_peatland_2016'.

Ecology and Ornithology

6.63 Some of the new connections of the KTR Project are routed in proximity to several designated sites and Sites of International/National Interest for Biodiversity within the LDP Proposal Maps, including Loch Ken and River Dee Marshes Special Protection Area (SPA) and Ramsar site (and associated Site of Special Scientific Interest (SSSI) designations). In addition, some of the towers of R route which is to be decommissioned are located within the Loch Ken and River Dee Marshes SPA and some towers within 500m of it. The corresponding policies in relation to the KTR Project's potential effects on ecological and ornithological interests are set out in **NE4: Sites of International Importance for Biodiversity**, **NE5: Species of International Importance**, **NE6: Sites of National Importance for Biodiversity and Geodiversity.** The content of the policies is set out below.

6.64 **NE4: Sites of International Importance for Biodiversity** states that:

"Development proposals likely to have a significant effect on an existing or potential Special Protection Area (SPA), existing or candidate Special Area of Conservation (SAC) or Ramsar Site, including developments outwith the site, will require an appropriate assessment and will only be permitted where:

- *the development does not adversely affect the integrity of the site; or*

[8] Part of the R Route to be removed passes through Class 3.2 land.

[9] Peat carbon rich soil greater than 0.5m depth is found in limited areas across the route of the KTR Project, including between Benbrack and Cairn Edward Hill; Localised pockets in Lauriston Forest; Beoch Moor north of Bargatton Loch, west and south of Bargatton Loch and R route at Shirmers Moss and Mosscroft.

- *there are no alternative solutions; there are imperative reasons of overriding public interest, including those of a social or economic nature; and compensatory measures have been identified and agreed to ensure that the overall coherence of the Natura network is protected.*

The boundaries of these sites are shown on the Proposals Maps."

6.65 **NE5: Species of International Importance** states that:

"Development proposals that would be likely to have an adverse effect on a European Protected Species will not be permitted unless it can be shown that:

- *there is no satisfactory alternative, and*
- *the development is required for preserving public health or public safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment, and*
- *the development would not be detrimental to the maintenance of the population of the species at a favourable conservation status in its natural range."*

6.66 **NE6: Sites of National Importance for Biodiversity and Geodiversity** states that:

"Development that affects Sites of Special Scientific Interest, not designated as International Sites, and other national nature conservation designations will only be permitted where:

- *it will not adversely affect the integrity of the area or the qualities for which it has been designated, or*
- *any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.*

The boundaries of these sites are shown on the Proposals Maps."

Traffic & Transport

6.67 The relevant policies in relation to the potential traffic and transport effects associated with the construction of each of the KTR Project connections, ancillary works and the decommissioning and removal of the existing N and R routes are set out in **CF4: Access Routes, T1:Transport Infrastructure** and **T2: Location of Development / Accessibility**. The content of the policies is set out below.

6.68 **CF4: Access Routes** states that:

"a) Development Affecting Existing Access Routes.

The Council as Access Authority will assert, protect and keep open and free from obstruction any route, waterway or other means by which access rights may reasonably be exercised. Development proposals should not impact adversely on any of the aforementioned access routes and Core Paths.

The Council will not grant planning permission to development proposals which would result in the loss of such access routes unless a satisfactory alternative route or mitigating measures can be secured. In such cases, future access provision, including any changes to existing access, must be shown in an Access Route Plan.

b) Provision of New Access Routes.

New development should consider access issues at an early stage of the design process and, where appropriate, incorporate new and enhanced access opportunities, linked to wider access networks and green networks. For small scale developments these considerations can be demonstrated in an Access Route Statement but for all residential development of five units or above and other major developments, an Access Route Plan demonstrating how access routes will be incorporated is required.

New or alternative access routes and enhancements to existing routes will be supported, especially if these can form part of green networks.

The Council will seek reasonable opportunities from developers to create, manage, maintain and improve access through planning conditions or legal agreements."

