



**SP ENERGY
NETWORKS**

The Kendoon to Tongland 132kV Reinforcement Project

**Environmental Impact Assessment Report (EIAR):
Non Technical Summary (NTS)**

August 2020

The Kendoon to Tongland 132Kv Reinforcement Project

Environmental Impact Assessment Report

Non-Technical Summary

**Prepared by LUC
on behalf of
SP Energy Networks**

August 2020



Preface

This Non-Technical Summary (NTS) accompanies an Environmental Impact Assessment Report (EIA Report) which has been prepared in support of an application by SP Energy Networks (SPEN) to the Scottish Government Energy Consents Unit (ECU) for Section 37 Consent to modernise and reinforce the 132 kilovolts (kV) electricity transmission network between Kendoon and Tongland in Dumfries and Galloway, including the decommissioning and removal of the existing N and R routes. The project is referred to as 'the KTR Project'.

The EIA Report accompanying the application comprises the following:

- Volume 1: Main text;
- Volume 2: Figures;
- Volume 3: Appendices; and
- Volume 4-6: Visualisations.

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, at the time of submission of the applications, hard copies are not available in public viewing locations in accordance with the Regulations.

A hard copy of the NTS can be requested free of charge. 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:

Dedicated freephone number: 0800 157 7353

Dedicated project email address: dgsr@communityrelations.co.uk

Freepost address: FREEPOST SPEN DGSR

Representations to the applications may be submitted via the ECU portal 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.

Glossary

Additional Mitigation: Any process, activity or activity designed to avoid, reduce or remedy adverse environmental impacts likely to be caused by a development project which is identified following assessment (distinct from Embedded Mitigation below).

Ancillary Development: Refers to any development which is necessary to the construction or operation of the overhead line e.g. access tracks and quarries.

Circuit: a combination of conductors (commonly three conductors) along which electricity is transmitted. Towers carry two circuits; wood poles carry one circuit.

Conductors: metallic wire strung from tower to tower or pole to pole, to carry electricity current.

Construction and Decommissioning Environmental Management Plan (CDEMP): A document management system with environmental procedures to monitor residual impacts of the construction and decommissioning phases of a development.

Construction Method Statement (CMS): a description of how the work will be carried out safely.

Cumulative Effects: effects on the environment which are caused by the combined result of past, current and future developments.

Ecological Clerk of Works (ECow): provides advice about ecological and environmental issues during the construction of a development.

Electric and Magnetic Fields (EMF): Their sources are the charged fundamental particles of matter and are associated with use of electrical power and various forms of natural and man-made lighting (i.e. high voltage power transmission equipment is a source of EMF)

Embedded Mitigation: environmental mitigation measures that are incorporated into the project design and are intended to prevent, reduce or remedy any significant adverse effects.

Environmental Impact Assessment (EIA): a formal process used to identify, predict and assess the likely environmental effects of a proposed development.

EIA Report: A report that includes such information that is reasonably required to assess the environmental effects of a development.

Infrastructure Location Allowance (ILA): Ensures that final positions of the project infrastructure and associated works are not varied to a such a degree as to cause an increase in the significance of likely environmental effects.

Insulators: articulated strings made either of glass or polymeric compound. These are required to prevent electric current crossing to a tower or pole body.

Kilovolt (kV): 1,000 volts.

Magnitude of Effect: The degree and extent to which the project changes the environment.

Non-Technical Summary (NTS): A summary of the EIA Report in 'non-technical language'.

Overhead Line (OHL): an electric line installed above ground usually supported by lattice steel towers or wooden poles.

Principal Contractor: a contractor appointed by the client to control the construction phase of any project involving more than one contractor.

Residual Effects: Those effects of a development following implementation of any relevant mitigation proposals.

Route Options: a number of routes connecting two substations or node points (in some cases, there may only be one route option).

Scoping: An initial stage of the EIA in determining the nature and potential scale of environmental impacts arising from a proposed development and assessing what further studies are required to establish their significance.

Scoping Opinion: A written statement of the opinion of the relevant planning authority as to the information to be provided in the EIA Report which specifically requires a local planning authority to respond or consult with consultees within a statutory period.

Span: the section of overhead line between two towers or two wood poles.

SPEN: ScottishPower Energy Networks, responsible for the development, operation and maintenance of electricity transmission in Central and Southern Scotland on behalf of the transmission license holder for this area, ScottishPower Transmission (SPT).

Statutory Consultees: Groups or bodies that by law, must be consulted as part of the planning application process for EIA development (i.e. the planning authority, Scottish Natural Heritage, the Scottish Environment Protection Agency and Historic Environment Scotland).

Study Area: the area within which route options can be identified between the required points of connection (substations or node points on the existing network).

Substation: this controls the flow and voltage of power by means of transformers and switchgear, with facilities for control, fault protection and communications.

Sustainable Drainage Systems (SuDS): are a collection of water management practices that aim to align modern drainage systems with natural water processes.

Underground Cable: an electric line installed below ground within a cable trench.

Volts: the international system unit of electric potential and electromotive force.

Wayleave: is a legally binding agreement between a land or property owner and a licence holder which grants the power to install their electricity lines and associated equipment on, over or under private land to keep the electricity line there and to have access to that land for the purposes of inspecting, maintain, repairing or removing the line or equipment.

Windthrow: the uprooting and overthrowing of trees by wind.

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1 Introduction

- 1.1 This document provides a Non-Technical Summary (NTS) of the Environmental Impact Assessment (EIA) Report (hereafter referred to as the 'EIA Report') which has been prepared in support of the applications for the development of a series of overhead line (OHL) connections and associated developments which form the Kendoon to Tongland 132 kilovolt (kV) Reinforcement Project hereafter referred to as the 'KTR Project'.
- 1.2 SP Energy Networks (SPEN) is seeking consent from the Scottish Ministers under section 37 of the Electricity Act 1989 and deemed planning permission under Section 57 of the Town and Country Planning (Scotland) Act 1997 (as amended) for the replacement and reinforcement of the 132kV electricity transmission network between Kendoon and Tongland in Dumfries and Galloway. Five separate applications will be made to the Scottish Ministers to construct and operate five new overhead electricity transmission lines which form the KTR Project. The applications for deemed planning permission also include the decommissioning and removal of the existing 132kV OHLs known as N route and R route (north and south¹) between Kendoon and Tongland as well as associated works (such as temporary infrastructure e.g. quarries etc.).
- 1.3 SPEN owns and operates the electricity transmission and distribution networks in central and southern Scotland². The transmission network includes more than 4,000km of OHLs and more than 360km of underground cables. In accordance with SPEN's legal duties, it is required to ensure efficient electricity supplies are maintained and assets are replaced when they come to the end of their operational life. The existing electricity transmission network in the south-west of Scotland 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.
- 1.4 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, and from Tongland to Dumfries. 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. The N and R routes which will be replaced as part of the KTR Project, currently connect five hydro-electric power stations that serve the populations of Galloway, Dumfries and Ayrshire with electricity. Built in the 1930s and running at full capacity, the existing 132kV OHL is at the end of its operational life and is therefore in need of replacing.
- 1.5 The applications for section 37 consent and deemed planning permission are accompanied by an EIA Report which presents the findings of the EIA, which has been prepared by LUC and specialist subconsultants on behalf of SPEN, in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, as amended³ (hereafter referred to as 'the EIA Regulations').
- 1.6 This standalone NTS has been prepared in accordance with the EIA Regulations to accompany the main part of the EIA Report, and provides a clear and easy to understand overview of the KTR Project and its likely significant effects.

¹ R (north) represents the existing R route from Glenlee substation to Kendoon substation and R (south) represents the existing R route from Glenlee substation to Tongland substation.

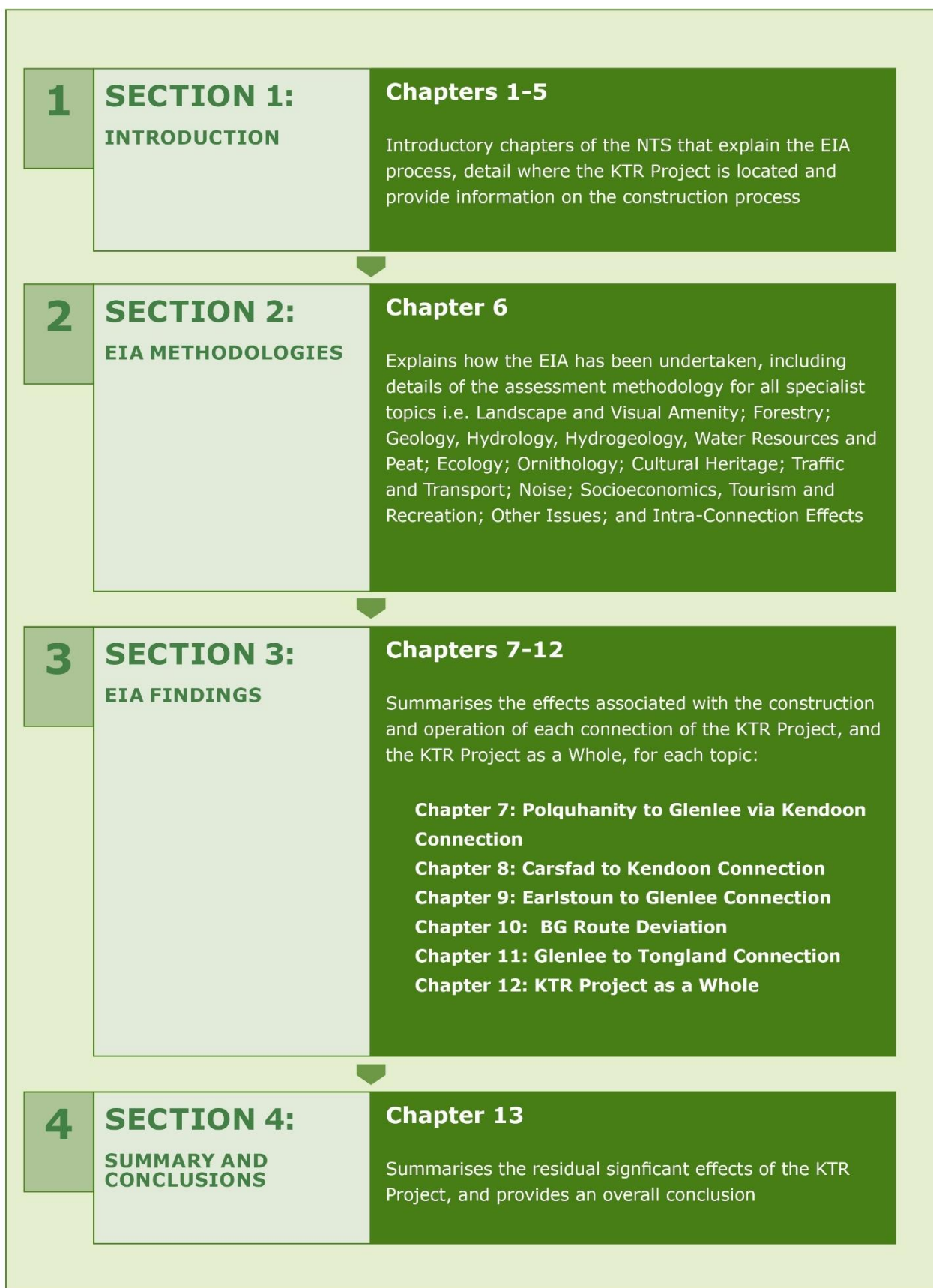
² Through its wholly-owned subsidiaries SP Transmission plc (SPT) and SP Distribution plc (SPD). SPT is the holder of a transmission licence and the reference to SPEN's duties should be read as applying to SPT.

³ 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 public places during statutory application consultation periods and to make copies available electronically.

- 1.7 The KTR Project consists of proposals for the replacement of approximately 47.8km of 132kV overhead transmission line which is currently supported on steel towers (the N and R routes). As noted above, there are five new 132kV OHL connections included within the KTR Project:
- A 132kV double circuit steel tower OHL, of approximately 10.1km in length, between Polquhanity to Glenlee via Kendoon (P-G via K) (the application for this connection will also be accompanied by a separate application to remove the existing N and R route north of Glenlee substation);
 - A 132kV single circuit wood pole OHL, of approximately 2.6km in length, between Carsfad to Kendoon (C-K);
 - A new 132kV single circuit wood pole OHL, of approximately 1.6km in length, between Earlstoun to Glenlee (E-G);
 - A new 132kV double circuit steel tower OHL deviation of the existing BG route, from Glenlee substation approximately 1.2km in length (BG Deviation); and
 - A new 132kV double circuit steel tower OHL, of approximately 32.3km in length, between Glenlee to Tongland (G-T) (the application for this connection also be accompanied by a separate application to remove the existing R route south of Glenlee substation).
- 1.8 The five connections are detailed further below in Sections 3 and 4 and the location of each new connection and the existing N and R routes to be removed are illustrated on **Figure 1**.
- 1.9 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, a separate planning application for the construction and operation of Glenlee substation extension was submitted to Dumfries and Galloway Council (D&GC) in September 2019 (application reference: 19/1498/FUL) and was approved, subject to planning condition, in August 2020.
- 1.10 The Glenlee substation planning application was accompanied by its own EIA Report (Sep 2019)⁴ covering all relevant issues, such as landscape and visual impact, construction noise and traffic and transport. The extension to the Glenlee substation is considered within the cumulative assessment as part of the EIA for the KTR Project.
- 1.11 This NTS includes information on the EIA process, the location and components of the KTR Project, and the likely effects of construction and operation of the KTR Project on the environment (including removal of N and R routes). Whilst the EIA Report is set out by topic, the NTS is structured slightly differently as illustrated in the diagram below. A summary of the methodologies employed provided in Section 6 which explains how the EIA has been undertaken, and the findings for each topic assessment presented by connection in Sections 7 to 11 to enable readers to consider the effects of most relevance to a particular location in one place. Details of the effects of the KTR Project as a Whole are provided in Section 12 and a summary and conclusion are provided in Section 13.

⁴ https://www.spenergynetworks.co.uk/pages/dumfries_galloway_project_documents.aspx

NTS Structure Diagram



2 What is EIA?

- 2.1 EIA involves the compilation, evaluation and presentation of the likely significant environmental effects resulting from a proposed development, to assist the consenting authority, statutory consultees and wider public in considering an application. Early identification of potentially adverse environmental effects also leads to the identification and incorporation of appropriate mitigation measures into the design to avoid, reduce and, where possible, remedy potentially significant environmental effects.
- 2.2 The KTR Project is subject to EIA; it involves the construction of new OHLs of 132kV and thus falls within Schedule 2 of the EIA Regulations. Specifically, it is a development to provide:
- “(2) an electric line installed above ground—
- With a voltage of 132 kilovolts or more;
- In a sensitive area...”
- 2.3 It is also considered that significant effects on the environment are likely as a result of the KTR Project therefore EIA is required. The findings and conclusions of the EIA are set out in the EIA Report for the KTR Project (August 2020), which has been summarised in this NTS.
- 2.4 The EIA Report presents information on the identification and assessment of the likely environmental effects of the KTR Project. The significance of these effects (either positive/beneficial or negative/adverse) has been assessed using criteria defined in the topic chapters of the EIA Report. Where appropriate, the significance of effects defined as **major**, **moderate**, **minor** or **none** have been identified. In the context of the EIA Regulations, effects assessed as being of ‘**major**’ or ‘**moderate**’ significance are considered to be **significant** effects.

Scoping

- 2.5 To inform the content of the EIA Report for the KTR Project an EIA Scoping Report was prepared and submitted to the Scottish Government Energy Consents Unit (ECU) in April 2017, together with a request for a Scoping Opinion. The purpose of scoping is to ensure that the EIA process focuses on key environmental issues associated with a development. Therefore, the Scoping Report sought to focus the EIA on the main effects of the KTR Project, with each of the topic-based chapters within the Scoping Report setting out a provisional list of likely significant effects prior to mitigation and a second provisional list of non-significant effects to be ‘scoped out’ of full assessment. 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, with the findings summarised in this NTS.
- 2.6 The topics which were scoped out of detailed assessment were air quality, land and agriculture, aviation and defence, and effects on existing infrastructure services e.g. gas, water and electricity. In addition, a number of topics which were introduced by the 2017 EIA Regulations were not assessed in detail on the basis that the Scoping Opinion was requested in advance of these Regulations coming into force. This approach was agreed with the ECU and, as such, potential effects on the following topics were also not assessed in detail:
- **Climate change:** 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 (UKCP18⁵).

⁵ <https://www.metoffice.gov.uk/research/collaboration/ukcp>.

- **Human health:** No specific effects on human health are considered likely to arise as a result of construction or operation of the KTR Project, however potential health effects have been considered in relation to noise and recreation. In addition, the assessment of 'intra-connection' and 'intra-KTR' effects considered interactions with traffic, dust, residential visual amenity and private water supplies (PWS) on properties (and therefore residents) that may experience a combination of these effects. 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 such, detailed consideration of potential effects on human health was therefore not required as part of the EIA.
- **Risk of major accidents and disasters:** 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. Similarly, areas where potential for peat slide risk were identified have also been avoided where possible through the design of the KTR Project, and the findings of a detailed peat slide risk assessment are provided as an appendix to the EIA Report. Finally, as noted above, 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) (CDM) Regulations 2015 and the Health and Safety at Work etc. Act 1974. As such, the risk of major accidents is not considered likely and has not been assessed in detail.

Embedded and Additional Mitigation Measures

- 2.1 Mitigation measures have been incorporated into the design to reduce potential effects and 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 in this way, 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. The EIA has therefore distinguished between embedded mitigation and additional mitigation.
- 2.2 'Embedded mitigation' includes changes that were made at the early routeing stage and during the design such as 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 runoff from construction working areas to ensure that this does not wash into watercourses and cause pollution downstream. The best practice/industry standard measures which form the embedded mitigation to be implemented during the construction process across all topic areas are well understood and it is highly likely that these measures would be successful.
- 2.3 During the pre-construction detailed design process, where possible, effects will be avoided or reduced through the refining of tower/pole and related infrastructure locations utilising the 50m infrastructure location allowance (ILA). 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. 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 prior to construction.
- 2.4 'Additional mitigation' measures are those which have been identified through the EIA process and which are specific to a particular location or issue. 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. The specialist topic chapters detail the additional mitigation identified during the assessment process to address localised site/issue specific likely adverse effects.

- 2.5 The embedded mitigation, which forms an integral part of the KTR Project, is therefore considered to be in place for assessment purposes, to ensure the EIA Report focuses on the likely significant effects of the KTR Project. Given the standard nature of the embedded mitigation measures identified, this approach prevents a series of unrealistic and unlikely effects from being reported in detail and provides clarity on the additional mitigation measures required to address likely significant as well as other adverse effects. This approach is standard practice in EIA for large infrastructure projects of this nature.
- 2.6 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 the EIA Report as 'residual effects'. This is a proportionate and realistic approach to assessment, which allows the reader to understand the likely significant effects arising from the KTR Project.

Consultation

- 2.7 While there are no formal pre-application requirements for consultation in respect of applications for section 37 consent/deemed planning permission, SPEN has adopted best practice as outlined in the Scottish Government Planning Advice Note (PAN) 3/2010 on Community Engagement (2010)⁶. 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. 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, including a number of public events at all three stages:
- Round One: Public consultation on the preferred corridors for the new OHLs was originally undertaken during the routeing stage as part of the wider Dumfries and Galloway Strategic Reinforcement (DGSR) Project⁷. The consultation period was scheduled for seven weeks between 8th June and 24th July 2015, but in response to feedback it was extended for an additional five weeks until 31st August 2015.
 - Round Two: Public consultation on the preferred route for each new OHL was carried out from 31st October to 21st December 2016.
 - Round Three: Public consultation on detailed alignment for each new OHL was carried out from 20th November 2017 to 26th January 2018.

Statutory Stakeholder Liaison Group

- 2.8 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 Forestry Commission Scotland⁸ to join the Group given the extent of forestry within the KTR Study Area. Chaired by the Scottish Government 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 into the routeing, design and assessment process.