6.69 **T1: Transport Infrastructure** states that:

"Proposals for the improvement of existing transport infrastructure and, where appropriate, the provision of new transport infrastructure and/or services will be supported provided they accord with the Regional and Local Transport Strategies; and where it can be demonstrated to the satisfaction of the Council that following appropriate assessment (where needed), the proposal has no adverse effects either alone or in combination on the integrity of any Natura site.

Development of facilities for cyclists and pedestrians will be supported.

a) Strategic Network.

The strategic transport network includes the trunk road, motorway and rail networks. Development proposals that have the potential to affect the performance or safety of the strategic transport network need to be appraised to determine their effects. The national and strategic role of these routes should not be compromised by development which individually or incrementally materially reduces the level of service of a route.

b) Regional Network.

Development which involves a new direct access onto the regional road network should not, individually or incrementally, materially reduce the level of service of a route".

6.70 **T2: Location of Development/Accessibility** states that:

All development proposals will be expected to:

- *prioritise personal travel by mode in the following order: walking, cycling, public transport and lastly car and other motorised vehicles;*
- *be well served by the most sustainable modes of travel available and provide opportunities for a modal shift from private car use to more sustainable transport, including active travel, wherever possible;*
- *consider providing electric vehicle charging points as part of the development;*
- *fit with the policies and recommendations of the Local Transport Strategy and Active Travel Strategy.*

Access Requirements

- *consider accessibility issues early on and ensure street layout and design are part of the design and planning process from the beginning, taking account of statutory equal opportunities obligations relating to accessibility and be designed for the safety and convenience of all potential users;*
- *incorporate appropriate on and / or offsite mitigation measures where required through developer contributions. These might include: improvements, enhancements or additions to the walking / cycling network (connecting into existing local pedestrian or cycle networks or wider green networks) and public transport services, as well as road improvements and new roads;*
- *incorporate an appropriate level of parking provision to the maximum standards as outlined in SPP (having regard to the travel modes and services which will be available) and also include adequate cycle parking.*

Where site masterplans are prepared, they should include consideration of the impacts of proposals on the local and strategic road network, the strategic rail network, paths and cycle routes.

In certain circumstances developers may be required to:

- *prepare and implement travel plans to support a development proposal that will result in significant travel generation, by virtue of its size, nature, or location (as determined by the Council);*
- *prepare a Transport Statement or Transport Assessment in accordance with Transport Scotland's Transport Assessment Guidance and implement appropriate mitigation measures where required."*

Cultural Heritage

6.71 Parts of the new connections of KTR Project will pass through a number of cultural heritage assets including two Archaeological Sensitive Areas (ASAs), namely Polharrow Burn ASA (P-G via K) and Grobdale ASA (G-T). In addition, the route of the OHL crosses Knocknalling Non-Inventory Garden (P-G via K) and access 47, which is an existing access, is located directly adjacent to Laurieston Hall Non-Inventory Garden. Use of Polharrow Bridge, which is a category B Listed Building, is proposed during construction of the KTR Project and impacts on Listed Buildings and Conservation Areas in the wider

surrounding environment are also considered in **Chapter 12: Cultural Heritage**. The corresponding Policies **H1: Listed Buildings, H2: Conservation Areas**, **HE3: Archaeology, HE4: Archaeological Sensitive Areas** and **HE6: Gardens and Designed Landscapes** are outlined below.

6.72 **Policy HE1: Listed Buildings** states that:

"The Council will support development that makes effective, efficient and sustainable use of listed buildings. In considering development that impacts on the character or appearance of a listed building or its setting the Council will need to be satisfied that:

a) Alterations

- *proposals to extend or alter a listed building respect the appearance, character and features which contribute to its listing as a building of special architectural or historic interest; and*
- *the layout, design, materials, scale, siting and the future use shown in any development proposals are appropriate to the character and appearance of the listed building and its setting; and*
- *proposals for a change of use will not result in loss of character or special architectural or historical features.*

Proposals to extend or alter a listed building should include written justification demonstrating a full and proper understanding of the character and special interest of the building.

b) Demolition or Partial Demolition of Listed Buildings

Proposals that involve the demolition or substantial demolition of a listed building or buildings or structures within its curtilage will only be supported where it is demonstrated that one of the tests below is met:

- *the building is not of special interest; or*
- *the building is incapable of repair; or*
- *the demolition of the building is essential to the delivery of significant benefits to economic growth or the wider community; or*
- *the repair of the building is not economically viable and that it has been marketed at a price reflecting its location and condition to potential restoring purchasers for a reasonable period.*

c) Recording Schemes

In considering proposals that involve the alteration, demolition or partial demolition of a listed building or buildings or structures within its curtilage the Council will require that a scheme for recording of the building is submitted, agreed with the Council and implemented by the developer where there will be loss of historic fabric, detail or changes to the general arrangement.

The Historic Built Environment Supplementary Guidance provides further information in respect of justifying the design of alterations or extensions, the evidence required in the Historic Environment Policy for Scotland 2019 for demolition to be supported; and Association of Local Government Archaeological Officers (ALGAO) survey information for recording the existing fabric".

6.73 **HE2: Conservation Areas** states that:

"The Council will support development within or adjacent to a conservation area that preserves or enhances the character and appearance of the area and is consistent with any relevant conservation area appraisal and management plan. In considering such development the Council will need to be satisfied that:

- *new development, as well as alterations or other redevelopment of buildings, will preserve or enhance the character, appearance and setting of the conservation area through appropriate design, general scale, massing and arrangement, use of materials and the detailing of such development; and*
- *the quality of views within, from and into the conservation area will be maintained or enhanced.*

In the case of the proposed demolition of any building in a conservation area, if the Council considers that the building, either in itself or as part of a group, is of value to the character or appearance of the area, the Council will require to be satisfied that retention, restoration and, where appropriate, sympathetic conversion to some other compatible use is not practical before considering proposals for demolition.

If the building is of little townscape value, demolition may be approved if its structural condition rules out retention at a reasonable cost or its form or location makes re-use extremely difficult.

Where redevelopment of the site is proposed, prior to granting consent for demolition, the Council must be satisfied that the proposals for the new building will protect or enhance the appearance of the conservation area.

The Historic Built Environment Supplementary Guidance and individual conservation area character appraisals and management plans provide further advice regarding development proposals in conservation areas, including any requirement for a design and access statement."

6.74 **HE3: Archaeology** states that:

"a) The Council will support development that protects significant archaeological and historic assets, and the wider historic environment from adverse effects.

In considering development proposals the Council will need to be satisfied that:

- *the development preserves or enhances the appearance, fabric or setting of the site or asset in-situ; and/or*
- *where there is uncertainty about the location, extent or significance of these assets an agreed scheme of assessment and evaluation to inform the application is included with the proposal; and/or*
- *due consideration has been given to the significance and value of the site or asset in relation to the long-term benefit and specific need for the development in the location proposed.*

b) Where, due to exceptional circumstances, development is to proceed and the preservation of historic assets in-situ including buildings is not possible, a scheme of mitigation involving excavation, recording, analysis, publication and archiving and any other measures appropriate to the case has been agreed with the Council.

The Historic Built Environment Supplementary Guidance provides further advice in respect of this policy"

6.75 **HE4 Archaeological Sensitive Areas** states that:

"The Council will support development that safeguards the character, archaeological interest and setting of Archaeologically Sensitive Areas (ASAs) as designated by the Council.

Boundaries of ASAs are shown on Map six and the Proposals Maps"

6.76 **HE6: Gardens and Designed Landscapes** states that:

"a) The Council will support development that protects or enhances the significant elements, specific qualities, character, integrity and setting, including key views to and from, gardens and designed landscapes included in the Inventory of Gardens and Designed Landscapes or the Non-Inventory List.