Community Liaison Group

- 2.9 A Community Liaison Group (CLG), chaired by the ECU, was established prior to the second round of consultation in 2016. 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

⁶ <https://www.gov.scot/publications/planning-advice-note-3-2010-community-engagement/>

⁷ The KTR Project originally comprised an integral part of the larger DGSR Project. Following a cost-benefit analysis of the DGSR Project, it was decided to progress a reduced scheme based on the modernisation and capacity increase of the existing 132kV OHLs between Kendoon and Glenlee and from Glenlee to Tongland (the KTR Project).

⁸ Forestry Commission Scotland became Scottish Forestry as of 1st April 2019.

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 routeing, design and EIA stages as they progressed.

Wider Consultation

- 2.10 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 Members of Parliament (MP) and Members of the Scottish Parliament (MSPs).
- 2.11 Meetings were held with the above parties throughout the routeing, design and EIA process. In addition, further consultation and a number of other meetings took place between the EIA topic area specialists and consultees, and between SPEN and landowners and local elected members.

Gatecheck

- 2.12 Following the scoping process, the ECU undertook a further consultation in the form of a 'pre application EIA gatecheck exercise' in April 2019. Further consultation was undertaken with members of the SSLG who were asked to provide their views on SPEN's response to comments provided in the EIA Scoping Opinion, and to seek their views on the design of the KTR Project.
- 2.13 A final meeting with the ECU was undertaken in May 2020 to agree the date for submission of the applications for the KTR Project and logistics for provision of information and approach to consultation.

The EIA Team

- 2.14 LUC has coordinated the EIA and compiled the EIA Report and this NTS on behalf of 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.
- 2.15 In addition to coordinating the EIA, LUC prepared a number of the specialist assessment chapters as noted below, supported by specialist sub-consultants where necessary as detailed **Table 2.1**, all of whom are considered 'competent experts' as required by the EIA Regulations.
- 2.16 The design of the KTR Project was undertaken by SPEN, with input from the teams noted in **Table 2.1** to ensure that, where possible, environmental features and potential environmental effects were avoided through the design and EIA process.

Table 2.1: Responsibilities for the EIA Report

EIA Report Chapter	Organisation Responsible	
Landscape and Visual Amenity	LUC	
Forestry	RTS Forestry	
Geology, Hydrology, Hydrogeology, Water Resources and Peat	Kaya Consulting Limited (Hydrology, Hydrogeology, Water Resources)	
	Fluid Environmental Consulting and east point geo (Geology and Peat)	
Ecology	LUC	
Ornithology	Natural Research Projects Limited	
Cultural Heritage	CFA Archaeology Limited	
Traffic and Transport	Mott MacDonald	
Noise	Hoare Lea	
Socioeconomics, Tourism and Recreation	Peter Brett Associates	

EIA Report Chapter	Organisation Responsible	
Other Issues	National Grid (Electric and Magnetic Fields) LUC (Dust)	 

3 Where is the KTR Project Located?

- 3.1 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 of the KTR Project 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. The location of the KTR Project is shown in **Figure 1**.
- 3.2 The area within which the northern section of the KTR Project is located is mainly 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, west 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. The southern reaches of the area within which the KTR Project is located are predominantly rural in nature and are characterised by a pattern of farmland and scattered coppices of deciduous woodland.
- 3.3 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.

4 How was the Route of the KTR Project Determined?

- 4.1 At the outset of the KTR Project, SPEN undertook a routeing study with the objective of identifying a *"technically feasible and economically viable"* route for a continuous 132kV OHL 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 OHL connections supported on trident wood poles from Carsfad to Kendoon, and from Earlstoun to Glenlee. The objective was to identify routes which *"on balance, cause the least disturbance to the environment and the people who live, work and enjoy recreation within it"*.
- 4.2 SPEN's approach to routeing the KTR Project was to adopt a 'blank sheet' approach which considered, but did not solely reflect, the route of the existing 132kV OHLs to ensure that all potential route options which best achieved the routeing objective were identified.
- 4.3 The methodology for the routeing study comprised a number of well-established steps, which were undertaken sequentially, with each step informing the next, leading to the confirmation of the 'preferred route' for each connection of the KTR Project. The outcome of each step was subjected to a technical review, and, where necessary, consultation, to ensure that SPEN and key stakeholders were confident with the findings prior to commencing the next step.
- 4.4 The identified route options were subject to a detailed appraisal using environmental criteria defined through desk based (and where possible field based) surveys of the Study Area, which continued to reflect the key considerations of the routeing methodology including length of route, landscape and visual amenity, ecology, cultural heritage and forestry.
- 4.5 Technical issues considered during routeing included physical constraints such as existing OHLs and crossings of public roads. Other factors including slope, altitude, access, large waterbodies and the location of other consented or proposed developments (including wind farms) were also taken into account.
- 4.6 The findings of the routeing process resulted in the 'preferred route' for each connection of the KTR Project which was subject to a formal consultation process in July 2016 with statutory and non-statutory consultees, landowners and members of the public to seek feedback.
- 4.7 Consultation responses received were taken into account when making modifications to the preferred route, culminating in a 'proposed route' for each new OHL which were progressed to EIA scoping and detailed design stage. The detailed design was led by SPEN and reviewed by LUC's environmental team and also landowners, with changes to the design being made to avoid/minimise environmental effects and meet landowner objectives for land use.
- 4.8 The final design of the KTR Project, including associated infrastructure such as accesses, quarries and construction compounds, which is the subject of the EIA and applications for section 37 consent and deemed planning permission, is shown in **Figures 2-6**.
- 4.9 The EIA Regulations also require that the main alternatives to the final project are considered and the details of these set out in the EIA Report and the following alternatives to the final design of the KTR Project were considered:
 - Alternative solution: restringing the existing overhead lines. This was not considered appropriate due to the age of the steel tower components, to ensure continuity of supply to existing customers, and due to the requirement to increase capacity of the network.
 - Alternative routes: as summarised within this Section of the NTS a routeing study was undertaken by SPEN to identify alternative route options for the overhead lines.
 - Undergrounding: further to a request from the ECU in the EIA Scoping Opinion, a detailed assessment of undergrounding of certain sections of the KTR Project was undertaken and is available on the SPEN website: www.spendgsr.co.uk.

- Alternative technology: use of two wood pole lines instead of a steel tower OHL for the G-T connection within Bennan Forest was suggested during consultation. This was not taken forward for safety, operational and maintenance reasons.
- Alternative design: Use of new 'T-pylon'. This was deemed to not be appropriate for the KTR Project as it is intended for larger 275kV OHLs.

5 What is the KTR Project and how will it be Constructed?

The KTR Project

- 5.1 The five new OHL connections of the KTR Project and the existing infrastructure of the N and R routes to be removed are illustrated on **Figures 2-6** and are described below.

Polquhanity to Glenlee (via Kendoon) (P-G via K)

- 5.2 A new 132kV OHL supported on steel towers 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 constructed OHL line which runs from Polquhanity to the existing New Cumnock substation, 3km north-east of Dalmellington. The P-G via K connection of the KTR Project also includes the removal of the existing N route and R route (north) and the undergrounding of sections of existing distribution OHLs. An overview of the P-G via K connection of the KTR Project is shown in **Figure 2**.
- 5.3 Minor works will be required at Kendoon substation to facilitate construction and operation of the KTR Project. This will include minor modifications to accommodate the terminal towers, extension to the fenceline, and creation of a temporary cranepad which will also require a temporary diversion of the existing access road into Kendoon to ensure unrestricted access for residents during the works.

Carsfad to Kendoon (C-K)

- 5.4 A new 132kV 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 wood poles. An overview of the C-K connection of the KTR Project is shown in **Figure 3**.
- 5.5 At Carsfad substation, minor modifications will be required to accommodate the new wood pole entry from Kendoon including removal and realignment of the existing palisade fence at the corner of the existing compound.

Earlstoun to Glenlee (E-G)

- 5.6 A new 132kV 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 wood poles. A short section of approximately 250m of underground cable will be required to connect into the Glenlee substation. During construction, three wood poles will require to be erected on a temporary basis to facilitate safe removal of the existing R route (north). Following its removal, the line will be diverted onto the final alignment. The E-G connection of the KTR Project is shown in **Figure 4**.
- 5.7 Minor modifications will be required at Earlstoun substation to accommodate the new wood pole entry from Glenlee.

BG Route Deviation (BG Deviation)

- 5.8 To facilitate construction and operation of the proposed OHL for the Glenlee to Tongland connection, the first five existing towers of the existing BG route will be moved approximately 40m north. 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 location of the existing towers which are currently part of the BG route will then form part of the proposed new Glenlee to Tongland circuit which will terminate within the proposed substation

extension at Glenlee. The BG Deviation 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 Deviation is shown in **Figure 5**.

Glenlee to Tongland (G-T)

- 5.9 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 steel towers. The G-T connection of the KTR Project also includes the removal of the existing R route (south). The G-T connection of the KTR Project is shown in **Figure 6**.
- 5.10 Works will be required at Tongland substation to accommodate the new circuits from Glenlee. This will include realignment of the existing palisade fence and changes to existing drainage arrangements.

Overview of Infrastructure

Steel Towers

- 5.11 Steel towers are proposed to be used for the P-G via K, BG Deviation, and the G-T connections of the KTR Project. The two main types of tower being used are the L7 and L4; the L7 towers carry 13 wires and the proposed L4 towers carry seven wires. The heights of the steel towers proposed for the KTR Project range from 23.16m to 39.09m. A typical L7 and L4 tower can be seen in **Photo 5.1** below.

Photo 5.1: Typical L7 Tower (Left) and Typical L4 Tower (Right)



- 5.12 The distance between steel towers averages between 200m and 300m but can be above 350m if there is a requirement to span a feature in the landscape such as a river or a loch. The distance between towers for the KTR Project range from 178.61m to 345.69m.
- 5.13 Towers are constructed using galvanised steel which, depending on weather conditions, will turn a dull grey colour after about 18 months. The majority of OHL components are maintenance free, although periodic painting of towers every 15 to 20 years will be required to prevent corrosion and deterioration of steelwork. Overhead transmission lines require refurbishment after

approximately 20 to 40 years and the towers themselves are expected to have a lifespan of approximately 80 years.

Wood Poles

- 5.14 Wood poles are proposed to be used for the C-K and the E-G connections of the KTR Project. The average wood pole height is 15m. The heights of the wood poles for the KTR Project range from 9.80m to 17.24m. **Photo 5.2** below shows a typical wood pole.

Photo 5.2: Typical Wood Pole



- 5.15 The distance between wood poles for the KTR Project vary from 45m to 180.70m.
- 5.16 New wood poles are dark brown in colour and weather over the years to a light grey. 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 and need to be refurbished or replaced after approximately 30 to 40 years.

Temporary Development

- 5.17 In addition to the KTR Project components detailed above, which are considered to be permanent for the purposes of the applications for section 37 consent and the EIA process, additional temporary infrastructure will be required during the felling and construction phase only. Land used for temporary development will be reinstated once the new OHLs of the KTR Project are operational and N and R routes removed.
- 5.18 Deemed planning permission is sought for the following additional components of the KTR Project comprising:
- **Forestry wayleave:** 40m either side of the steel towers and 35m either side of the wood poles will be required to be felled of trees for construction and operation of the KTR Project. Where commercial forestry is present, this will be required to be kept free of trees for the lifetime of the project⁹ however in other areas, such as broadleaf woodland, the extent of tree clearance within the wayleave is determined based on a detailed assessment of the type, age

⁹ It should be noted that within the 70m/80m wayleave corridor there is the opportunity to manage certain tree species to deliver biodiversity (ecological/ornithological) and/or landscape mitigation. This will primarily utilise lower growing or shrub tree species which have a low mature height or grow at such a slow speed that their overall height can be controlled by regular site visits and crown reduction. This will be targeted at specific areas where there is deemed to be either maximum environmental benefit in terms of creating suitable habitat for wildlife, or where the planting will provide landscape mitigation by reducing the linear appearance of the OHL.

and condition of trees in that location to minimise loss of trees. SPEN will undertake annual inspections throughout the lifetime of each the OHLs within the KTR Project, to ensure that no clearance infringements occur.

- **Timber stacking areas:** once trees are felled, the timber will be stacked at the forest roadside in timber stacking areas to await uplift by timber lorry to the appropriate market. A typical timber lorry and stacked timber is shown on **Photo 5.3**.

Photo 5.3: Typical Timber Lorry



- **Accesses and access tracks (including passing places and turning bays):** 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. Some of the access points will require access via bellmouth accesses from the public road. Access to every steel tower and wood pole of the KTR Project is required during construction and, where possible, the design has sought to incorporate the use of existing tracks (and bridges), with upgrading of these tracks where necessary. Where this is not possible, temporary tracks have been identified.
- **Quarries:** Stone is required for the construction and upgrading of the access tracks and working areas for the KTR Project. Seven quarries have been identified where stone will be excavated and processed prior to transportation to the point of use. It is anticipated that all stone required for the KTR Project can be provided from the seven quarries identified however the assessment has been undertaken on the assumption that stone will need to be imported to ensure that a maximum case has been assessed for effects on traffic and transport. A typical quarry processing plant is shown in **Photo 5.4**.

Photo 5.4: Typical Quarry Processing Plant

- **Construction compounds:** Six temporary construction compounds will be required for the storage of materials, and the siting of staff offices and other facilities. 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.
- **Watercourse crossings:** Where a new temporary access track is required to cross a watercourse, a temporary bridge will be utilised. For narrow burns, a mat of timbers will be used, supported by steel beams. For larger watercourses a steel plate decking including safety barriers will be used, supported by main support beams.
- **Working areas (around towers and wood poles):** 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 5.5** shows a typical working area.

Photo 5.5: Typical Working Area

- **Undergrounding of distribution voltage network:** 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 effects. In total, 251 wood poles are required to be removed from the existing OHL and the total length of OHL to be removed is approximately 12km and the replacement UGC will be approximately 13km. The existing wood poles are approximately 8-10m above ground.

Removal of N and R Routes

- 5.19 The N and R routes comprise the existing 132kV OHLs between Polquhanity and Kendoon (N route) and Kendoon and Tongland, via Glenlee (R route). The N and R route OHLs are currently supported on steel lattice towers ranging in height from 18.2m to 29.9m. An overview of the existing N and R (north and south) OHL routes are shown in **Figure 2** and **Figure 6**. The N and R routes which are proposed to be decommissioned and removed as part of the KTR Project total approximately 43.3km of existing 132kV OHLs. The OHLs consists of 169 towers in total; 11 towers for the N route and 158 towers for the R route.
- 5.20 Following operation of the KTR Project, the existing N and R routes will be decommissioned and removed. It is proposed that the decommissioning will be completed within 18 months of commissioning the new OHL components of the KTR Project.
- 5.21 The assessment of effects of the removal of N and R routes is considered within the assessments of the relevant connections of the KTR project which are effectively replacing N and R routes. The assessment of effects of the P-G via K considers the effect of the removal of the N route towers between Polquhanity and Kendoon and part of R route (north) between Kendoon and Glenlee. The assessment of effects of G-T considers the effect of the removal of the R route (south) between Glenlee and Tongland.

Construction Programme and Working Methods

Construction Programme

- 5.22 Subject to the granting of the consents and the fulfilment of associated conditions, construction is anticipated to commence in March 2022 and be completed in December 2026. The estimated construction periods for each connection are summarised in **Table 5.1** below¹⁰.

Table 5.1: 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)
Removal of N and R Routes	N: 01/09/2023 to 17/05/2026 (32 months) R: 02/09/2022 to 31/12/2026 (51 months)

Working Hours

- 5.23 Construction activities will be undertaken during daytime periods only. This will be 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). Any variations to the hours stated here will be agreed in advance with D&GC.

¹⁰ Within the programme there will be localised timing restrictions associated with breeding periods for protected species (including birds).

Construction and Decommissioning Environmental Management Plan

- 5.24 Prior to the construction of the KTR Project, SPEN will develop a detailed Construction and Decommissioning Environmental Management Plan (CDEMP) with its appointed contractors. Adherence to a CDEMP will ensure that any potential environmental effects associated with the KTR Project are minimised during the construction period and that all consent conditions and environmental legislation are complied with. The CDEMP also provides information on the overarching environmental principles and procedures which will be adhered to throughout the course of the works. Adherence to the CDEMP will be a contractual requirement of each contractor that SPEN engages on the KTR Project.
- 5.25 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).

Community Liaison

- 5.26 SPEN and the appointed contractors will 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.

Health and Safety

- 5.27 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 residents, construction workers, SPEN company operatives and the general public.
- 5.28 During construction activities will be managed within the requirements of The CDM Regulations 2015 and will not conflict with the Health and Safety at Work etc Act 1974.

Decommissioning

- 5.29 When the operational life of the KTR Project comes to an end, the OHLs 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.
- 5.30 An assessment of the decommissioning of the KTR Project 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.

6 How has the EIA been undertaken?

6.1 The EIA examined potential effects of the KTR Project on the following topics:

- Landscape and Visual Amenity;
- Forestry;
- Geology, Hydrology, Hydrogeology, Water Resources and Peat;
- Ecology;
- Ornithology;
- Cultural Heritage;
- Traffic and Transport;
- Noise;
- Socioeconomics, Tourism and Recreation; and
- Other Issues (Dust and Electric and Magnetic Fields (EMF)).

6.2 A summary of the methodologies applied to identify and assess likely significant effects is presented for topic area below.

6.3 Terms that are commonly used within the assessment include:

- **Effect:** Refers to the change in the existing environmental conditions that will result from the KTR Project during construction and operation (including removal of N and R routes). **Likely significant effects** are reported in the EIA Report. Effects can be adverse or beneficial.
- **Cumulative and combined effects:** Effects which may arise as a result of: i) interaction between, and combination of effects from, the KTR Project (e.g. the effect of changes to water quality on animal species nearby), as well as ii) effects of the KTR Project in combination with other future developments nearby (e.g. other OHL projects and wind farms¹¹).
- **Mitigation:** Refers to measures that will be taken to avoid or reduce significant adverse effects. A distinction is made between 'embedded mitigation' and 'additional mitigation'. Residual effects are those that remain following application of the additional mitigation.
- **Receptor:** Refers to elements of the natural and built environment and also people and communities that may experience effects – adverse or beneficial – as a result of the KTR Project. Examples of receptors include people, historic features, animal and plant species, watercourses etc.

6.4 To assist with interpretation of the assessment and identification of likely significant effects, potential effects are identified as **major, moderate, minor** or **none**. **Major** and **moderate** effects are considered to be **significant** in the context of the EIA Regulations.

6.5 The assessments were informed by desk studies, field surveys, and consultation where relevant, as set out in the topic area methodology overview below.

6.6 The Study Area for each topic has been defined separately to reflect the likely extent of any significant effects. For example, the Study Area for the traffic and transport assessment covers the local roads which will be used for vehicles during construction, whereas the Study Area for the ecology assessment covers the proposed infrastructure locations and relevant survey and assessment areas for habitats and species.

¹¹ The following wind farms were considered in the cumulative assessment: Blackcraig, Knockman Hill, Mochrum Fell, Little Sypland, Shepherds Rig, Troston Loch, Cornharrow, Glenshimmeroch and Fell.

- 6.7 The assessment methodologies for each topic are summarised below and the findings of the assessment are presented by connection, in Sections 7 to 11 of this NTS. The findings of the assessment of the KTR Project as a Whole are presented in Section 12 of this NTS.

Landscape and Visual Amenity

- 6.8 The assessment of effects on landscape and visual amenity considered potential effects on:
- landscape character and resources, including effects upon the physical elements, character and/or qualities of the landscape; and
 - views and visual amenity, including effects upon potential receptors (people) and viewing groups caused by change in the appearance of the landscape.
- 6.9 The assessment has been informed by the preparation of Zone of Theoretical Visibility (ZTV) mapping and visualisations prepared in accordance with good practice guidance from SNH and the Landscape Institute (LI).
- 6.10 The following effects have been scoped out of the assessment:
- Effects on views and visual amenity of visual receptors beyond a 5km radius from the KTR Project, and effects on the landscape character of the Study Area beyond a 3km radius, where it is judged that significant effects are unlikely to occur.
 - Effects on designated landscapes beyond a 3km radius from the KTR Project, from where it is judged that significant effects on key characteristics and/or special qualities, or views are unlikely to occur.
 - Effects on landscape and visual receptors that have minimal or no theoretical visibility (as predicted by the ZTV) and/or very distant visibility beyond the 5km Study Area.
 - Cumulative landscape and visual effects arising during the construction phase in conjunction with other developments beyond the KTR Project, given the distance between the KTR Project and the other developments and the uncertainty of construction timings.
 - Effects arising from the physical decommissioning and reinstatement activities involved with the removal of N and R Routes given the temporary nature and extent of these activities.