In considering development proposals the Council will need to be satisfied that:

- *the development protects or enhances the significant elements of the garden or landscape in-situ; and*
- *due consideration has been given to the significance and value of the asset in relation to the long-term benefit and specific need for the development in the location proposed.*

b) Developers will be required to submit the results of an assessment of the impact of their proposals on the sites and their settings plus details of any potential mitigation measures.

c) Proposals that would have a detrimental effect on the specific quality, character or integrity of a garden or designed landscape will not be approved unless it is demonstrated that the proposal has benefits of overriding public interest.

Boundaries are shown on Map seven and the Proposals Map"

Forestry

6.77 The KTR Project will require the felling of a total of approximately 356 hectares (ha) of forestry[10], with the majority of the trees proposed for felling comprising Sitka spruce, the dominant species in Scottish commercial forestry. The corresponding policies **NE7: Forestry and Woodland**, **NE8: Trees and Development** and **NE8: Tree Preservation Orders** are outlined below.

6.78 **NE7: Forestry and Woodland** states that:

"The following policy will apply to those woodland/forestry felling, planting and replanting proposals which do not require planning permission but where the Council acts as a consultee to Scottish Forestry.

The Council will support the creation and protection of sensitively designed and managed forests and woodlands.

Proposals should seek to ensure that ancient and semi-natural woodlands and other woodlands with high nature conservation value are protected and enhanced.

In determining its response to individual forestry felling, planting and replanting consultations where Scottish Forestry are the determining authority, the Council will:

- *take into account environmental and other interests identified in the Forestry and Woodland Strategy including biodiversity, water (including flood risk management), soil and air, landscape setting, historic environment and land restoration;*
- *consider the scheme's location as set out in the Forestry and Woodland Strategy;*
- *seek to ensure an appropriate balance between both afforested and un-afforested areas in the locality;*
- *encourage planting of a type, scale, design, age, composition and species mix that is appropriate to the locality;*
- *actively encourage proposals to have a positive effect on nature conservation and/or natural and historic environment interest;*
- *encourage proposals to take account of possible recreational use in the design of any planting schemes and indicate how such recreational uses have been investigated; and*
- *ensure that proposals do not have an adverse impact on the road network."*

6.79 **NE8: Trees and Development** states that:

"In assessing development proposals, the Council will support proposals that:

- *promote additional tree planting;*
- *protect and enhance ancient woodland sites;*
- *maintain trees, woodlands (in particular ancient and semi-natural woodlands), and hedgerows (thereafter referred to as the 'woodland resource') and require developers to incorporate, wherever feasible, the existing woodland resource into their schemes;*
- *encourage planting of a type, scale, design, composition and species mix that is appropriate to its locality and appropriately incorporates the woodland resource into the overall design of the scheme; and*
- *show how existing trees will be appropriately protected during the construction period.*

In submitting development proposals, details should be provided of the arrangements to be made for the long term maintenance of both the existing woodland resource and any proposed new planting, including providing adequate room for further growth.

If it is demonstrated to the satisfaction of the Council that it is not possible to retain the woodland resource then an appropriate replacement planting scheme will be required to be agreed by the Council. Any such replacement planting scheme should normally be located within the site.

The processes and recommendations contained in BS 5837:2012, and any subsequent revised or amended document, should be taken into account in designing and implementing development proposals.

Where the works to a protected tree or trees forms part of a development proposal, the applicant should also demonstrate that:

- *the benefits of the development, including any replacement planting, will outweigh the loss of or potential harm caused by the works to the tree or trees; and*
- *the development has been designed and located in order to minimise potential adverse impacts on the protected tree or trees.*

Supplementary guidance provides further advice and guidance in respect of survey work, designing around trees, new planting, protection during construction, maintenance and removing existing trees."