Study Area

- 6.11 Informed by an initial bare earth ZTV, the type of OHL infrastructure proposed, and professional judgement, a Study Area of 5km radius from the final steel tower and wood pole positions was agreed through consultation with statutory consultees. This was defined on the basis that at distances greater than 5km, significant effects on landscape character and visual amenity are unlikely to occur. A 10km radius Study Area was agreed for the consideration of potential cumulative landscape and visual effects arising in conjunction with other existing, consented and/or proposed developments.

Field Survey Work

- 6.12 Extensive field surveys were undertaken during the routeing phases of the KTR Project between 2014 and 2017 with further work undertaken in 2018 and 2019. Field survey work included visits to settlements, assessment viewpoints and designated landscapes, and extensive travel around the Study Area to consider potential effects on landscape character and views and visual amenity.

Assessment Methodology

- 6.13 The assessment methodology has been prepared in accordance with the principles contained within the Third Edition of Guidelines for Landscape and Visual Impact Assessment (GLVIA3). The key steps in the methodology for assessing both landscape and visual effects are as follows:
- As noted above, a 5km radius Study Area was defined based on professional judgement and agreed through consultation with D&GC and SNH.

- The extent from which the components of the KTR Project may be visible across the Study Area was established through creation of ZTVs informed by the type and scale of steel lattice tower and wood pole.
 - The landscape of the proposed KTR Project and surrounding Study Area were analysed in terms of baseline landscape character and overall sensitivity.
 - The visual baseline was recorded in terms of the different groups of people (visual receptors) who may experience views of the KTR Project, the locations where they will experience views and the nature of these views and existing visual amenity.
 - Viewpoints were selected to represent a broad range of views and types of viewer (receptor) likely to be affected by the proposed KTR Project connections. These were agreed through consultation with D&GC and SNH and visualisations have been produced from the agreed viewpoints and presented within the EIA Report. Sample visualisations have been provided for the following viewpoints within the NTS:
 - Visualisation 1: Viewpoint 5: B7000 west of Glenhoul Hill;
 - Visualisation 2: Viewpoint 7: Southern Upland Way near Waterside Hill;
 - Visualisation 3: Viewpoint 9: Mulloch Hill; and
 - Visualisation 4: Viewpoint 29: Barstobrick Hill (Neilson's Monument).
 - Likely significant effects, including potential cumulative effects, on landscape and visual receptors were identified.
 - The significance of landscape and visual effects was judged with reference to the sensitivity of the resource/receptor and the magnitude of change.
 - Potential mitigation measures (including the decommissioning and removal of N Route and R Route, undergrounding of distribution OHLs and re-planting of felled areas) which may influence the residual landscape and visual, including cumulative, effects were identified.
- 6.14 The assessment of landscape and visual effects considers both the sensitivity (combining judgements of susceptibility and value) and magnitude of change (combining judgements of size/scale, geographical extent, duration and reversibility) to arrive at an informed professional judgement on the significance of each landscape and visual effect assessed.
- 6.15 Temporary effects occurring during the construction phase are generally judged to be reversible or partially reversible, following the removal of construction related ancillary development and restoration of temporary disturbance areas (short-term, within 0-5 years). Effects arising during the operational phase are generally judged to be irreversible and will remain throughout the life of the KTR Project infrastructure (long-term, 5-80 years).
- 6.16 Levels of landscape or visual effect are identified as **none, minor, moderate** or **major**. **Major** and **moderate** effects are considered **significant** in the context of EIA Regulations.

Forestry

- 6.17 The assessment of effects on forestry considered potential effects on:
- long term loss of forest resource as a result of felling of trees within the 80m/70m 'wayleave' corridor, centred on the OHLs of each connection;
 - loss of broadleaf woodland including ancient woodland and native woodland as a result of felling of trees within the wayleave corridor;
 - temporary loss of forest resource associated with the felling of trees for the creation of temporary construction compounds, quarries and construction access tracks; and
 - effects on forest management during construction and operation.
- 6.18 A number of potential effects were scoped out of detailed assessment for all connections, including:
- Effects on areas used by sheltering animals, an effect which is more usually attributed to the removal of agricultural shelterbelts in more exposed upland locations. Whilst partial removal

of some shelterbelt woodlands is proposed as part of construction of the KTR Project, there would be sufficient residual shelter in the area and no effects are therefore likely to occur.

- Effects on deer stalking are unlikely as there will be extensive woodland areas not affected by the KTR Project which will be available for deer stalking during the felling/ construction phase.
- Felling is also required outwith the wayleave corridor to reduce the risk of trees adjacent to the wayleave being blown over by the wind ('windthrow'). SPEN has no control over felling and replanting in these areas but 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 landowner to Scottish Forestry (SF) (on behalf of the Scottish Ministers). The felling permission will require that these areas are replanted, and as such, effects associated with felling outside of the wayleave have been scoped out of detailed assessment as there will be no loss to the overall forest resource in the long-term.
- Cumulative effects have been scoped out as the other projects in the Study Area for assessment of cumulative effects are all wind farms, and it is reasonable to assume that there will be no residual loss of woodland associated with these wind farm projects as the developers will require to undertake compensatory planting for any areas of felling.

Study Area

- 6.19 The Study Area in relation to effects of the KTR Project on forestry includes all woodland directly affected by the construction and operation of the KTR Project (i.e. within the 80m/70m wayleave corridor).
- 6.20 For the purposes of the assessment, effects have been assessed in the context of the local forest resource which is considered to be appropriately represented by the area within 20km of the KTR Project. This area is representative of forest cover and land uses for the larger regional forest resource within south-west Scotland. By undertaking the assessment within this Study Area it also allows a maximum case scenario to be presented, as undertaking the assessment at the regional level would reduce the percentage of woodland area affected by the KTR Project.
- 6.21 The Study Area comprises large tracts of commercial forestry as well as blocks of broadleaf woodland and smaller scattered shelterbelts, several areas of which are classed as ancient woodland or semi-natural ancient woodland.
- 6.22 The majority of the commercial forestry within the area which will be affected by the felling of trees within the wayleave corridor is owned by Forestry Land Scotland (FLS) (constituting approximately 60% of the forestry within which the KTR Project is proposed), with a number of private landowners owning the remaining forestry.

Field Survey Work

- 6.23 Field surveys were undertaken between August 2016 and April 2019 to supplement and verify desk-based work and consultations with forestry landowners and Scottish Forestry and to further inform the assessment. The surveys comprised walking (where forest density allowed) along each of the proposed OHL connections which comprise the KTR Project. Forest characteristics including forest type and detailed descriptions of the area, age, species mix and stocking density, together with length of proposed connection passing through the forest, were recorded. A general assessment of site conditions was undertaken to inform the prediction of the likely risk of windthrow to the trees outwith the wayleave corridor. This was based on the professional judgement of the forestry surveyor and took into account the current forest, including an assessment of age, species and height of the trees. In addition, a range of site conditions were considered, including aspect, altitude and soil type.

Assessment Methodology

- 6.24 The approach to assessing the significance of effects comprised the following stages:
- establish the existing conditions;
 - identify likely forestry effects and assess their significance;

- where likely significant effects were identified, identify additional mitigation measures to avoid, reduce or mitigate such significant effects; and
 - assessing the significance of the residual effect following application of the additional mitigation measures.
- 6.25 The significance of an effect on forestry derives from the combination of the sensitivity of the forestry and the extent/degree of change to the forestry, i.e. the magnitude of effect.
- 6.26 As there are no published criteria, guidance or methodologies in relation to the assessment of significance of effects on forestry, the assessment is necessarily based on professional judgement informed by available forestry plans (and supporting information), field work, local management experience and consultation.
- 6.27 Due to the inherent differences between the types of forestry effect, where possible, sensitivity and magnitude criteria have been identified using professional judgement and these have been combined to identify the significance of the effect.
- 6.28 For some effects e.g. effects on forestry management during construction and operation, sensitivity and magnitude criteria are not appropriate therefore a judgement of significance has been made based solely on professional judgement.
- 6.29 All effects are considered and presented as either **significant (major or moderate)** or **not-significant (minor or none)** in the context of the EIA Regulations.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

- 6.30 The assessment of effects on geology, hydrology, hydrogeology, water resources and peat considered potential effects on:
- Surface and ground water quality and private drinking water supplies during construction of the KTR Project and decommissioning of N and R routes.
 - Effects on channel morphology (bank erosion and channel form) during construction of the KTR Project and decommissioning of N and R routes.
 - Effects during construction on runoff rates and flood risk.
 - Effects during construction on groundwater dependent terrestrial ecosystems (GWDTEs)¹².
 - Direct loss and/or indirect disturbance of peat during construction. Direct losses of peat occur where peat is excavated and cannot be appropriately re-used. Indirect peat loss occurs where temporary infrastructure covers the vegetative peat surface or activities near the peat, such as excavation and drainage can dry the peat out¹³.
 - Effects on hydrology/flood risk during operation.
 - Peat Slide Risk during construction (assessed for G-T only).
- 6.31 A number of potential effects were scoped out of detailed assessment for all connections, including:
- Effects on bedrock geology during both construction and operation.
 - Changes to public/private water supply yield because of changes to runoff rates and volumes during both construction and operation.
 - Operational effects on surface water quality and PWS.
 - Cumulative effects on water quality and hydrology during construction and operation taking into account other development proposals in combination with each of the KTR Project connections. There are a number of wind farm developments within the Water of Ken/River Dee catchment area, which all drain (indirectly) into the Water of Ken/River Dee. On the basis

¹² GWDTEs were only found to be present in the P-G (via K) and G-T connections, so effects on GWDTE are only assessed for these connections.

¹³ Due to the absence of peat on the BG Route Deviation, effects on peat were not assessed for this connection.

that these wind farm schemes have been appropriately designed and will be constructed in line with Scottish Planning Policy (SPP) and national guidelines with respect to Sustainable Drainage Systems (SuDS) and pollution control and conditions of planning permission/consent, there will be no cumulative effect on downstream catchments.

- Cumulative effects on peat, on the basis that the other developments i.e. wind farms have followed best practice guidance, avoided deep peat where possible, can appropriately re-use/reinstate any excavated peat and will be constructed in line with any relevant planning permission/consent conditions.
- Effects on peat during the operational phase.

Study Area

Hydrology

- 6.32 The KTR Project is located mainly within the Water of Ken and River Dee catchment. The Study Area for the assessment of effects on hydrology comprises the KTR Project infrastructure and 100m and 250m buffer zones¹⁴ from infrastructure and the watercourses and catchments located upstream and downstream.
- 6.33 The KTR Project passes over several major tributaries of the Water of Ken/River Dee including the Water of Deugh, which enters the Water of Ken at Kendoon, the Coom Burn, Polharrow Burn and Kenick Burn, as well as numerous other smaller watercourses. These are all within the larger River Dee catchment. The River Dee (at Tongland) drains a catchment area of 899km² and most of the KTR Project infrastructure is located within the River Dee catchment. A small section of the KTR Project is within the Tarff Water catchment. The Tarff Water catchment is smaller, draining a catchment area of 60km²; several small sections of the KTR Project G-T connection lie within the Tarff Water catchment.
- 6.34 The internationally designated Loch Ken and River Dee Marshes SPA (and Ramsar Site) is located within the Water of Ken/River Dee catchment, downstream of the KTR Project infrastructure. This site is designated for its wintering Greenland white-fronted goose and greylag goose populations. The site is also designated as a Site of Special Scientific Interest (SSSI) and the catchment supports important salmon and trout populations.

Private Water Supplies

- 6.35 Information on PWS sources and supplied properties within 1km of the KTR Project was obtained through consultation with D&GC, a review of data from the Drinking Water Quality Regulator of Scotland online map¹⁵, and site visits where possible.

Peat

- 6.36 The Study Area for potential effects on peat was focussed on the KTR Project infrastructure locations. Generally, peat deposits greater than 1m deep are primarily located along the route of the G-T connection. No peat is located along the BG Deviation.

Field Survey Work

- 6.37 Field surveys were undertaken along the length of the proposed KTR Project to obtain baseline information and inform constraints mapping for location of infrastructure. The main aims of the field survey were to:
- identify, photograph and measure all existing and proposed watercourse crossings;
 - identify and map other water features such as wetlands and springs;
 - gain an overview and understanding of areas identified as floodplain within the SEPA Flood Maps;

¹⁴ SEPA Guidance for assessing impacts of development on GWDTEs recommends a 250m buffer zone from all excavations deeper than 1m and a 100m buffer for excavations less than 1m deep. SEPA Guidance for assessing impacts of development proposals on groundwater abstractions and PWS a 250m buffer zone is used for all new OHL infrastructure, including tracks.

¹⁵ <http://dwqr.scot/private-supply/pws-location-map/>

- ground truth identified water supplies to see if supplies exist and to identify the type of supply; and
 - provide general overview of landscape, topography and land cover of importance to hydrology.
- 6.38 Peat depth surveys were undertaken along the route of the proposed new OHLs and associated infrastructure (access tracks, construction compounds, quarries etc) where available mapping¹⁶ indicated that there was a potential for peat deposits to be present. Peat was shown to be absent for BG Deviation, so no peat probing was undertaken along the route of this connection.
- 6.39 Peat depth surveys were undertaken between 2017 and 2019 to gather baseline information, inform constraints mapping and design and to allow quantitative information to be gathered for the draft Outline PMP and Peat Slide Risk Assessment. Whilst the KTR Project has been designed to minimise disturbance to peatland, it has not been possible to avoid these areas entirely.

Assessment Methodology

- 6.40 The sensitivity of hydrological and geological features was determined through consideration of their physical attributes, processes affecting them (e.g. flood risk) and, in the case of waterbodies, water quality, and in the case of peat, depth and extent of modification. The magnitude of change was assessed based on a number of criteria informed by professional judgement and experience of other similar assessments.
- 6.41 The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity of receptor and magnitude of change. **Major** and **moderate** effects are considered **significant** in the context of the EIA Regulations.
- 6.42 The assessment was undertaken assuming 'embedded mitigation' relating to best practice and industry standard measures for construction of projects of this nature is in place and is effective e.g. treatment and attenuation of runoff from construction working areas to ensure that this does not wash into watercourses and cause pollution downstream. Where necessary, further 'additional mitigation' measures have also been identified.
- 6.43 Consultation was undertaken with D&GC Flood Risk Management Team and Environmental Health Officer, SEPA and the ECU throughout the assessment.

Ecology

- 6.44 Informed by consultation, the location of the KTR Project and extensive field survey, the ecology assessment considered the following potential effects:
- construction effects on designated sites;
 - construction effects on habitats of conservation concern¹⁷;
 - construction effects on the following protected species populations:
 - pine marten;
 - red squirrel;
 - badger;
 - otter; and
 - bats.
- 6.45 A number of potential effects were scoped out of detailed assessment for all connections, including:
- operational effects on all ecological features as all effects are expected to occur during the construction/decommissioning of the OHL;

¹⁶ Soils map of Scotland, the British Geological Survey map of superficial deposits or the SNH Carbon and Peatland 2016.

¹⁷ As listed in Annex 1 of the Habitats Directive; the Scottish Biodiversity List and the Dumfries and Galloway Biodiversity Action Plan.

- construction effects on common and widespread habitats as only habitats of conservation concern are assessed;
- construction effects on water vole as no evidence of water vole was recorded during the field surveys;
- construction effects on great crested newt (GCN) due to the lack of suitable habitat within the Study Area; and
- construction effects on fish and aquatic invertebrates as standard embedded mitigation measures will ensure protection of watercourses, fish and aquatic invertebrates.

Study Area

6.46 The Study Area for the ecology assessment varied by ecological feature, as defined by best practice as detailed below:

- **Statutory designated sites and non-statutory designated sites:** desk-based studies undertaken for the footprint of the KTR Project, the wayleave, and areas outside wayleave proposed for windthrow management (plus 5km buffer).
- **Habitat and vegetation:** the footprint of the KTR Project, the 70m/80m wayleave, windthrow areas and further 100m buffer (i.e. 180m corridor) for steel lattice tower OHLs, 170m corridor for wood pole OHLs and 100m for existing N and R routes.
- **GWDTes:** all proposed areas requiring excavation, plus 250m buffer for >1m deep excavations, or 100m buffer for <1m deep excavations.
- **Protected species:** available protected species data was collected for the footprint of the KTR Project plus 2km buffer of the wayleave and windthrow areas. Field surveys were undertaken for the footprint of the KTR project, the wayleave, windthrow areas and further buffer, up to 200m from wayleave, as defined by best practice methods as detailed below.
- **Fish:** representative sampling points where infrastructure crosses watercourses and downstream locations.

Field Survey Work

6.47 The following field surveys were undertaken to inform the final design of the KTR Project and ecological assessment:

- habitat surveys;
- Protected species surveys, including detailed searches for signs of¹⁸:
 - pine marten;
 - red squirrel;
 - badger;
 - otter;
 - water vole;
 - bats; and
 - GCN (Habitat Suitability only); and
 - fish (primarily Atlantic salmon and trout)¹⁹.

6.48 All ecology surveys were undertaken over a two-year period, 2017-2019, in appropriate conditions and, where necessary, appropriate seasons.

¹⁸ It should be noted that assessments for all species were not undertaken for all connections of the KTR project due to presence/absence of the species in the relevant Study Areas.

¹⁹ Fish surveys were undertaken by Galloway Fisheries Trust in September 2017. On the basis that embedded mitigation measures will be put in place during construction (e.g. buffers from riparian corridors and pollution prevention measures) there will be no significant effects on aquatic receptors, such as salmonids. This approach to aquatic mitigation will also address any biosecurity concerns around aquatic invasive non-native species, such as American signal crayfish. As such, these aquatic receptors were not assessed in detail.

Assessment Methodology

- 6.49 The ecology assessment was based on methods described in 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Marine, and Coastal. Chartered Institute Ecology and Environmental Management (CIEEM) (2018).
- 6.50 The guidelines recommend that the 'importance' of a given site in relation to each of its ecological features is determined within a defined geographical context e.g. international, UK/national, regional, county, local, and Study Area.
- 6.51 Following the identification of ecological importance of a feature, potential effects were identified. This process involved the study of each of the proposed new OHLs and OHLs to be decommissioned (N and R routes), construction methods and timescales to identify the pathways by which ecological features may be affected. Potential direct and indirect effects were grouped into the following broad types:
- direct habitat loss;
 - severance (disruption of ecological processes through fragmentation, isolation and barriers);
 - mortality (loss of life to faunal species or populations, including designated site qualifying features, through direct contact or following pollution events, etc.); and
 - disturbance (disruption to ecological processes through increased human presence, noise, vibration, etc.).
- 6.52 To determine significance, effects were considered with reference to whether they are positive or negative, the extent, the magnitude, the duration and frequency of effect, and whether it is considered to be reversible or not.
- 6.53 A degree of confidence, based on professional judgement, was used to assess the likelihood of an effect occurring i.e. 'certain/near certain' is estimated at $\geq 95\%$, 'probable' is estimated at 50-90%; unlikely is estimated at 5-50%; and extremely unlikely is estimated at $\leq 5\%$.
- 6.54 An effect is considered to be significant if it has the potential to affect the integrity of a habitat or the conservation status of a species. Where significant effects are identified at the international/European/UK/National level, these are considered to be **major** effects. Effects which are significant at the regional and county level are **moderate**, and effects which are significant at the local and Study Area are **minor**. **Major** and **moderate** effects are considered '**significant**' in the context of the EIA Regulations.