Socio Economic

6.80 The KTR Project has the potential to generate socio-economic effects at the local, regional and/or national level, principally in relation to changes in economic development, employment opportunities and tourism or recreational activities. Where the development proposals fall within the buffer areas of tourism and recreational assets, policies **ED10: Galloway and Southern Ayrshire Biosphere** and **ED11: Dark Skies** should be considered. **CF2: Green** Networks is also considered relevant to the KTR Project. Policies **ED11, ED12** and **CF2** are outlined below.

6.81 **ED10: Galloway and Southern Ayrshire Biosphere** states that:

"The Council supports the designation and aims of the Biosphere and will encourage development that demonstrates innovative approaches to sustainable communities and the economy, and supports the enhancement, understanding and enjoyment of the area as a world class environment. Development must be appropriate to the role of the different zones within the Biosphere".

6.82 **ED11: Dark Skies** states that:

a) "Galloway Forest Dark Sky Park

The Council supports the designation of the Galloway Forest Dark Sky Park, and will assess proposals for development on their merits, securing levels of lighting that are appropriate to the nature of the development, contribute to sustainable development, and do not adversely affect the objectives of the Dark Sky Park designation.

b) Dark Skies

Supplementary guidance provides guidance on the adoption of good lighting principles and practice for Dumfries and Galloway, including those relating particularly to the Galloway Forest Dark Sky Park".

6.83 **CF2: Green Networks** states that:

"Green networks comprise of a network of green and blue spaces (such as bodies of water and wetlands) as well as green corridors within and around settlements, linking out into the wider countryside and across administrative boundaries.

Proposals that add to and/or enhance green networks or connections to them will be supported."

LDP2 Supplementary Guidance

6.84 The LDP2 supplementary guidance was formally adopted in line with the recently adopted LDP2 and will have the same weight as the Plan in the decision-making process. **Table 6.3** below provides a summary of the supplementary guidance documents considered relevant to the KTR Project.

[10] Of this total, approximately 163ha is long term forest loss associated with felling of the wayleave corridor, approximately 80ha is associated with felling for construction compounds, quarries and access tracks, and approximately 114ha is associated with felling of areas at risk of windthrow.

Table 6.3: LDP2 Supplementary Guidance

Topic Area	Proposed Plan LDP2 Supplementary Guidance
Hydrology, Hydrogeology and Water Resources and Peat	Flooding and Development (February 2020)
	Surface Water and Sustainable Urban Drainage Systems (February 2020)
Forestry	Trees and Development (February 2020)
Cultural Heritage	Historic Built Environment (February 2020)
Social and Economic	Dark Skies Friendly Lighting (February 2020)

Other Material Considerations

Dumfries & Galloway Supplementary Guidance Under Review

6.85 The Council is currently reviewing a suite of documents which were previously adopted as supplementary guidance to the first LDP (2014). These documents need to be updated and issued for consultation prior to them being readopted as supplementary guidance to the newly adopted LDP2. At the time of writing, the Council is reviewing only six of the previously adopted supplementary guidance for re-adoption; of relevance to the KTR Project is the Dumfries and Galloway Forestry and Woodland Strategy (December 2014) and Mineral Resources (January 2018).

Committed Development

6.86 A 'committed development' is considered to be a development that has either full planning permission, planning permission in principle, or is allocated in an approved strategic development plan or in an adopted LDP. As existing developments located within a 150m 'trigger zone for consideration' of a proposed route or substation location were included as a routeing /siting criterion for the KTR Project, further committed development within this distance was also identified, with attention focussed only on residential developments and other potentially sensitive receptors.

6.87 Committed developments were identified through consultation with D&GC who provided the planning application boundaries for the area, which were subsequently mapped to identify the location of potential developments more accurately[11]. On 7th May 2020, a further update on committed developments was sought from D&GC, with no updates in relation to committed developments received.

[11] The search was updated 15th November 2018