Ornithology

- 6.55 The assessment of effects on ornithology has considered the potential effects associated with construction and operation of the KTR Project (including removal of N and R routes) as follows:
- a short-term reduction in breeding or wintering bird populations due to disturbance (during construction);
 - a long-term/permanent reduction in breeding or wintering populations due to direct loss of critical habitats (during operation);
 - a long-term/permanent reduction in breeding or wintering populations due to disturbance displacement resulting from maintenance activities or birds' perceived reductions in suitability of adjacent habitats (during construction and operation);
 - a long-term/permanent reduction in breeding or wintering bird populations due to collision mortality (during operation);
 - a long-term/ permanent reduction in breeding or wintering bird populations due to the loss of habitat critical for nesting or feeding (during construction and operation);
 - long-term/permanent reduction in breeding or wintering bird populations due to electrocution mortality (during operation); and

- cumulative effects with other nearby development proposals that are constructed during the same period, and/or with other developments which pose a potential mortality risk (during operation).
- 6.56 The assessment was undertaken for species which are considered to be of high and moderate Nature Conservation Importance (NCI) and for which (after the field and desk-based studies) a population is known to be present in the vicinity of the KTR Project²⁰. The species assessed were: whooper swan; Greenland white-fronted goose; greylag goose; hen harrier; goshawk; osprey; peregrine; red kite; honey-buzzard; barn owl; nightjar; golden eagle; curlew; and lapwing²¹.
- 6.57 It should be noted that assessments for all species were not undertaken for all connections of the KTR project due to presence/absence of the species in the relevant Study Areas. In addition, the following potential effects were scoped of detailed assessment:
- Long-term/permanent reduction in breeding or wintering bird populations due to direct loss of critical habitats for nesting or feeding through land-take for the towers and associated infrastructure. The areas of habitat potentially lost when considered with the size of the ranges of all these species, plus options to continue using the habitat mean effects are unlikely to be significant.
 - Effects on internationally and nationally designated sites: For all sites except the Loch Ken and River Dee Marshes SPA (and Ramsar Site) (and the component Parton to Crossmichael SSSI); this was agreed with SNH during the scoping stage.
 - Effects on all species considered to be of low NCI.

Study Area

- 6.58 The Study Area was defined with reference to the location of the route for each connection forming part of the KTR Project and encompasses a series of buffers of generally up to 2km radius as defined by SNH guidance and dependent on the sensitivity of the species assessed.

Field Survey Work

- 6.59 Baseline field surveys were carried out between October 2016 and August 2019. Information on bird flight activity was collected in targeted watches from a number of vantage points (VPs). Migration watch VPs (MWP)²² and focal VPs (FVPs) were located to provide views over the 500m buffer of the KTR Project in areas identified through the desk study and during consultation with SNH and the Royal Society for the Protection of Birds (RSPB) (including Laughenaghie & Airie Hills SSSI, Laurieston Forest, Loch Ken and River Dee Marshes SPA (and Ramsar Site)) where species of high or moderate NCI were considered likely to occur.
- 6.60 In addition, a number of other surveys were conducted: to identify breeding sites of scarce raptors and owls in appropriate buffers; to search for displaying male black grouse (1.5km buffer); to provide an inventory of breeding waders (500m buffer); and to locate singing ("churring") nightjar (2km buffer) and quantify their flight activity (500m buffer).
- 6.61 With the exception of the point where the existing R route (south) is located within the Loch Ken and River Dee Marshes SPA (and Ramsar Site), no surveys were required along the existing N and R routes. These areas will be surveyed at a time closer to the removal of the OHL to ensure breeding, foraging and roosting species are protected from disturbance where necessary during the decommissioning works.

²⁰ Species of high nature conservation importance include those listed on in Annex 1 of the EU Birds Directive, breeding species listed on Schedule 1 of the WCA, species listed on Schedule 1A and A1 of the WCA, and species cited in the qualifying features for international designated sites or notified features of national designated sites within 20km of the KTR Project. Species of moderate nature conservation importance include species cited on the BoCC 'Red list' or the IUCN 'Red list – Near Threatened' (IUCN, 2018), regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the KTR Project, and species present in regionally important numbers (>1% regional population).

²¹ All have high NCI with the exception of curlew and lapwing which are moderate.

²² A MWP is a vantage point location where watches are carried during the bird main migration periods (March and April, and September to early November only). A FVP can be used during other periods e.g. all winter, all year.

Assessment Methodology

- 6.62 The nature conservation importance of the species assessed was defined and considered in the context of the magnitude of effect determined by consideration of the spatial and temporal nature of each effect, as well as the conservation status of the affected population where data is available.
- 6.63 In accordance with EIA Regulations each effect is evaluated and classified as either **significant (major or moderate)** or **not significant (minor or none)**. Effects resulting in detectable changes in the conservation status of regional populations of NCI are automatically considered to be significant for the purposes of the EIA Regulations. Non-significant effects include all those which are likely to result in small to barely detectable (**minor**) or non-detectable (i.e. **none**) changes in conservation status of regional (and therefore national) populations.

Cultural Heritage

- 6.64 The assessment of effects on cultural heritage considered the potential effects associated with construction and operation of the KTR Project as follows:
- Direct effects during construction on cultural heritage assets, including potential for direct effects on heritage assets that lie within the 50m ILA. Heritage assets outwith the ILA will not be directly affected.
 - Direct effects on buried archaeological remains that potentially survive within the ILA.
 - Indirect (secondary/construction) effects on cultural heritage assets that could be affected by potential tree fall/felling in windthrow areas.
 - Effects during operation on the setting of cultural heritage assets with statutory and non-statutory designations within 5km of the KTR Project.
 - Direct cumulative effects during construction on cultural heritage assets associated with more than one connection of the KTR Project.
 - Cumulative effects during operation on the setting of cultural heritage assets within 5km of the KTR Project.
- 6.65 The following potential effects were scoped out of detailed assessment:
- Effects relating to the decommissioning and removal of the existing N and R Routes as agreed with Dumfries and Galloway Council's Archaeology Service (DGCAS)²³.
 - Direct effects during operation on cultural heritage assets.
 - Effects during construction on the settings of cultural heritage assets.
 - Effects during construction and operation on the setting of cultural heritage assets located more than 5km from the KTR Project.

Study Area

- 6.66 Two Study Areas have been defined for the assessment of effects of the KTR Project on cultural heritage assets:
- **Inner Study Area:** The ILA has been used to identify the potential for direct effects upon heritage assets arising from the KTR Project.
 - **Outer Study Area:** Potential indirect effects upon the setting of heritage assets are considered within 5km where there is likely to be visibility of one or more of the connections of the KTR Project.

²³ On the basis that potential effects associated with the decommissioning of N and R routes has been scoped out, references to the KTR Project as they relate to cultural heritage setting effects do not include this, and relate only to effects associated with the new OHL.

Field Survey Work

- 6.67 Field work was undertaken on a number of visits throughout 2017. The field survey was carried out for the 200m route corridor where the proposed OHL alignment crossed areas of open moorland, rough and improved pasture, and through semi-natural woodland. Areas of dense conifer plantation (commercial forestry) were excluded from the walkover survey due to access difficulties. However, targeted visits were made to inspect previously recorded heritage assets identified during the desk-based assessment that are located in areas of commercial forestry present at the time of the field survey, where access was possible.
- 6.68 The majority of the proposed new access track routes were covered by the field survey as they are located in the 200m field survey corridor. Some short sections of new track outside the 200m corridor and existing tracks have not been surveyed. Desk based data has been reviewed to inform the assessment for these areas, and it is intended that post-consent surveys of these areas will be undertaken where required.
- 6.69 Site visits to assess the character and sensitivity of the settings of the identified heritage assets in the Outer Study Area were also undertaken in 2017. These site visits focused on visiting those designated heritage assets that lie in close proximity to the KTR Project and are predicted to have at least theoretical visibility of one or more connections of the KTR Project.

Assessment Methodology

- 6.70 Cultural heritage assets are given weight through the designation process, ranging from high (i.e. sites of national importance) to negligible (i.e. sites of little or no importance). This information is combined with the potential magnitude of change. For direct effects this associated with the potential for disturbance or destruction to cultural heritage assets that could cause direct, adverse and permanent effects during construction. For operational effects, the magnitude of change considers the contribution of setting to the appreciation or understanding of a particular asset.
- 6.71 The sensitivity and magnitude of change are considered using professional judgement to arrive at a level of effect; effects of **major** or **moderate** significance are considered to be **significant** in the context of the EIA Regulations.

Traffic and Transport

- 6.72 The potential effects below have been considered for the individual connections comprising the KTR Project during construction, both for the KTR Project in isolation and cumulatively with committed schemes which are likely to utilise local roads at the same time:
- driver delay;
 - road safety; and
 - community effects (severance, pedestrian amenity / fear and intimidation, and pedestrian delay).
- 6.73 The following potential effects were scoped out of detailed assessment:
- Operational effects: as traffic associated with operation and maintenance will be infrequent and likely limited to an annual maintenance inspection with any further visits generally being the result of unplanned outages on the lines. These infrequent visits are unlikely to generate significant volumes of traffic.
 - Construction traffic noise: as traffic movements will be distributed over the existing road network and the proposed new accesses to be formed during the construction phase are of temporary/short duration, therefore no significant noise effects are anticipated to arise.
 - Potential effects on air quality resulting from construction traffic: on the basis that the KTR Project will be accessed via a number of geographically distinct roads and access points and therefore traffic related emissions will be diffused throughout the Study Area.

Study Area

- 6.74 The Study Area for traffic and transport is effectively the public road network in the vicinity of the KTR Project which will be used during construction of the new OHL connections and the decommissioning and removal of the existing N and R routes. Whilst a Study Area has not been defined on a distance basis, the public roads in the vicinity of the KTR Project which are proposed to be used during construction and operation of the KTR Project, and therefore those which have been assessed as part of this study, include: A77(Trunk), A76 (Trunk), A75(Trunk), A713, A762, A712, A711, A702, B795, B741, C13s, C45s, C31s, C50s, U137s, U133s, U107s, U103s, U1s, U2s, U3s, U34s, U43s, U62s and Gateside Road.

Field Survey Work

- 6.75 A number of traffic surveys and field visits were undertaken in 2018 and 2019. The field visits involved a drive through of the public road sections within the Study Area to identify potential constraints and upgrades necessary to accommodate the safe movements of construction traffic and review sensitive route sections. In addition, automatic traffic counts and non-motorised user surveys were undertaken at key locations throughout the Study Area to inform the assessment.

Assessment Methodology

- 6.76 Under the IEMA Guidelines²⁴ used to inform the assessment, road links may be categorised as 'specifically sensitive', where they are considered to be more vulnerable to changes to the volume or profile of traffic flows. Such locations could include 'accident blackspots', hospitals, and links with high pedestrian flows. Given the rural nature of the Study Area, and its proximity to the Galloway Forest Park which is promoted for recreational use, all routes have been treated as sensitive areas. As such, where the predicted increase in traffic volume exceeded 10% on routes to be used during construction, the effects were assessed in detail.
- 6.77 The magnitude of change has been calculated as the proportional change in traffic volume anticipated on each public road section within the Study Area. This calculation compares the forecast development traffic generation against the anticipated traffic baseline during the assumed construction years.
- 6.78 Quantitative assessments were undertaken alongside the application of professional judgement to determine whether or not the effects are considered to be of significance. **Major** and **Moderate** effects are **significant** in the context of the EIA Regulations.
- 6.79 The temporary effects of felling and construction will be mitigated through adoption of a regulated and approved Construction Traffic Management Plan (CTMP) and the assessment has been undertaken on the assumption that this, and the embedded measures set out within it, will be in place.

Noise

- 6.80 The assessment of effects on noise considered the following:
- effects associated with construction of the temporary works such as laying of underground cable for undergrounding of the existing distribution OHL (for P-G via K), access track and compound construction, quarrying and felling (including secondary effects due to windthrow felling);
 - effects associated with removal of the existing OHLs along the N and R Routes;
 - operational noise associated with the proposed new OHLs; and
 - cumulative effects of construction works and operational noise.
- 6.81 The following potential effects have been scoped out of detailed assessment:

²⁴ Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment (IEMA) (1993), Guidelines for the Environmental Assessment of Road Traffic, Guidance Notes No. 1 (referred to as 'the IEMA Guidelines').

- noise associated with the construction of wood pole and steel towers and commissioning of the KTR Project;
- noise associated with the removal of the wood poles of the existing 11kV OHL;
- noise associated with changes in road traffic flows on existing roads during construction and operation; and
- vibration caused during construction or operation of the OHLs (except for vibration associated with quarry blasting).

Study Area

- 6.82 Based on the proposed construction activities and assessment criteria considered, as well as experience of the assessment of construction and operation of similar developments, the potential for significant effects is considered unlikely beyond 300m. The Study Area for construction effects was therefore limited to 300m from all ancillary components of the KTR Project (i.e. temporary construction compounds, working areas, access tracks and areas of construction or decommissioning activity).
- 6.83 For operational noise, to provide a quantitative assessment of noise levels associated with the operation of the proposed new OHLs, locations representative of the closest noise-sensitive receptors were selected for each of the individual connections comprising the KTR Project. In most cases, these were properties already identified within the 300m Study Area; however, in some cases, additional properties outside this Study Area were selected to provide representative operational noise levels for certain individual connections.

Field Survey Work

- 6.84 A quiet rural character was assumed as a 'worst-case' basis for background noise, therefore no background noise surveys were considered necessary for construction noise.
- 6.85 For the assessment of operational noise, given the limited noise effects from a 132kV OHL, existing baseline noise levels were not required to be quantified through surveys at the properties studied. The only exception is the Stonebyres property, which currently has two OHLs (from the R Route (north)) which are proposed to be replaced as part of the P-G via K and C-K connections of the KTR Project. On this basis a background noise survey was undertaken to inform the detailed assessment. A noise meter was installed in the garden area of the property which allowed estimates to be made of levels of noise currently experienced at the property.

Assessment Methodology

- 6.86 Residential receptors are classed as high sensitivity, according to the classification system adopted for this assessment which has been informed by guidance contained in British Standard (BS) 5228-1. This provides guidance on a range of considerations relating to construction noise used to identify magnitude of effect related to level and duration of noise levels over set thresholds. The prediction methodology and typical emission levels for key noise-generating construction activities in the BS were also referenced. This was used to calculate potential worst-case noise levels at residential properties within the Study Area for different construction activities.
- 6.87 For operational noise, the magnitude of effect has been informed by the methodology of BS 4142 (2014, amended 2019). This BS provides an objective method for rating the likelihood of complaint from, or sources of sound of, an industrial and/or commercial nature.
- 6.88 The assessment has been undertaken on the basis that a number of embedded mitigation measures to minimise noise effects of construction will be in place, including adherence to best practice construction techniques and use of the quietest work practices where possible. Predictions of audible noise from transmission lines was undertaken based on available research and guidance given the dimensions and characteristics of the proposed conductors.
- 6.89 The predicted significance of the effect was determined based on professional judgement, considering both sensitivity of receptor and magnitude of change. **Major** and **moderate** effects are considered **significant** in the context of the EIA Regulations.

Socioeconomics, Tourism and Recreation

- 6.90 The assessment of potential effects on socioeconomics, tourism and recreation has considered the following:
- Labour market effects, namely employment creation and gross value added (GVA).
 - Effects on relevant business sectors, principally the energy (electricity transmission), forestry, construction, and tourism and recreation sectors (assessed for KTR as a Whole only as not considered likely to be significant at the scale of each individual connection).
- 6.91 The following potential effects were scoped out of detailed assessment:
- Visual amenity, traffic and noise effects on local residents, individual tourists and the local community as these effects are already assessed in other topics where relevant.
 - Effects on forestry and woodland resources (rather than on the forestry business sector), as these are considered in the forestry assessment.
 - Demographic and housing effects, as owing to a lack of any predicted need for migration to support, or migration as a consequence of, the KTR Project, there is no potential for such effects to be significant.

Study Area

- 6.92 The following Study Areas were used in this assessment:
- Two Socio-economic Study Areas were used to assess likely labour market and associated socio-economic effects on the forestry, energy and construction key business sectors; a Local Socio-economic Study Area comprising 30 minutes' drive-time of the KTR Project route and a Wider Socio-economic Study Area comprising the entire Dumfries and Galloway local authority. Beyond this any likely socio-economic effects would be limited and not significant.
 - A 10km Tourism and Recreation Study Area (5km each side of the proposed KTR Project) to assess likely effects on the tourism and recreation sector, visitor accommodation occupancy and access to recreational routes. Within the Tourism and Recreation Study Area a 4km Business Survey Search Area (2km each side of the proposed KTR Project route) was also used to identify tourism businesses located closest to the KTR Project and thus most likely to experience potential socio-economic effects.

Field Survey Work

- 6.93 A site visit was conducted across the Tourism Business Search Area in September 2018. 94 individual tourism businesses with publicly available contact details were identified and the Tourism Business Survey was conducted by telephone in autumn 2018. Follow-up Surveys were undertaken with additional tourism businesses within the Tourism Business Search Area which were subsequently identified through the survey.

Assessment Methodology

- 6.94 Sensitivity of the labour market was identified based on the availability of labour/skills. For wider socio-economic effects in terms of economic growth and the performance of key business sectors, sensitivity was determined with reference to the importance of the receptor likely to be affected and the susceptibility of the receptor to changes as a result of the KTR Project. The sensitivity of relevant socio-economic receptors was therefore defined on a case by case basis using relevant baseline information.
- 6.95 The assessment of likely tourism and recreation effects was undertaken for the following groupings:
- Designated walking and recreational routes;
 - Outdoor tourist destinations;
 - Hospitality;
 - Visitor Accommodation;

- Recreational activities in the open countryside; and,
 - Tourists travelling (by road) through the open countryside.
- 6.96 The magnitude of change associated with the construction and/or operation of the KTR Project on identified socio-economic, tourism and recreation receptors was determined based on likely changes to employment and the scale of likely effects on other receptors.
- 6.97 Likely employment effects were assessed on a quantitative basis and other likely socio-economic changes were examined qualitatively on a case by case basis.
- 6.98 A matrix-based approach was adopted to consider the sensitivity of identified receptors in combination with the likely magnitude of socio-economic change resulting from the KTR Project, informed by professional judgement.
- 6.99 For the purposes of the assessment, **major** and **moderate** effects are considered **significant** in the context of the EIA Regulations.

Other Issues

- 6.100 The assessment of effects associated with 'other issues', considered EMF exposure during operation of the new OHL, and construction effects on residential properties associated with dust.
- 6.101 The following effects were scoped out of detailed assessment:
- Potential EMF effects during construction, on the basis that EMFs are only produced when an OHL is energised with current flowing, therefore no EMFs will be produced during construction.
 - Dust effects during operation of the new OHLs of the KTR Project as there will be limited dust raising maintenance activities being undertaken and transport will be limited.
 - There are no hospitals, GP surgeries and schools within the 200m Study Area, therefore these were scoped out of the assessment of effects associated with dust.
 - The removal of the existing N and R routes, on the basis that the activities required to facilitate removal of the towers will have limited dust raising potential.
 - Dust effects on public roads associated with temporary construction traffic is not assessed on the basis that the KTR Project will be accessed via a number of geographically distinct roads and access points.

Study Area

- 6.102 The assessment of EMFs considers likely effects associated with the new OHLs; the EMFs produced by an OHL will be highest directly under the line and will rapidly decrease at increasing distance from the line.
- 6.103 The Study Area for dust has considered sensitive receptors (i.e. residential properties) within 200m of the KTR Project, including accesses, quarries and construction compounds etc.

Field Survey Work

- 6.104 No specific field survey work was undertaken for the assessment of other issues.

Assessment Methodology

- 6.105 The assessment of effects of EMFs was based on the final design of the KTR Project, giving consideration to proximity to residences and other sensitive land uses where relevant. Each line is assessed on the basis of its design, and in line with the Code of Practice on Compliance²⁵. Where OHLs comply with this guidance, effects are **not significant**.
- 6.106 The assessment of effects on dust took a risk-based approach to identifying the likelihood of dust emissions causing nuisance (including effects such as soiling of buildings and the potential for

²⁵ Department of Energy and Climate Change (2012). Power Lines: Demonstrating compliance with EMF public exposure guidelines. A voluntary Code of Practice. London.

effects on human health). Effect magnitude was identified based on the dust raising potential of the activities that will take place during construction of the KTR Project within 200m of residential properties. Professional judgement is used to consider how receptor sensitivity and effect magnitude combine to affect potential receptors. Dust effects which are predicted to have an adverse effect on the amenity of the receptor or on human health are considered significant in the context of the EIA Regulations.

Intra-Connection Effects

- 6.107 The assessment considers the intra-connection effects arising from each connection comprising the KTR Project i.e. the combined effects on a single receptor resulting from a number of separate effects caused by each connection of the KTR Project, including removal of the existing N and R route towers, as well as the intra-connection effects of the KTR Project as a Whole. An example of an 'intra-connection effect' would be where a particular property is affected by dust, noise and traffic disruption during construction, and where once operational there may be effects on visual amenity, with the combined result being greater than each individual effect alone.
- 6.108 The assessment focussed on the potential for nearby sensitive receptors (i.e. properties) to experience intra-connection and intra-KTR Project effects primarily relating to the effects associated with:
- visual amenity during construction and operation;
 - effects on PWS during construction;
 - construction traffic disturbance;
 - construction noise; and
 - dust from construction activities.
- 6.109 The following receptors were scoped out of the assessment:
- sensitive receptors (i.e. properties) common to more than one assessment but where effects are identified as 'none' in all assessments prior to mitigation; and
 - receptors considered in other chapters e.g. the ecology assessment of effects on protected species takes into account disturbance from construction noise etc. and therefore protected species are not considered as receptors that are likely to experience further 'intra-connection effects' or 'intra-KTR effects'.

Study Area

- 6.110 The Study Area for the assessment of 'intra-connection effects' and 'intra-KTR effects' is defined by the Study Areas of each of the individual environmental topic assessments, which are discussed in the relevant topics above, focussed on the identification of residential properties which may experience such effects.

Field Survey Work

- 6.111 No specific field work was undertaken to inform the assessment.

Assessment Methodology

- 6.112 The predicted significance of the 'intra-connection' and 'intra-KTR' effects was determined based on professional judgement, considering the extent to which a single receptor (i.e. residents as represented by residential properties) may be affected as a result of a combination of different effects during the construction and operation of the KTR Project. The assessments of 'intra-connection' and 'intra-KTR' effects consider how the residual effects for each topic may combine to affect a common receptor.

7 What are the Environmental Effects of the Polquhanity to Glenlee via Kendoon Connection of the KTR Project?

Polquhanity to Glenlee (via Kendoon) (P-G via K)

- 7.1 A new 132kV OHL supported on steel towers is required between Polquhanity (approximately 3km north of the existing Kendoon substation) and the existing Glenlee substation, via the existing Kendoon substation, where minor upgrading works are required. This proposed OHL, of approximately 10.1km in length, will connect to the recently consented and constructed OHL which runs from Polquhanity to the existing New Cumnock substation, 3km north-east of Dalmellington.
- 7.2 A number of sections of existing distribution OHL in the vicinity of the P-G via K connection are required to be undergrounded, and in some cases re-located, to facilitate the construction and operation of the P-G via K connection as part of the KTR Project. Some of this will be temporary and will be reinstated once the KTR Project is operational, and some areas will remain undergrounded as embedded mitigation for landscape and visual effects to avoid the creation of a localised 'wirescape' where distribution OHLs are located in close proximity to multiple KTR Project connections.
- 7.3 An overview of the P-G via K connection of the KTR Project is shown in **Figure 2**. The assessments of the effects of the P-G via K connection of the KTR Project also consider the removal of the N route towers between Polquhanity and Kendoon and part of R route between Kendoon and Glenlee (R route north).

Landscape and Visual Amenity

Existing Conditions

- 7.4 The landscape of the P-G via K connection is contained within the Dundough and Kenmure Valleys in the central area of the Galloway Glens known as the Glenkens Valley. The northern part of the V shaped valley is relatively narrow and becomes slightly wider after passing Kendoon. The shape of the valley and the landscape varies between more intimate enclosed areas near Knocknalling, and more open elevated moorland and farmland west of Earlstoun Loch and close to the settlement of St John's Town of Dalry. Land use at low elevations generally consists of farmland and mixed woodland, contrasting with dense conifer plantations and areas of open moorland at higher elevations.

Assessment Findings

- 7.5 Construction of the P-G via K connection will result in **moderate** (adverse, short-term) **significant** effects on the Upper Dale – Dumfries and Galloway Landscape Character Types (LCT) (165) for a localised area, reducing to **Minor** (adverse, short-term), **not significant** for the LCT as a whole.
- 7.6 **Significant** visual effects associated with the construction phase are also identified for the following locations (all adverse and short-term):
 - Viewpoint 1 (VP1): Layby on A713 near Polquhanity: **Major**;
 - VP2: Dundough at access to Polmaddy: **Moderate**;
 - VP4: Footbridge access to Kendoon: **Major**;

- VP5: B7000 west of Glenhoul Hill: **Moderate**;
- VP6: Layby on A713 near Knocknalling Wood: **Moderate**;
- VP7: Southern Upland Way near Waterside Hill: **Moderate**;
- VP8: Southern Upland Way near St John's Town of Dalry: **Moderate**;
- VP10: A762 north of Glenlee: **Moderate**;
- Dundough: **Moderate**;
- Kendoon: **Major**;
- St John's Town of Dalry: **Moderate**;
- P7: Karnak: **Moderate**;
- P8: Hawkrigg: **Moderate**;
- P46: Inverharrow: **Moderate**;
- P56: Waterside, Glenlee: **Moderate**;
- A713: **Moderate**;
- A762: **Moderate**;
- Southern Upland Way: **Moderate**; and
- Core Path 164: **Moderate**.

7.7 Once operational, **Moderate** (adverse, long-term) **significant** effects on the Upper Dale – Dumfries and Galloway LCT (165) are predicted to occur for a localised area, reducing to **Minor**, **not significant** for the LCT as a whole.

7.8 Significant visual effects are predicted at the following locations prior to mitigation, and where relevant, the additional mitigation and the residual effect is also summarised in **Table 7.1** below. All effects are considered to be adverse and long term.

Table 7.1: Likely significant Visual Effects during Operational Phase: Polquhanity to Glenlee via Kendoon (P-G via K)

Summary of Likely significant Visual Effects during Operational Phase: Polquhanity to Glenlee via Kendoon (P-G via K)		Additional Mitigation Measures	Likely residual Effect
VP1: Layby on A713 near Polquhanity	Moderate	Replanting of areas of additional windthrow felling.	Minor (adverse, long-term) and not significant
VP2: Dundough at access to Polmaddy	Moderate	None	Moderate
VP4: Footbridge access to Kendoon	Moderate	None	Moderate
VP6: Layby on A713 near Knocknalling Wood	Moderate	None	Moderate
VP7: Southern Upland Way near Waterside Hill	Moderate	None	Moderate
VP8: Southern Upland Way near St John's Town of Dalry	Moderate	None	Moderate
VP10: A762 north of Glenlee	Moderate	Replanting of areas of additional windthrow felling.	Minor
Dundough	Moderate	None	Moderate
Kendoon	Moderate	None	Moderate
P7: Karnak	Moderate	Replanting of areas of additional windthrow felling.	Minor

Summary of Likely significant Visual Effects during Operational Phase: Polquhanity to Glenlee via Kendoon (P-G via K)		Additional Mitigation Measures	Likely residual Effect
P8: Hawkrigg	Moderate (adverse, long-term) and	Replanting of areas of additional windthrow felling.	Minor
A713	Moderate	Replanting of areas of additional windthrow felling.	Minor
A762	Moderate	Replanting of areas of additional windthrow felling.	Minor

7.9 Significant cumulative landscape and/or visual effects likely to arise during the operational phase for the P-G via K connection at the following locations (all adverse and long-term):

- Upper Dale – Dumfries and Galloway LCT (165): **Moderate**;
- VP4: Footbridge access to Kendoon: **Moderate**;
- VP7: Southern Upland Way near Waterside Hill: **Moderate**;
- Dundough: **Moderate**; and
- Kendoon: **Moderate**.

Forestry

Existing Conditions

7.10 From the Polquhanity terminal tower, travelling south, the P-G via K connection enters into Polmaddy Forest which is owned by FLS and which is predominately mature commercial conifer at the northern end and then comprises areas of young broadleaf forest at the southern end, where it exits and passes over an area of open farmland. The wayleave corridor then passes through some small areas of riparian mature broadleaf woodland into Kendoon substation. This area of broadleaf woodland at the entrance to Kendoon power station is the only area of Ancient woodland within which this connection is proposed (0.18ha area of anticipated felling). On exiting Kendoon substation, the P-G via K connection passes over areas of open ground prior to crossing several sections of broadleaf woodland including at Knocknalling, Polharrow bridge and Barchock wood. North of Glenlee Substation at Hag Wood the P-G via K connection passes through an area of commercial conifer. The line then enters Glenlee substation passing over the Coom burn and a riparian area of broadleaf woodland.

Assessment Findings

- 7.11 Tree felling proposed for this connection incorporates 20.69ha of trees within the 80m wide wayleave corridor. It is also proposed that a further 20.90ha of forestry outwith the wayleave corridor would be clear felled to manage the potential for windthrow (albeit that, as noted above, SPEN has no control over implementation of proposals relating to windthrow, which would be managed in consultation with the landowners²⁶).
- 7.12 Further construction effects on forestry associated with this connection include the felling of 1.03ha of forestry for the creation of access tracks and the felling of 8.09ha of forestry for the creation/extension of a quarry within Polmaddie forest.
- 7.13 Within those areas to be felled are 9.36ha of broadleaf designated as Ancient and Semi-Natural Woodland (ASNW) and Native Woodland Survey of Scotland (NWSS). Within this total there is also 1.78ha of Plantations on Ancient Woodland Sites (PAWS) at Hag Wood also with an ASNW/NWSS designation.
- 7.14 The residual effects on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **moderate** and **significant**. Whilst SPEN will implement best practice in managing these areas and will seek to undertake replanting within the wayleave

²⁶ Or secured by Scottish Forestry.

corridor, this is subject to landowner agreement and therefore cannot be considered committed mitigation.

- 7.15 The residual effect associated with loss of broadleaf woodland including Ancient Woodland and Native Woodland Resource due to felling of trees within the wayleave corridor will be **moderate** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 7.16 The residual effect of loss of the forest resource associated with the felling of trees for the creation of temporary construction compounds, quarries and construction access tracks will be **moderate** and **significant**. Agreements between SPEN and the landowners will be in place which gives a high level of confidence that the replanting will take place, however as it's not directly under SPEN's control, the replanting cannot be considered committed mitigation.
- 7.17 Effects on forestry management during construction and operation will be **none** and **not significant**.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Existing Conditions

Watercourses and Surface Water

- 7.18 The main watercourses within the Study Area are the Water of Deugh, the Polmaddy Burn, the Polquhanity burn, the Water of Ken, Polharrow Burn, Glen Strand and the Coom Burn. There are also several small and unnamed watercourses within the Study Area. There are two relatively large lochs on the Water of Ken within the Study Area of this connection; Carsfad Loch in the north and Earlstoun Loch further south. There are several areas of wet, boggy ground and marshland within the Study Area.

Hydrology and Flood Risk

- 7.19 SEPA flood maps show some fluvial flooding associated with watercourses in the study area, including the Polmaddy Burn, the Water of Ken and the Polharrow Burn. Some proposed towers are within or close to SEPA's predicted 200-year event fluvial floodplain. SEPA flood maps identified several localised areas of predicted surface water (rainwater) flooding close to or within the P-G via K connection.

Watercourse Crossing

- 7.20 The P-G via K connection infrastructure has 90 watercourse crossings. Some watercourses are crossed more than once, either by existing access tracks, proposed new access tracks, the OHL itself or the 11kV distribution underground cable (UGC). Most watercourses to be crossed for this connection are generally small (<2.5m wide) except for the Polmaddy Burn which is around 20m wide at the OHL crossing location and the Water of Deugh, which is around 36m wide at the OHL crossing location. Polharrow Burn, Glen Strand and Garroch Burn/Coom Burn and the Glenlee Tailrace are also crossed by OHL.

Water Supplies, Discharge and Abstractions, and Services

- 7.21 There are 13 PWS source locations within 1km of the P-G via K connection and no licenced groundwater abstractions. The only Scottish Water pipework close to the P-G via K Connection is located in the roads at the Earlstoun and Glenlee substations. Locations of utilities will be confirmed prior to construction.

Water Quality and Protected Areas

- 7.22 Water Quality of the watercourses that have been classified by SEPA within the Study Area is as follows:
- The Polmaddy Burn: Bad ecological potential.
 - The Water of Ken downstream of Kendoon Loch to Earlstoun Loch and downstream of Earlstoun Loch: Bad ecological potential.

- Polharrow Burn: Poor ecological potential.
- Earlstoun Loch: Good ecological potential.
- The Coom Burn/Garroch Burn: Moderate ecological potential.

7.23 There are no water related designated sites within or close to this connection, however the Loch Ken and River Dee Marshes SPA (and Ramsar site) is located on the Water of Ken approximately 4km downstream of Glenlee.

Soils, Geology and Peat

7.24 The majority of the connection (including N and R route (north)) is underlain by brown earth with some areas of peaty gleys in the northern section between Polquhanity and Kendoon. Peat is generally 'not present' across much of the route P-G via K route but with some 'deep' peat (>1m in depth) in localised areas. Where peat depths were recorded, they were mostly located in sections within valleys and plateaus.

Groundwater

7.25 The majority of this connection (including N and R route (north)) is underlain by non-aquifers or low productivity aquifers that are generally without groundwater except at shallow depths.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

7.26 One area of moderately dependent (dominant) GWDTE habitat has been identified within this connection, at the northern extent of the OHL route.

Assessment Findings

- 7.27 Effects on water quality of downstream water bodies and watercourses as a result of construction of the P-G via K connection are predicted to be **minor** and **not significant**.
- 7.28 Effects on PWS are also assessed as **minor**, and with the implementation of additional mitigation in the form of monitoring before and after construction and provision of alternative water supplies if required at four PWS (i.e. High Carminnows PWS; Phail Barcris PWS²⁷; Carsfad Cottage PWS; and Waterside PWS) the effect will be reduced to **none** and **not significant**.
- 7.29 Effects on watercourse bank erosion and the form of channels, runoff rates and flood risk will be **none** and **not significant**. Construction works of the few towers that are located close to the Water of Ken floodplain will not take place when the river is in flood and the contractor will sign up to SEPA Floodline which provides advance warning for flooding in Dumfries and Galloway, including the Water of Ken.
- 7.30 Prior to the implementation of additional mitigation during construction, the assessment identified an effect on one localised GWDTE at the most northerly end of the P-G via K connection which was predicted to be of **moderate** significance. Proposed additional mitigation includes the replacement of material round the tower bases without compaction and ensuring the access track will have sufficient drainage to maintain water flows below the surface. With the implementation of this mitigation the significance of the residual effect on the GWDTE is reduced and considered to be of **minor** significance and therefore **not significant**.
- 7.31 Implementation of embedded mitigation measures including appropriate peat management techniques during construction will ensure that the potential effects on peat are **minor** and therefore **not significant**.
- 7.32 The effect of removal of the existing N and R route (north) towers will be **none** and **not significant**.
- 7.33 The effect of operation of the P-G via K connection on hydrology/flood risk will be **none** and **not significant**. In the few situations where towers are located within or close to the 200-year floodplain of the Water of Ken, they will be designed and constructed to be operational during floods, and to not impede water flow.

²⁷ The requirement at Phail Barcris will depend on the confirmed location of the borehole, which will be clarified at pre-construction stage.

- 7.34 Cumulative effects on geology, hydrology, hydrogeology, water resources and peat for the P-G via K connection were scoped out of detailed assessment.

Ecology

Existing Conditions

Designated Sites

- 7.1 There are no statutory designated sites within the proposed development footprint, wayleave or wider windthrow areas. The nearest statutory designated sites (<1km) are:
- Cleugh SSSI (approximately 800m east) designated for its lowland neutral grassland.
 - Hannaston Wood SSSI (approximately 900m west) designated for its lichen assemblages, upland oak woodland and neutral grassland.
 - Water of Ken Woods SSSI (approximately 700m west and 500m south-east) designated for lichen assemblages and upland oak woodland.
- 7.2 With the exception of the Water of Ken Woods SSSI, there is no structural or functional connectivity between the P-G via K connection and the statutory designated sites. The Water of Ken Woods SSSI comprises a series of units across a wider area of woodland. While the P-G via K connection does not cross any of the units, it does pass through woodland that provides connectivity between units.
- 7.3 Three distinct Ancient Woodland Inventory (AWI) sites are located within the wayleave. These are located immediately north of Kendoon substation, at Knocknalling wood and at Hag Wood.

Habitats

- 7.4 The north of the Study Area primarily comprises coniferous forest plantation. Open ground in the north of the Study Area is dominated by grassland. The southern part of the Study Area, from Kendoon to Glenlee, generally comprises typical agricultural habitats. The Study Area included a small part of the Knocknalling Wood and riparian woodland associated within the Water of Ken. All other wooded habitats are associated with watercourses or visual screening provision around substations. The majority of habitats within the Study Area are considered to be common and widespread.

Protected Species

- 7.5 Protected species surveys identified the presence of red squirrel, badger, otter and bats within the P-G via K Study Area. Whilst no evidence of pine marten was recorded, historic records and the presence of suitable habitat suggests that the species is present.

Assessment Findings

- 7.6 The potential effects prior to mitigation during construction on designated sites and habitats of conservation concern are considered to be **minor** and therefore **not significant**. Construction effects in relation to direct habitat loss, mortality and disturbance on pine marten, red squirrel, badger and bats are considered to be **minor** and therefore **not significant**. For severance a **minor positive** effect will occur for bats due to the potential to create new foraging opportunities in the Study Area through creation of the wayleave in forestry. Construction effects in relation to direct habitat loss, mortality and disturbance on otter are considered to be **none** and **not significant**.
- 7.7 Although the assessment did not identify any significant effects, a number of additional specific measures were identified to minimise any potential effects, including but not limited to:
- Limiting vegetation removal where possible and identifying areas within the wayleave where replanting can achieve mixed scrub/woodland habitats.
 - Pre-construction surveys, no more than six months prior to felling, to identify changes in baseline as well as the retention of trees with bat roost potential where possible.
 - Obtain protected species license from SNH where surveys suggest presence of resting sites.

- Sensitive timing of felling works to avoid the relevant breeding season of respective protected species (March to July for pine marten and red squirrel, November to June for badger and April to September for bats).
- Delivery of 'toolbox talks' to all workers on the site to advise them of what to do in the event that any protected species are found during the works.
- Preparation of Species Protection Plans for felling and construction phases, as part of the project's wider CDEMP. The Species Protection Plans will set out measures to protect all species covered by legislation in the UK.
- Presence of an Environmental Clerk of Works (ECoW) during all construction operations to provide ongoing support and monitoring. The ECoW role will be developed in accordance with current good practice guidelines.

7.8 As no operational or cumulative effects on ecological features are anticipated, these were scoped out of the detailed assessment.

Ornithology

Existing Conditions

Designated Sites

7.9 The P-G via K connection of the KTR Project does not intersect with any site that is designated at international or national levels for ornithological interests.

Wildfowl

7.10 Low levels of flight activity by greylag goose in the potential collision risk height for this connection were recorded.

Scarce Raptors and Owls

7.11 Red kite, osprey and peregrine all bred within the Study Area during the survey period. Only one osprey, one peregrine and two red kite nests were situated within the core survey area of the P-G via K connection. Low levels of flight activity at potential risk height by peregrine and red kite was recorded. No osprey or barn owl flight activity was observed.

Assessment Findings

7.12 For the P-G via K connection, no adverse effects are predicted during construction, operation, or removal of the existing N and R route (north) on any identified bird species within the Study Area (wildfowl, scarce raptors and owls i.e. greylag goose, osprey, peregrine, red kite and barn owl) prior to mitigation. Therefore, residual effects are judged to be **none** and **not significant**. No additional mitigation is required.

7.13 The assessment did not identify any cumulative effects on ornithology for the P-G via K connection.

Cultural Heritage

Existing Conditions

7.14 In total, 70 heritage assets have been identified within the P-G via K Inner Study Area. The majority of these relate to medieval or later rural land use. However, discovery of early prehistoric find-spots, including early prehistoric (Mesolithic) flint artefacts around the Water of Ken indicate the potential for other prehistoric remains to be present.

7.15 There are 61 heritage assets within 5km that have predicted visibility of the P-G via K connection. Of these, seven Scheduled Monuments, one Category A Listed Building, one Category B Listed Building, three ASAs, five Non-Inventory Designated Landscapes (NIDLs) and four Non-Statutory

Register (NSR) Sites, within 5km of the OHL, have settings that will potentially be affected by the P-G via K connection.

Assessment Findings

- 7.16 There are **no significant (major or moderate)** direct effects predicted on heritage assets resulting from the P-G via K connection. It is predicted that there would be **minor (not significant)** direct effects on eight heritage assets prior to mitigation (Knocknalling NIDL (34), Polharrow Burn ASA (165), two findspots (7 and 182), farmstead (21), a hay-ree (3), and enclosure (62) and a building (38)). There is also moderate to high potential for buried archaeological remains to survive in areas where the ground within the ILA has not been disturbed by modern commercial forestry activity. There are 39 other heritage assets within the ILA which will be avoided by construction works and effects on all other assets would be **none** and **not significant**.
- 7.17 Additional mitigation to prevent, reduce or offset the eight **minor** effects noted above is proposed, including preservation in-situ if remains are found, and archaeological investigations (i.e. watching briefs and excavations) in areas with high potential for buried remains. Following implementation of these measures, three **minor (not significant)** residual effects are considered likely on: Knocknalling Non-Inventory Designated Landscape (NIDL) (34), a former enclosure and Polharrow Burn Archaeologically Sensitive Area (ASA) (165).
- 7.18 Of the 21 assets with settings that will potentially be affected by the P-G via K connection once operational, **minor** adverse effects on eight heritage assets have been identified:
- Dalry, motte (SM1117);
 - Polmaddy, settlement (SM5391);
 - Bardennoch-Garryholm ASA (ASA12);
 - Polharrow Burn ASA (ASA14);
 - Knocknalling NIDL (MDG25539);
 - Garroch NIDL (MDG25541);
 - Earlstoun Castle NIDL (MDG25687); and,
 - Mackilston, cairn (MDG3865).
- 7.19 In 13 cases, the effects on the settings of the heritage assets have been assessed to be of imperceptible magnitude and the significance of the resultant effect assessed as being **none**.
- 7.20 **No significant** cumulative effects of the P-G via K connection, in combination with other existing and proposed developments in the vicinity, are considered likely.

Traffic and Transport

Existing Conditions

- 7.21 Sections of the A77, A76, A75, A713, A712, A711, A702, A762, B741, U1s, U2s and Gateside Road public roads will be used by construction traffic for the P-G via K Connection, all of which are currently operating under capacity. There are no notable crash clusters (accident 'blackspots') and there is no apparent safety problem specifically relating to vulnerable road users.

Assessment Findings

- 7.22 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the

CTMP is considered a 'live' document. The assessment has also taken account of road upgrades that will be undertaken for the Glenlee substation extension including infrastructure improvements to the A762 (between the A713 and the U2s) and on the U2s.

- 7.23 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** for the P-G via K connection and **not significant**.
- 7.24 Due to the implementation of the infrastructure improvements noted above and the CTMP, residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the KTR Project, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Existing Conditions

- 7.25 The Study Area is generally rural in character and background noise levels will likely vary according to specific conditions, particularly in relation to natural noise levels such as wind disturbed foliage and watercourse noise, as well as the varying influence of traffic on the road network in some cases. There are a number of highly sensitive receptor locations (i.e. residential dwellings) and a representative sample has been assessed for potential effects associated with construction and operation of the P-G via K connection.

Assessment Findings

- 7.26 Prior to mitigation, potential temporary **moderate** effects are predicted during construction of the P-G via K connection at High Carminnows, Stonebyres (Kendoon), Afric and Karnak. Additional mitigation is proposed in the form of limiting working hours at weekends, and therefore the effects will be reduced **minor** and **not significant**. All other effects will be at worst **minor** and temporary and not significant in EIA terms.
- 7.27 There are **no adverse significant** effects from operational noise from the proposed OHL for the P-G via K connection. Replacement of the existing N route OHL close to Stonebyres (between 239(N) and 240(N)) may result in a marginal decrease in operational noise once the existing infrastructure has been removed and the P-G via K connection is commissioned which would be a beneficial effect albeit not significant.
- 7.28 There are **no significant** residual cumulative effects due to the influence of the other proposed connections of the KTR Project or other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Existing Conditions

- 7.29 Existing settlements in close proximity to the P-G via K connection include the small settlements of Glenlee, Dundough and Kendoon. There are also smaller residential clusters, hamlets and farm buildings in the locality. A number of local roads are located in close proximity to this connection, including the A713 Galloway Tourist Route and Scottish Castle Route at Polquhanity, both of which are considered important for tourists travelling through the countryside. Other key roads with the potential to be affected by this connection are noted in relation to traffic and transport above. A number of Core Paths intersect with or overlap with proposed public road construction routes for the P-G via K connection of the KTR Project.

- 7.30 Tourism and recreation is recognised as an important component of the economy within Dumfries and Galloway and key tourism assets located within close proximity of the P-G via K connection identified include²⁸:
- Galloway Forest Park and Dark Sky Park;
 - Public footpath and footbridge access to Kendoon (east of A713);
 - Mulloch Hill, situated south-east of St John's Town of Dalry;
 - Numerous cultural heritage assets, including Scheduled Monuments and Listed Buildings; and,
 - Visitor accommodation.

Assessment Findings

- 7.31 No significant effects were identified during construction or operation of the P-G via K connection. **Minor adverse** effects were predicted for recreational access, designated walking and recreational routes and outdoor tourist destinations during construction. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**. No mitigation measures are proposed
- 7.32 During operation, **minor adverse** effects were identified for designated walking and recreational routes, outdoor tourist destinations, visitor accommodation and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 7.33 **No significant** cumulative residual effects are considered likely to arise from the P-G via K connection.

Other Issues

Existing Conditions

EMFs

- 7.34 EMFs and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons) and they occur naturally within the body and in the natural world. Energised high voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs.

Dust

- 7.35 There are 43 residential properties within 200m of the P-G via K connection and these are therefore judged to be potential receptors of dust emissions from the associated construction works and construction traffic movements.

Assessment Findings

EMFs

- 7.36 The P-G via K OHL would be fully compliant with Government policy in relation to EMF. Specifically, the EMFs produced would be below the relevant exposure limits, and the proposed OHL would comply with required policy and safety standards. Therefore, EMF effects resulting from the P-G via K would be **not significant**.

Dust

- 7.37 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the construction area are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised. Therefore, dust effects for the P-G via K connection will be **not significant**.

²⁸ Note that this is not an exhaustive list.

Intra-Connection Effects

Existing Conditions

- 7.38 Details of the existing conditions in relation to the topics where it is considered that there could be interactions that could result in 'intra-connection' effects on residential receptors are set out above (i.e. LVIA, hydrology, traffic, noise and dust).

Assessment Findings

- 7.39 No new significant effects have been identified over and above those associated with the main landscape, hydrology, noise, traffic and dust assessments for the P-G via K connection. As such, residual **major** effects (**significant**) were identified for three properties/property groups during construction and residual **moderate** effects (**significant**) were identified for nine properties/property groups during construction, all of which are primarily associated with the effects on residential visual amenity. **Moderate (significant)** effects were identified for ten properties/property groups once operational, primarily as a result of effects on visual amenity including a positive effect on one property associated with the removal of the existing R route. All other effects are **minor** or **none** (and **not significant**).

8 What are the Environmental Effects of the Carsfad to Kendoon Connection of the KTR Project?

Carsfad to Kendoon (C-K)

- 8.1 A new 132kV OHL, of approximately 2.6km in length, is required between the hydroelectric power station at Carsfad, where minor upgrade works are required, and the existing substation at Kendoon. The OHL will be supported on wood poles. An overview of the C-K connection of the KTR Project is shown in **Figure 3**.

Landscape and Visual Amenity

Existing Conditions

- 8.2 The landscape of the C-K connection is contained within the Dundegh valley, although much of this part of the valley is relatively open comprising Carsfad Loch and adjacent farmland elevated moorland. Tree cover is relatively sparse which generally allows for longer distance views along and across the valley. Settlements generally comprise individual residences and farmsteads and the hamlet of Kendoon.

Assessment Findings

- 8.3 During construction, no significant landscape effects are predicted. Two **moderate** (adverse, short term and **significant**) effects are predicted for VP4: Footbridge access to Kendoon and at the settlement of Kendoon during construction.
- 8.4 **No significant** landscape and visual effects are predicted during operation.
- 8.5 **No significant** cumulative landscape or visual effects are predicted during the operational phase.

Forestry

Existing Conditions

- 8.6 On exiting the Carsfad substation the wayleave corridor passes through nine small scattered areas of broadleaf woodland before entering Kendoon substation. These woodlands have a total area of 0.98ha of which 0.2ha is designated as ASNW/NWSS. Whilst care has been taken to minimise losses, it has not been possible to avoid the areas of ASNW/NWSS entirely for this connection. All felling outwith the wayleave corridor is broadleaf and is not at the risk of windthrow. No felling will be required for temporary access tracks.

Assessment Findings

- 8.7 The residual effect on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **moderate** and **significant**. Whilst SPEN will implement best practice in managing these areas and will seek to undertake replanting within the wayleave corridor, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 8.8 The residual effect associated with Loss of Broadleaf Woodland including Ancient Woodland and Native Woodland Resource due to felling of trees within the wayleave corridor will be **moderate** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting

within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.

- 8.9 Effects on forestry management during construction and operation will be **none** and **not significant**.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Existing Conditions

Watercourses and Surface Water

- 8.10 The main watercourse within the Study Area is the Water of Ken, as well as several small unnamed watercourses. With the exception of Carsfad Loch there are no other open water bodies of water (e.g. ponds, lochs) along this connection.

Hydrology and Flood Risk

- 8.11 SEPA flood maps show some flooding from the Water of Ken close to Kendoon. One proposed new wood pole is located close to or within SEPA's predicted 200-year floodplain in this area. There is no surface water (rain water) flooding predicted within this connection.

Watercourse Crossing

- 8.12 The C-K connection infrastructure has 13 watercourse crossings; several of the watercourses are crossed by both the OHL and access tracks at a similar location (as the access track parallels the OHL route). Most watercourses to be crossed are generally small (<2.5m wide) except for the Water of Ken, which is approximately 36m wide at the OHL crossing location.

Water Supplies, Discharge and Abstractions, and Services

- 8.13 There are 13 PWS source locations within 1km of the C-K connection and no licenced groundwater abstractions. There is no Scottish Water pipework close to the C-K Connection. Locations of utilities will be confirmed before construction.

Water Quality and Protected Areas

- 8.14 The Water of Ken downstream of Kendoon Loch has been classified by SEPA as Bad ecological potential in 2017. The Loch Ken and River Dee Marshes SPA (and Ramsar site) is located on the Water of Ken approximately 10km downstream of this connection. The River Dee catchment supports salmon and trout populations and the C-K connection drains indirectly to the Water of Ken/River Dee catchment.

Soils, Geology and Peat

- 8.15 Scottish Soil mapping shows the majority of the connection is underlain by brown earth with some areas peaty gleys in the northern section near Kendoon within the Water of Ken valley. Peat is generally not present across much of the C-K route.

Groundwater

- 8.16 The majority of this connection is underlain by non-aquifers or low productivity aquifers that are generally without groundwater except at shallow depths.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

- 8.17 There are no GWDTEs present in this connection.

Assessment Findings

- 8.18 Effects on water quality of downstream water bodies and watercourses as a result of construction of the C-K connection are predicted to be **minor** and **not significant**.
- 8.19 Effects on PWS during construction are assessed as **none** and **not significant**. However, monitoring before and after construction and provision of alternative water supplies will be put in place if required at the two properties within 250m of the C-K connection (Stroangassel Farm and Carsfad Cottage).

- 8.20 Effects on watercourse bank erosion and the form of channels, and runoff rates and flood risk will be **none** and **not significant**. The proposed wood pole that is close to the 200-year floodplain of the Water of Ken will be designed and constructed to be operational during floods, and to not impede water flow. Construction will not take place when the river is in flood. The contractor will sign up to SEPA Floodline which provides advance warning for flooding in Dumfries and Galloway, including the Water of Ken/River Dee.
- 8.21 Effects on ground-water levels and recharge during construction will be **none** and **not significant**, however additional mitigation will be put in place to avoid/minimise dewatering and physical-cut offs, to ensure this is maintained.
- 8.22 Implementation of appropriate peat management techniques during construction will ensure that the potential effects on peat will be **minor** to **none** and therefore **not significant**. In addition, further ground investigations will be undertaken to ensure that tracks are appropriately sited to avoid any localised areas of peat where possible.
- 8.23 The effect of operation of the C-K connection will be **none** and **not significant**.
- 8.24 Cumulative effects on geology, hydrology, hydrogeology, water resources and peat for the C-K connection were scoped out of detailed assessment.

Ecology

Existing Conditions

Designated Sites

- 8.25 There are no statutory designated sites within the proposed development footprint, or wayleave. The nearest statutory designated site (<1km) is Cleugh SSSI (approximately 600m east) designated for its lowland neutral grassland. There is no structural or functional connection between the designation and the C-K connection. One AWI site is located within the wayleave, which is located north of Kendoon substation.

Habitats

- 8.26 The C-K connection is primarily within agricultural land and the A713 is a dominant feature in the Study Area of this connection and runs almost entirely along its length. Continuous bracken dominates the area east of the road and grasslands to the west. The habitats in the north and south of the Study Area, surrounding the two substations, Kendoon and Carsfad, are broadleaved woodland areas with a number of buildings. The majority of the habitats within the Study Area were considered to be common and widespread.

Protected Species

- 8.27 Protected species surveys identified the presence of red squirrel, otter and bats within the C-K Study Area. Whilst no evidence of pine marten was recorded, historic records and the presence of suitably habitat suggests that the species is present. No evidence of badger was recorded.

Assessment Findings

- 8.28 The potential effects prior to mitigation during construction on designated sites and habitats of conservation concern are considered to be **not significant**. Construction effects in relation to direct habitat loss, severance and disturbance on pine marten and red squirrel are considered to be **none** and **not significant**. Effects on mortality for pine marten and red squirrel will be significant at the Study Area level and **minor** and therefore **not significant** in EIA terms for red squirrel, pine marten and bats. Construction effects in relation to direct habitat loss, severance, mortality and disturbance on otter are considered to be **none** and **not significant**. Effects of direct habitat loss, mortality and disturbance severance on bats will be significant at the Study Area level and therefore **minor** and **not significant** in EIA terms. Effects of severance on bats will be **none** and **not significant**.
- 8.29 Although the assessment did not identify any significant effects, a number of additional specific measures were identified to minimise any potential effects, including but not limited to:

- Pre-construction surveys, no more than six months prior to felling, to identify changes in baseline as well as the retention of trees with bat roost potential where possible.
 - Obtain protected species license from SNH where surveys suggest presence of resting sites.
 - Sensitive timing of felling works to avoid the relevant breeding season of respective protected species (March to July for pine marten and red squirrel and April to September for bats).
 - Delivery of 'toolbox talks' to all workers on the site to advise them of what to do in the event that any protected species are found during the works.
 - Preparation of Species Protection Plans for felling and construction phases, as part of the project's wider CDEMP. The Species Protection Plans will set out measures to protect all species covered by legislation in the UK.
 - Presence of an ECoW during all construction operations to provide ongoing support and monitoring. The ECoW role will be developed in accordance with current good practice guidelines.
- 8.30 As no operational or cumulative effects on ecological features are anticipated, these were scoped out of the detailed assessment.

Ornithology

Existing Conditions

Designated Sites

- 8.31 The C- K connection of the KTR Project does not intersect with any site that is designated at international or national levels for ornithological interests.

Scarce Raptors and Owls

- 8.32 One red kite nest was found in the core survey area of the C-K connection and low levels of flight activity by red kite were recorded.

Assessment Findings

- 8.33 For the C-K connection, no adverse effects are predicted during construction or operation on any identified bird species within the Study Area (scarce raptors and owls i.e. red kite) prior to mitigation. Therefore, residual effects will be **none** and **not significant**. No additional mitigation is required.
- 8.34 The assessment did not identify any cumulative effects on ornithology for the C-K connection.

Cultural Heritage

Existing Conditions

- 8.35 In total, 18 heritage assets have been identified within the C-K Inner Study Area. The majority of these relate to medieval or later rural land use. However, discovery of early prehistoric find-spots, including early (Mesolithic) prehistoric flint artefacts around the Water of Ken indicate the potential for other prehistoric remains to be present.
- 8.36 There are 22 heritage assets within 5km that have predicted visibility of the C-K connection. Of these, four Scheduled Monuments, three ASAs and three NIDLs, have settings that will potentially be affected by the presence of the C-K connection.

Assessment Findings

- 8.37 There are **no significant (major or moderate)** direct effects predicted on heritage assets resulting from the C-K connection. It is predicted that there would be **minor (not significant)** direct effects on three heritage assets prior to mitigation (Polharrow Burn ASA (165), a findspots (7) and a former farmstead (21)). There is also moderate to high potential for buried

archaeological remains to survive. There are nine other heritage assets within the ILA which will be avoided by construction works.

- 8.38 Additional mitigation to prevent, reduce or offset the minor effects is proposed, including pre-construction walkover surveys and archaeological investigations (i.e. watching briefs and excavations) in areas with high potential for buried remains. Following implementation of these measures, one **minor (not significant)** residual effect is considered likely on Polharrow Burn Archaeologically Sensitive Area (165).
- 8.39 Of the ten sites within 5km of the OHL which have settings that will potentially be affected by the C-K connection, **no significant (major or moderate)** effects have been predicted, one **minor** adverse effect is predicted on Polharrow Burn ASA and the effects on the other nine assets is assessed as **none (not significant)**.
- 8.40 **No significant** cumulative effects of the C-K connection, in combination with other existing and proposed developments in the vicinity, are considered likely.

Traffic and Transport

Existing Conditions

- 8.41 Sections of the A77, A76, A75, A713, A712, A711, A702, B741 and Gateside Road public roads will be used by construction traffic for the C-K Connection, all of which are currently operating under capacity. There are no notable crash clusters (accident 'blackspots') and there is no apparent safety problem specifically relating to vulnerable road users.

Assessment Findings

- 8.42 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the CTMP is considered a 'live' document.
- 8.43 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** for the C-K connection and **not significant**.
- 8.44 The residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the KTR Project, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Existing Conditions

- 8.45 The Study Area is generally rural in character and background noise levels will likely vary according to specific conditions, particularly in relation to natural noise levels such as wind disturbed foliage and watercourse noise, as well as the varying influence of traffic on the road network in some cases. There are a number of highly sensitive receptor locations (i.e. residential dwellings) and a representative sample has been assessed for potential effects associated with construction and operation of the C-K connection.

Assessment Findings

- 8.46 Prior to mitigation, potential temporary **moderate** effects are predicted during construction of the C-K connection at Carsfad Cottage, Kinross and Stroangassel Farm. Additional mitigation is

proposed in the form of limiting working hours at weekends, and therefore the effects will be reduced **minor** and **not significant**. All other effects will be at worst **minor** and temporary and **not significant** in EIA terms.

- 8.47 There are **no adverse significant** effects from operational noise from the proposed C-K Connection.
- 8.48 There are **no significant** cumulative effects due to the influence of the other proposed connections of the KTR Project or other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Existing Conditions

- 8.1 Existing settlements in close proximity to the C-K connection include the small settlements of Kendoon and Dundough. There are also smaller residential clusters, hamlets and farm buildings in the locality. A number of local roads are located in close proximity to this connection, including multiple stretches of the A713 Galloway Tourist Route and Scottish Castle Route. Other key roads with the potential to be affected by this connection are noted in relation to traffic and transport above. A number of Core Paths intersect with or overlap with proposed public road construction routes for the C-K connection of the KTR Project.
- 8.2 Tourism and recreation is recognised as an important component of the economy within Dumfries and Galloway and key tourism assets located within close proximity of the C-K connection include²⁹:
- Glenhoul Hill;
 - Public footpath and footbridge access to Kendoon (east of A713);
 - Numerous cultural heritage assets, including Scheduled Monuments and Listed Buildings; and,
 - Visitor accommodation.

Assessment Findings

- 8.3 **No significant** effects were identified during construction or operation of the C-K connection.
- 8.4 **Minor adverse** effects were predicted for designated walking and recreational routes and outdoor tourist destinations during construction. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**. No mitigation measures are proposed.
- 8.5 During operation, **minor adverse** effects were identified for designated walking and recreational routes, outdoor tourist destinations, visitor accommodation, and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 8.6 **No significant** cumulative residual effects are considered likely to arise from the C-K connection.

Other Issues

Existing Conditions

EMF

- 8.7 EMFs and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons) and they occur naturally within the body and in the natural world. Energised high voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs.

²⁹ Note that this is not an exhaustive list.

Dust

- 8.8 There are 16 residential properties within 200m of the C-K connection and these are therefore judged to be potential receptors of dust emissions from the associated construction works and construction traffic movements.

Assessment Findings*EMFs*

- 8.9 The C-K OHL would be fully compliant with Government policy in relation to EMF. Specifically, the EMFs produced would be below the relevant exposure limits, and the proposed OHL would comply with required policy and safety standards. Therefore, EMF effects resulting from the KTR Project would be **not significant**.

Dust

- 8.10 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the construction area are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised. Therefore, dust effects for the C-K connection will be **not significant**.

Intra-Connection Effects**Existing Conditions**

- 8.11 Details of the existing conditions in relation to the topics where it is considered that there could be interactions that could result in 'intra-connection' effects on residential receptors are set out above (i.e. LVIA, hydrology, traffic, noise and dust).

Assessment Findings

- 8.12 No new significant residual effects have been identified over and above those associated with the main landscape, hydrology, noise, traffic and dust assessments for the C-K connection. There is one residual **moderate (significant)** effect during construction which is primarily associated with effects on visual amenity and all other effects during construction and operation are **minor (not significant)**.

9 What are the Environmental Effects of the Earlstoun to Glenlee Connection of the KTR Project?

Earlstoun to Glenlee (E-G)

- 9.1 A new 132kV OHL, of approximately 1.6km in length, is required between the hydroelectric power station at Earlstoun where minor works are required, and the existing substation at Glenlee. The OHL will be supported on wood poles. A short section of approximately 250m of underground cable will be required to connect into the Glenlee substation. During construction, three wood poles will require to be erected on a temporary basis to facilitate safe removal of the existing R route (north). Following its removal, the OHL will be diverted onto the final alignment. The E-G connection of the KTR Project is shown in **Figure 4**.

Landscape and Visual Amenity

Existing Conditions

- 9.1 The landscape of the E-G connection includes the lower wooded landscape south of Earlstoun Loch, open arable farmland west of the A713 and afforested Hag Wood. The closest settlement is St John's Town of Dalry to the west, the settlement of Glenlee to the south and a relatively small number of properties along the A713.

Assessment Findings

- 9.2 **No significant** landscape effects are predicted to arise during the construction phase.
- 9.3 **Moderate** (adverse, short-term) **significant** effects on views from VP10: A762 north of Glenlee are predicted to occur during the construction phase, attributed predominantly to the creation of the wayleave and the felling of adjacent coniferous woodland at Hag Wood deemed to be at risk of windthrow.
- 9.4 **No significant** landscape or visual effects are predicted to arise during the operational phase.
- 9.5 **No significant** cumulative landscape or visual effects are predicted to arise during the operational phase.

Forestry

Existing Conditions

- 9.6 On leaving Earlstoun power station the proposed 70m wayleave corridor passes through three areas of broadleaf woodlands before arriving at Hag wood immediately north of Glenlee. At Hag wood the OHL passes through an area of mature conifer forestry with an edge of broadleaf trees adjacent to the existing OHL of R route (north) and also adjacent to the proposed P-G via K OHL.

Assessment Findings

- 9.7 Tree felling proposed for this connection incorporates 1.7ha of trees within the 70m wide wayleave corridor and 0.2ha for access tracks. It is also proposed to fell a further 0.68ha of forestry out with the wayleave corridor to mitigate the potential for windthrow to take the felled edge to an existing more windfirm edge.

- 9.8 Within those areas to be felled are 1.6ha of broadleaf woodland including areas designated as within ASNW or NWSS. There is also 0.9ha of PAWS at Hag Wood which is also designated as ASNW/NWSS. Whilst care has been taken to minimise losses, it has not been possible to avoid the ASNW or NWSS sites entirely for this connection.
- 9.9 The residual effects on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **moderate** and **significant**. Whilst SPEN will implement best practice in managing these areas and will seek to undertake replanting within the wayleave corridor, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 9.10 The residual effect associated with loss of broadleaf woodland including Ancient Woodland and Native Woodland Resource due to felling of trees within the wayleave corridor will be **moderate** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 9.11 The residual effect of loss of the forest resource associated with the felling of trees for the construction access tracks will be **none** and **not significant**.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Existing Conditions

Watercourses and Surface Water

- 9.12 The main watercourse in the Study Area is the Water of Ken and the OHL passes over several small unnamed watercourses and the Coom Burn and Glenlee Tailrace channel in the south. No open water bodies of water (e.g. ponds, lochs) were noted along this connection.

Hydrology and Flood Risk

- 9.13 SEPA flood maps show some predicted flooding of the Water of Ken close to the Earlstoun substation and also close to southern extent of this connection. There is no surface water (pluvial) flooding predicted within this connection.

Watercourse Crossing

- 9.14 The E-G connection infrastructure has 15 watercourse crossings. The short underground cable (UGC) section passes under a small unnamed watercourse, just upstream of where it is culverted under the Glenlee Power Station. The UGC will also pass below the existing culvert within the substation at a sufficient depth to avoid any impact on the culvert. Most watercourses to be crossed are generally small (<2.5m wide) except for spillway channel downstream of the dam for the hydro power scheme. At the OHL crossing location, the channel is approximately 8m wide.

Water Supplies, Discharge and Abstractions, and Services

- 9.15 There is one PWS source within 1km of the E-G connection. There are no licenced groundwater abstractions within 1km of the E-G connection. The only Scottish Water pipework close to the E-G Connection is located on the roads at the Earlstoun and Glenlee substations. Locations of utilities will be confirmed before construction.

Water Quality and Protected Areas

- 9.16 The Water of Ken downstream of Kendoon Loch was classified by SEPA in 2017 as having Bad ecological potential. The Coom Burn/Garroch Burn was classified as having Moderate ecological potential. The Loch Ken and River Dee Marshes SPA (and Ramsar site) is located on the Water of Ken approximately 4km downstream of the E-G connection. The entire E-G connection drains to the Water of Ken/River Dee catchment which supports salmon and trout populations.

Soils, Geology and Peat

- 9.17 Scottish Soil mapping shows the majority of the connection is underlain by alluvial soils with some brown soils to the west. Peat is absent along the majority of this connection with the exception in

the south where peat between 1.5m to up to 3.0m is present within the Coom Burn and Water of Ken valley. This area of peat is modified and not active peatland.

Groundwater

- 9.18 The majority of the connection route is underlain by non-aquifers or low productivity aquifers that are generally without groundwater except at shallow depths.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

- 9.19 There are no GWDTEs present in this connection.

Assessment Findings

- 9.20 Effects on water quality of downstream water bodies and watercourses as a result of construction of the E-G connection are predicted to be **minor** and **not significant**.
- 9.21 There is one property within 250m of the E-G connection (Waterside). Effects on the PWS during construction are assessed as **none** and **not significant**. However, monitoring before and after construction and provision of alternative water supplies will be put in place if required.
- 9.22 Effects on watercourse bank erosion and the form of channels will be **minor** to **none** and **not significant**. The potential **minor** effect is associated with construction of the watercourse crossing associated with the underground cable section of the E-G connection which could temporarily affect the bed and banks local to the works resulting in an effect of **minor** significance. However, implementation of additional mitigation including isolation of the working area during installation of the underground cable (i.e. ensuring it is kept dry), and reinstatement of the channel bed and banks to their original condition, mitigates the effect and the residual effect is **none** and **not significant**.
- 9.23 Effects on runoff rates, flood risk and ground-water levels and recharge during construction will be **none** and **not significant**. The few proposed wood poles that are close to the 200-year floodplain of the Water of Ken will be designed and constructed to be operational during floods, and to not impede water flow. Construction will not take place when the river is in flood. The contractor will sign up to SEPA Floodline which provides advance warning for flooding in Dumfries and Galloway, including the Water of Ken/River Dee.
- 9.24 Implementation of appropriate peat management techniques during construction will ensure that the potential effects on peat will be **minor** to **none** and therefore **not significant**.
- 9.25 The effect of operation of the E-G connection will be **none** and **not significant**.
- 9.26 Cumulative effects on geology, hydrology, hydrogeology, water resources and peat for the E-G connection were scoped out of detailed assessment.

Ecology

Existing Conditions

Designated Sites

- 9.27 There are no statutory designated sites within the proposed development footprint, wayleave or wider windthrow areas. The nearest designated sites (<1km) are:
- Hannaston Wood SSSI (approximately 900m west) designated for its lichen assemblages, upland oak woodland and neutral grassland.
 - Water of Ken Woods SSSI (approximately 700m west and 400m south-east) designated for lichen assemblages and upland oak woodland.
- 9.28 There is no structural or functional connectivity between the E-G connection and Hannaston Wood SSSI. The Water of Ken SSSI comprises series of units across a wider area of woodland. While the E-G connection does not cross any of the units, it does pass through woodland that provides connectivity between units. One AWI site is located within the wayleave, which is located at Hag Wood.

Habitats

- 9.29 The habitats comprise of a mosaic of agricultural grasslands and smaller areas of semi-natural woodlands and scrub. Much of the E-G connection is grassland. In the south of the Study Area is Hag wood where a substantial area of an invasive non-native species, Rhododendron, was recorded during the surveys.

Protected Species

- 9.30 No field signs of red squirrel or pine marten were recorded however otter, badger and bats were found to be present within the Study Area.

Assessment Findings

- 9.31 The potential effects prior to mitigation during construction on designated sites are considered to be **minor** and therefore **not significant** for overall direct habitat loss. The effect on severance will be significant for connectivity of the Water of Ken Woods SSSI at the Study Area level due to the loss of approximately 50% of Hag Wood (PAWS site) and a further small narrow stretch of broadleaved woodland on the banks of the Coom Burn. This will be **minor** and **not significant** in EIA terms. The potential effects prior to mitigation during construction on habitats of conservation concern are considered to be **not significant**. Construction effects in relation to direct habitat loss, mortality and disturbance on badger and bats are considered to be **minor** and therefore **not significant**. Severance effects on badger will be not significant, and a **minor positive** effect will occur for bats due to the potential to create new foraging opportunities in the Study Area through creation of the wayleave in forestry. Construction effects in relation to direct habitat loss, mortality and disturbance on otter are considered to be **not significant**.
- 9.32 Although the assessment did not identify any significant effects, a number of additional specific measures were identified to minimise any potential effects, including but not limited to:
- Limiting vegetation removal where possible and identifying areas within the wayleave where replanting can achieve mixed scrub/woodland habitats.
 - Pre-construction surveys, no more than six months prior to felling, to identify changes in baseline as well as the retention of trees with bat roost potential where possible.
 - Obtain protected species license from SNH where surveys suggest presence of resting sites.
 - Sensitive timing of felling works to avoid the relevant breeding season of respective protected species (November to June for badger and April to September for bats).
 - delivery of 'toolbox talks' to all workers on the site to advise them of what to do in the event that any protected species are found during the works.
 - Preparation of Species Protection Plans for felling and construction phases, as part of the project's wider CDEMP. The Species Protection Plans should set out measures to protect all species covered by legislation in the UK.
 - Presence of an ECoW during all operations to provide ongoing support and monitoring. The ECoW role should be developed in accordance with current good practice guidelines.
- 9.33 As no operational or cumulative effects on ecological features are anticipated, these have been scoped out of the detailed assessment.

Ornithology

Existing Conditions

Designated Sites

- 9.34 The E-G connection of the KTR Project does not intersect with any site that is designated at international or national levels for ornithological interests.

Scarce Raptors and Owls

- 9.35 No nests of any species of scarce raptor or owl were within the core area, and only low levels of flight activity by red kite were recorded.

Assessment Findings

- 9.36 For the E-G connection, no adverse effects are predicted during construction or operation on any identified bird species within the Study Area (scarce raptors and owls i.e. red kite) prior to mitigation. Therefore, residual effects are judged to be **none** and **not significant**. No additional mitigation is required.
- 9.37 The assessment did not identify any cumulative effects on ornithology for the E-G connection.

Cultural Heritage

Existing Conditions

- 9.38 In total, 13 heritage assets have been identified within the E-G Inner Study Area. The majority of these relate to medieval or later rural land use. However, metal working finds at Glenlee, which suggests the potential for a 'bloomery' site indicate the potential for other prehistoric remains to be present.
- 9.39 There are 28 heritage assets within 5km that have predicted visibility of the E-G connection. Of these, four Scheduled Monuments, three NIDLs and one NSR site have settings that will potentially be affected by the presence of the E-G connection.

Assessment Findings

- 9.40 One significant (**major**) direct effect is predicted on a possible bloomery / metal working site (66) resulting from the E-G connection prior to mitigation. It is predicted that there would also be **minor (not significant)** direct effects on two other heritage assets prior to mitigation (a findspot (192)) and a former enclosure (62)) and there is moderate to high potential for buried archaeological remains to survive in areas where the ground within the ILA has not been disturbed by modern commercial forestry. There are six other heritage assets within the ILA which will be avoided by construction works.
- 9.41 Additional mitigation is proposed to prevent, reduce or offset the potential effect on the bloomery/metal working site. This will include further archaeological investigation to establish if any remains survive and to record the possible extent of the site. In addition, pre-construction walkover surveys and archaeological investigations (i.e. watching briefs and excavations) in areas with high potential for buried remains will also be undertaken. Following implementation of these measures, two **minor (not significant)** residual effects are considered likely (the bloomery/metal working site and a former enclosure).
- 9.42 Of the eight sites within 5km of the OHL which have settings that will potentially be affected by the E-G connection, **no significant (major or moderate)** effects have been predicted, two **minor** adverse effects are predicted on Dalry, motte (SM1117) and Garroch NIDL (MDG25540) and the effects on the other assets are assessed as **none**.
- 9.43 **No significant** cumulative effects of the E-G connection, in combination with other existing and proposed developments in the vicinity, are considered likely.

Traffic and Transport

Existing Conditions

- 9.44 Sections of the A77, A76, A75, A713, A712, A711, A702, A762, B741, U2s and Gateside Road public roads will be used by construction traffic for the E-G Connection, all of which are currently operating under capacity. There are no notable crash clusters (accident 'blackspots') and there is no apparent safety problem specifically relating to vulnerable road users.

Assessment Findings

- 9.45 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the CTMP is considered a 'live' document. The assessment has also taken account of road upgrades that will be undertaken for the Glenlee substation extension including infrastructure improvements to the A762 (between the A713 and the U2s) and on the U2s.
- 9.46 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** for the E-G connection and **not significant**.
- 9.47 Due to the implementation of the infrastructure upgrades noted above and the CTMP, the residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the KTR Project, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Existing Conditions

- 9.48 The Study Area is generally rural in character and background noise levels will likely vary according to specific conditions, particularly in relation to natural noise levels such as wind disturbed foliage and watercourse noise, as well as the varying influence of traffic on the road network in some cases. There are a number of highly sensitive receptor locations (i.e. residential dwellings) and a representative sample has been assessed for potential effects associated with construction and operation of the E-G connection.

Assessment Findings

- 9.49 Prior to mitigation, potential temporary moderate effects are predicted during construction of the E-G connection at the properties located near the Glenlee substation. Additional mitigation is proposed in the form of limiting working hours at weekends, the effects will be reduced **minor** and **not significant**. All other effects will be at worst **minor** and temporary and **not significant** in EIA terms.
- 9.50 There are **no** adverse significant effects from operational noise from the proposed OHL for the proposed E-G connection.
- 9.51 There are **no significant** cumulative effects due to the influence of the other proposed connections of the KTR Project and other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Existing Conditions

- 9.52 Existing settlements in close proximity to this connection include the small settlements of Earlstoun, St Johns Town of Dalry and Glenlee. There are also smaller residential clusters, hamlets and farm buildings in the locality. A number of local roads are located in close proximity to this connection, including multiple stretches of the A713 Galloway Tourist Route and Scottish Castle Route and the A762 Scottish Castle Route. Other key roads with the potential to be affected by this connection are noted in relation to traffic and transport above. A number of Core Paths intersect with or overlap with proposed public road construction routes for the E-G connection of the KTR Project.

- 9.53 Tourism and recreation is recognised as an important component of the economy within Dumfries and Galloway and key tourism assets located within close proximity of the E-G Connection include³⁰:
- Mulloch Hill, situated south-east of St John's Town of Dalry;
 - Hospitality businesses including The Cross Keys and Kitty's Tearooms;
 - CatStrand Arts and Visitor Centre;
 - Numerous cultural heritage assets, including Scheduled Monuments; and,
 - Visitor accommodation.

Assessment Findings

- 9.54 **No significant effects** were identified during construction or operation of the E-G connection.
- 9.55 **Minor adverse** effects were predicted for recreational access, designated walking and recreational routes and outdoor tourist destinations during construction. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**. No mitigation measures are proposed.
- 9.56 During operation, **minor adverse** effects were identified for designated walking and recreational routes, outdoor tourist destinations, visitor accommodation and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 9.57 **No significant** cumulative residual effects are considered likely to arise from the E-G connection.

Other Issues

Existing Conditions

EMFs

- 9.58 EMFs and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons) and they occur naturally within the body and in the natural world. Energised high voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs.

Dust

- 9.59 There are 15 residential properties within 200m of the E-G connection and these are therefore judged to be potential receptors of dust emissions from the associated construction works and construction traffic movements.

Assessment Findings

EMFs

- 9.60 The E-G Connection would be fully compliant with Government policy. Specifically, all the EMFs produced would be below the relevant exposure limits, and the proposed OHLs would comply with the required policy and safety standards. Therefore, EMF effects resulting from the KTR Project would be **not significant**.

Dust

- 9.61 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the site are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised and associated dust effects for each of the individual connections of the KTR Project will be **not significant**.

³⁰ Note that this is not an exhaustive list.

Intra-Connection Effects

Existing Conditions

- 9.62 Details of the existing conditions in relation to the topics where it is considered that there could be interactions that could result in 'intra-connection' effects on residential receptors are set out above (i.e. LVIA, hydrology, traffic, noise and dust).

Assessment Findings

- 9.63 No new significant residual effects have been identified over and above those associated with the main landscape, hydrology, noise, traffic and dust assessments for the E-G connection and all effects during construction and operation are **minor (not significant)**.

10 What are the Environmental Effects of the BG Route Deviation of the KTR Project?

BG Route Deviation

- 10.1 The BG route comprises an existing 132kV OHL between the existing Glenlee substation and the existing substation at Newton Stewart. To facilitate construction and operation of the proposed OHL for the G-T connection, the first five existing towers of the existing BG route are proposed to be removed and replaced with five new towers approximately 40m north of the existing locations. The relocation of these towers will result in an approximate 1.2km deviation of the existing BG route OHL which will connect into the proposed extension to the Glenlee substation. The existing tower locations which are currently part of the BG route will then form part of the proposed new Glenlee to Tongland circuit which will terminate within the proposed substation extension at Glenlee. The OHL is currently supported on lattice steel towers. The BG Deviation is shown in **Figure 5**.

Landscape and Visual Amenity

Existing Conditions

- 10.2 The landscape of the BG Deviation is largely limited to the rough grassland and moorland on the eastern flank of Glenlee Hill and the lower wooded area of Black Bank Wood. Settlement in the Study Area comprises the detached and semi-detached properties at Glenlee.

Assessment Findings

- 10.3 **No significant** landscape effects are predicted to arise during construction. There will be one **moderate** visual effect (**significant**, adverse, short term) at the settlement of Glenlee during construction.
- 10.4 **No significant** landscape effects are predicted to arise during operation as a result of the BG Route Deviation. There will be one **moderate** visual effect (**significant**, adverse, long-term) at Glenlee once operational which will also be significant cumulatively in combination with the towers and OHLs of the G-T connection.

Forestry

Existing Conditions

- 10.5 Heading south-west from Glenlee the BG Deviation passes through broadleaf woodland designated as NWSS and ASNW and is part of Blackbank wood through which the existing OHL passes.

Assessment Findings

- 10.6 Blackbank wood which has a total area of 24.56ha, all of which is designated as Native Woodland. Whilst care has been taken to minimise losses, it has not been possible to avoid this area of broadleaf woodland entirely for the BG Deviation given the location of the existing towers.
- 10.7 Tree felling proposed for this connection incorporates 2.12ha of trees within the 80m wide wayleave corridor, all of which is ASNW/NWSS. There is no proposed felling outwith the wayleave corridor associated with temporary works or for addressing the risk of windthrow.
- 10.8 The residual effect on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **moderate** and **significant**. Whilst SPEN will implement best

practice in managing these areas, and will seek to undertake replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.

- 10.9 The residual effect associated with loss of broadleaf woodland including Ancient Woodland and Native Woodland resource due to felling of trees within the wayleave corridor will be **major** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Existing Conditions

Watercourses and Surface Water

- 10.10 The main watercourses in the Study Area are the Craigshinnie Burn and The Coom Burn and Tailrace Channel (from Glenlee Power Station). The BG Deviation connection also passes over several small unnamed watercourses. No open waterbodies of water (e.g. ponds, lochs) were noted along this connection.

Hydrology and Flood Risk

- 10.11 SEPA flood maps show flooding on the Craigshinnie Burn (Park Burn). The nearest BG Deviation infrastructure is approximately 100m north of the burn. There is a low point just west of tower BG97, which is shown in the SEPA flood maps as at risk of surface water (rain water) flooding.

Watercourse Crossing

- 10.12 There are nine watercourse crossings associated with the BG Deviation connection (four crossings of the OHL, four new access track crossings and one existing track crossing). Most watercourses to be crossed by tracks are generally small (<2.5m wide) except for the existing access track crossing of the approximately 10m wide Craigshinnie Burn.

Water Supplies, Discharge and Abstractions, and Services

- 10.13 There are four PWS sources within 1km of the BG connection. There are no licenced groundwater abstractions in this connection. The only Scottish Water pipework close to the BG Deviation Connection is located on the local road at Glenlee substation. Locations of utilities will be confirmed before construction.

Water Quality and Protected Areas

- 10.14 The Water of Ken downstream of Kendoon Loch was classified by SEPA in 2017 as having Bad ecological potential while the Coom Burn/Garroch Burn was classified as having Moderate ecological potential. The Loch Ken and River Dee Marshes SPA (and Ramsar site) is located on the Water of Ken approximately 4km downstream of this connection. The BG Deviation connection drains to the Water of Ken/River Dee catchment which supports salmon and trout populations.

Soils, Geology and Peat

- 10.15 Scottish Soil mapping shows the majority of the connection to be underlain by brown soils with some alluvium in the north at Glenlee in the Coome Water and Water of Ken valleys. No peat was indicated on the mapping and therefore no peat survey points were undertaken.

Groundwater

- 10.16 The majority of the connection is underlain by non-aquifers or low productivity aquifers that are generally without groundwater except at shallow depths.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

- 10.17 There are no GWDTEs present in this connection.

Assessment Findings

- 10.18 There is a minor watercourse which impinges on the proposed working area south of tower BG097 however this will be avoided through additional mitigation in the form of micro-siting within the ILA

during construction, to ensure that effects on water quality of downstream water bodies and watercourses will remain **minor** and **not significant**.

- 10.19 Effects on PWS within 250m of the BG connection (Ford Farm, Glenlee spring and the 10 supplied properties) during construction are assessed as **minor** and **not significant**. However, monitoring before and after construction and provision of alternative water supplies will be put in place if required. In addition, confirmation of the location of pipework will be undertaken, thereby reducing the significance of the effect to **none**.
- 10.20 Effects on bank erosion, channel form, and run-off rates and flood risk during construction will be **none** and **not significant**.
- 10.21 Effects on ground-water levels and recharge during construction will be **none** and **not significant**, through the implementation of additional mitigation i.e. avoiding physical dewatering and cut-offs as far as possible.
- 10.22 The effect of operation of the BG Deviation will be **none** and **not significant**.
- 10.23 Cumulative effects on geology, hydrology, hydrogeology, water resources and peat for the BG Deviation were scoped out of detailed assessment.

Ecology

Existing Conditions

Designated Sites

- 10.24 There are no statutory designated or non-statutory designated sites within the proposed development footprint or wayleave. The nearest designated site (<1km) is Water of Ken Woods SSSI (approximately 700m north west and 400m south-east) designated for lichen assemblages and upland oak woodland. There is no structural or functional connectivity between the SSSI and the BG Deviation. One AWI site is located within the wayleave, which is located at Black Bank Wood.

Habitats

- 10.25 Woodland and scrub vegetation accounts for a large part of the total habitat in this connection. The land running to the north, north-west is dominated by bracken and grasslands. The gentle slope of the ground causes water to collect downslope and the habitat becomes increasingly marshy to the south. The majority of the habitats within the Study Area were considered to be common and widespread.

Protected Species

- 10.26 Despite suitable habitat being available for pine marten, red squirrel and badger, no evidence of these species was identified. There was evidence of otter and suitable habitat for bats within the Study Area.

Assessment Findings

- 10.27 The potential effects prior to mitigation during construction on designated sites and habitats of conservation concern are considered to be **not significant**. Construction effects in relation to direct habitat loss, mortality and disturbance on otter and bats are considered to be **not significant**.
- 10.28 Although the assessment did not identify any significant effects, a number of embedded mitigation measures will be put in place as part of the construction process which will help ensure that no effects arise, including but not limited to:
 - Preparation of Species Protection Plans for felling and construction phases, as part of the project's wider CDEMP. The Species Protection Plans will set out measures to protect all species covered by legislation in the UK.
 - Presence of an ECoW during all operations to provide ongoing support and monitoring. The ECoW role will be developed in accordance with current good practice guidelines.

- 10.29 As no operational or cumulative effects on ecological features are anticipated, these have been scoped out of the detailed assessment.

Ornithology

- 10.30 Due to the low records of flight activity for all of the bird species considered within the scope of the assessment, no significant effects arising from the BG Deviation are predicted.

Cultural Heritage

Existing Conditions

- 10.31 In total, nine heritage assets have been identified within the BG Inner Study Area. The majority of these relate to medieval or later rural land use. However, metal working finds at Glenlee, which suggests the potential for a 'bloomery' site indicate the potential for other prehistoric remains to be present.
- 10.32 There are 35 heritage assets within 5km that have predicted visibility of the BG Deviation. Of these, three Scheduled Monuments, one ASA, six NIDLs and one NSR Site, have settings that will potentially be affected by the BG Deviation.

Assessment Findings

- 10.33 One **significant (major)** direct effect is predicted on a possible bloomer / metal working site (66) resulting from the BG Deviation prior to mitigation. In addition, it is considered that there is moderate to high potential for buried archaeological remains to be present. There are five other heritage assets within the ILA which will be avoided by construction works.
- 10.34 Additional mitigation to prevent, reduce or offset the potential effect on the bloomer/metal working site will include further archaeological investigation to establish if any remains survive and to record the possible extent of the site. In addition, pre-construction walkover surveys and archaeological investigations (i.e. watching briefs and excavations) in areas with high potential for buried remains will also be undertaken. Following implementation of these measures, one **minor (not significant)** residual effect is considered likely (the bloomer/metal working site).
- 10.35 Of 11 sites within 5km of the OHL which have settings that will potentially be affected by the BG Deviation, effects on all assets are assessed as **none**.
- 10.36 **No significant** cumulative effects of the BG Deviation, in combination with other existing and proposed developments in the vicinity, are considered likely.

Traffic and Transport

Existing Conditions

- 10.37 Sections of the A77, A75, A713, A712, A711, A702, A762, U2s and U3s will be used by construction traffic for the BG Deviation, all of which are currently operating under capacity. There are no notable crash clusters (accident 'blackspots') and there is no apparent safety problem specifically relating to vulnerable road users.

Assessment Findings

- 10.38 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the

CTMP is considered a 'live' document. The assessment has also taken account of road upgrades that will be undertaken for the Glenlee substation extension including infrastructure improvements to the A762 (between the A713 and the U2s) and on the U2s and additional mitigation in the form of localised widening of strategic sections of the U3s (between the A712 and worksite access reference 37) will be implemented to ease access to the worksites for HGV construction traffic and general traffic sharing these route sections notably including upgraded passing places.

- 10.39 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** for the BG Deviation and **not significant**.
- 10.40 Due to the implementation of the upgrades noted above and the CTMP, the residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the KTR Project, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Existing Conditions

- 10.41 The Study Area is generally rural in character and background noise levels will likely vary according to specific conditions, particularly in relation to natural noise levels such as wind disturbed foliage and watercourse noise, as well as the varying influence of traffic on the road network in some cases. There are a number of highly sensitive receptor locations (i.e. residential dwellings) and a representative sample has been assessed for potential effects associated with construction and operation of the BG Deviation.

Assessment Findings

- 10.42 Works associated with construction activities for the BG Deviation will have **minor** temporary adverse effect at most prior to mitigation, which is considered to be **not significant** in EIA terms. No additional mitigation is proposed.
- 10.43 There are **no** adverse **significant** effects from operational noise from the proposed BG Deviation OHL.
- 10.44 There are **no significant** cumulative effects due to the influence of the other proposed connections of the KTR Project and other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Existing Conditions

- 10.45 Existing settlements in close proximity to this connection include the small settlements of Earlstoun, St. John's Town of Dalry, Garroch. There are also smaller residential clusters including the properties at Glenlee substation, as well as other hamlets and farm buildings in the locality. A number of local roads are located in close proximity to this connection, including multiple stretches of the A713 Galloway Tourist Route and Scottish Castle Route. Other key roads with the potential to be affected by this connection are noted in relation to traffic and transport above. A number of Core Paths intersect with or overlap with proposed public road construction routes for the BG deviation connection of the KTR Project.
- 10.46 Tourism and recreation is recognised as an important component of the economy within Dumfries and Galloway and key tourism assets located within close proximity of this connection include³¹:
- Mulloch Hill, situated south-east of St John's Town of Dalry;

³¹ Note that this is not an exhaustive list.

- Numerous cultural heritage assets, including Scheduled Monuments; and
- Visitor accommodation.

Assessment Findings

- 10.47 **No significant** effects were identified during construction or operation of the BG Deviation.
- 10.48 **Minor adverse** effects were predicted for designated walking and recreational routes and outdoor tourist destinations during construction. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**. No mitigation measures are proposed.
- 10.49 During operation, **minor adverse** effects were identified for designated walking and recreational routes, outdoor tourist destinations and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 10.50 **No significant** cumulative residual effects are considered likely to arise from the BG Route Deviation.

Other Issues

Existing Conditions

EMFs

- 10.51 EMFs and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons) and they occur naturally within the body and in the natural world. Energised high voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs.

Dust

- 10.52 There are 11 residential properties within 200m of the BG Deviation connection and these are therefore judged to be potential receptors of dust emissions from the associated construction works and construction traffic movements.

Assessment Findings

EMFs

- 10.53 The BG Deviation OHL would be fully compliant with Government policy. Specifically, all the EMFs produced would be below the relevant exposure limits, and the proposed OHLs would comply with the required policy and safety standards. Therefore, EMF effects resulting from the BG Deviation will be **not significant**.

Dust

- 10.54 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the site are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised and associated dust effects for the BG Deviation connection will be **not significant**.

Intra-Connection Effects

Existing Conditions

- 10.55 Details of the existing conditions in relation to the topics where it is considered that there could be interactions that could result in 'intra-connection' effects on residential receptors are set out above (i.e. LVIA, hydrology, traffic, noise and dust).

Assessment Findings

- 10.56 No new residual significant effects have been identified over and above those associated with the original landscape, hydrology, noise, traffic and dust assessments for the BG Deviation. As such, **moderate** effects (**significant**) were identified for one group of properties during construction (properties at Glenlee substation) and operation which is primarily associated with the effects on residential visual amenity. All other effects are, at most, **minor (not significant)**.

11 What are the Environmental Effects of the Glenlee to Tongland Connection of the KTR Project?

Glenlee to Tongland (G-T)

- 11.1 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 where minor upgrading works are required. The OHL will be supported on steel towers. The G-T connection of the KTR Project is shown in **Figure 6**. The assessment of the effects of the G-T connection also considers the removal of the R route (south) between Glenlee and Tongland.

Landscape and Visual Amenity

Existing Conditions

- 11.2 The landscape of the G-T connection is varied including partly elevated open farmland and moorland associated with the Craigshinnie valley, lower foothills with dense conifer plantations, and lower settled valleys. Settlements located within the Study Area for the G-T connection include St John's Town of Dalry, New Galloway, Kirkcudbright and the smaller communities of Glenlee, Mossdale and Laurieston. A number of more scattered residences and farmsteads are also located east of the G-T connection. While there are a number of settlements and properties within 5km, much of the G-T connection passes through areas with no settlements, largely between Glenlee Hill and Laurieston Forest.

Assessment Findings

- 11.3 During construction there will be significant landscape effects on the following receptors (all **Moderate** (adverse, short-term) and **significant** - Locally (**Minor** - **Not significant** for LCT as a whole):
- Foothills with Forest LCT – Dumfries and Galloway (176);
 - Rugged Uplands with Forest LCT – Dumfries and Galloway (181); and
 - Drumlin Pastures LCT (169).
- 11.4 Significant visual effects are also identified for the following locations during construction (all adverse and short-term):
- VP11: Unclassified road (U3S) south-west of Glenlee: **Moderate**;
 - VP12: Core Path 516 south-west of Glenlee: **Major**;
 - VP 14: A712, The Queen's Way: **Moderate**;
 - VP16: Core path near Tannoch Flow: **Moderate**;
 - VP21: Mossdale: **Moderate**;
 - VP22: Core Path 485 Mossdale to Gatehouse Station Railway Walk: **Moderate**;
 - VP26: Kennick Burn picnic area: **Moderate**;
 - VP28: A762 south of Laurieston: **Moderate**;
 - VP29: Barstobrick Hill (Neilson's Monument): **Moderate**;
 - VP30: A75 at junction with unclassified road: **Moderate**;

- VP31: Unclassified road (U43S) near Argrennan Mains: **Major**;
 - VP32: A711 north of Tongland substation: **Moderate**;
 - Glenlee: **Moderate**;
 - P77: Airie Cottage: **Moderate**;
 - P79: Darsalloch: **Moderate**;
 - P167: Upper Balannan Farm: **Moderate**;
 - Property Group consisting of: P170, P171, P172: **Moderate**;
 - P173: Woodlands: **Moderate**;
 - Property Group consisting of: P174, P175, P176, P177, P178, P179, P180: **Moderate**;
 - Property Group consisting of: P185, P186, P187, P188, P189, P190: **Moderate**;
 - P195: High Clachan: **Moderate**;
 - Property Group consisting of: P199, P201, P207, P208, P216, P220, P221: **Moderate**;
 - Property Group consisting of: P225, P226: **Moderate**;
 - A712: **Moderate**;
 - A75: **Moderate**;
 - Core Path No. 205 Mossdale Kite Walk, Red Kite Trail: **Moderate**; and
 - Core Path No. 153 Airie near Mossdale: **Major**.
- 11.5 Once operational, **Moderate** (adverse, long-term) **significant** effects on the Foothills with Forest LCT – Dumfries and Galloway (176), Rugged Uplands with Forest LCT – Dumfries and Galloway (181) and Drumlin Pastures LCT (169) are predicted to occur for a localised area, reducing to **Minor, not significant** for the LCT as a whole.
- 11.6 Significant visual effects are predicted at the following locations prior to mitigation, and where relevant, the additional mitigation and the residual effect is also summarised in **Table 11.1** below. All effects are considered to be adverse and long term.

Table 11.1: Significant Visual Effects during Operational Phase: Glenlee to Tongland (G-T)

Summary of Likely significant Visual Effects during Operational Phase: Glenlee to Tongland (G-T)		Additional Mitigation Measures	Likely residual Effect
VP12: Core Path 516 south-west of Glenlee	Major	None	Moderate
VP14: A712, The Queen's Way	Moderate	Replanting of areas of additional windthrow felling	Minor
VP16: Core path near Tannoch Flow	Moderate	None	Moderate
VP21: Mossdale	Moderate	None	Moderate
VP22: Core Path 485 Mossdale to Gatehouse Station Railway Walk	Moderate	None	Moderate
VP26: Kennick Burn picnic area	Moderate	None	Moderate
VP28: A762 south of Laurieston	Moderate	None	Moderate
VP29: Barstobrick Hill (Neilson's Monument)	Moderate	Replanting of areas of additional windthrow felling	Moderate
VP31: Unclassified road (U43S) near Argrennan	Moderate	None	Moderate

Summary of Likely significant Visual Effects during Operational Phase: Glenlee to Tongland (G-T)	Additional Mitigation Measures	Likely residual Effect
Mains		
VP32: A711 north of Tongland substation	Moderate	None
Glenlee	Moderate	None
P77: Airie Cottage	Moderate	None
P173: Woodlands	Moderate	None
Property Group consisting of: P174, P175, P176, P177, P178, P179, P180	Moderate	None
Property Group consisting of: P199, P201, P207, P208, P216, P220, P221	Moderate	None
Property Group consisting of: P225, P226	Moderate	None
A712	Moderate	Replanting of areas of additional windthrow felling
Core Path No. 205 Mossdale Kite Walk, Red Kite Trail	Moderate	None
Core Path No. 153 Airie near Mossdale	Moderate	None

- 11.7 Once operational, significant cumulative effects are predicted for Foothills with Forest – Dumfries and Galloway LCT (176): **Moderate** (adverse, long-term) and **significant** for a localised area, **Minor** (adverse, long-term) and **not significant** for the LCT as a whole). Significant cumulative effects are also predicted for VP12: Core Path 516 south-west of Glenlee, VP29: Barstobrick Hill (Neilson's Monument), and Glenlee (all **Moderate** (adverse, long-term) and **significant**).

Removal of the existing R-route (South)

- 11.8 Removal of the existing R-route (south) will result in a **moderate beneficial** effect for the Flooded Valley LCT (164) (beneficial, long-term and **significant**). There will also be **significant** (beneficial and long-term) visual effects for the following receptors:
- VP25: A713 near Parton Mill Bridge: **Moderate**;
 - P82: Boatknowe: **Moderate**;
 - Property Group consisting of: P83, P83, P85: **Moderate**;
 - Property Group consisting of: P87, P88: **Moderate**;
 - P86: Mallard Cottage: **Major**;
 - P89: Garplefoot: **Moderate**;
 - P106: Killochy Farm: **Moderate**;
 - P114: Ken Tor: **Moderate**;
 - Property Group consisting of: P115, 116: **Moderate**;
 - P129: Barbershall: **Moderate**;
 - Property Group consisting of: P143, P143a, P144: **Moderate**;
 - Core Path No. 21 Dalry to New Galloway: **Moderate**;
 - Core Path No. 29 Glengunnock Wood: **Moderate**; and
 - Core Path No. 208 Livingston Hill: **Moderate**.

Forestry

Existing Conditions

- 11.9 The majority of the G-T connection is located in commercial forestry, including Bennan Hill Forest and Laurieston Forest, as well as smaller commercial woodland blocks at Slogarie and Bargatton Loch. There are also areas of broadleaf woodland including some woodland designated as NWSS/AWI located near the Queensway public road.

Assessment Findings

- 11.10 Tree felling proposed for this connection incorporates 137.98ha within the 80m wide wayleave corridor. It is also proposed, with landowner agreement, to fell a further 91.94ha of forestry out with the wayleave corridor to mitigate the potential for windthrow by creating windfirm edges which is assumed will be replanted by the landowners, albeit that this is not under the control of SPEN.
- 11.11 Further construction effects on forestry associated with this connection include the felling of 6.29ha of forestry for the creation of access tracks, 2.46ha for the creation of temporary construction compounds and the felling of 61.24ha of forestry for the quarry sites at Willshill quarry and Hindcraig quarry in Bennan Forest, and Lochenbreck and Criagelwhan quarries within Slogarie and Laurieston forests.
- 11.12 Within those areas to be felled is 14.56ha of broadleaf woodland including areas designated as ASNW and NWSS. There is also 13.68ha of PAWS which also has an ASNW/NWSS designation (mainly within Bennan forest). Whilst care has been taken to minimise losses of broadleaf woodland, it has not been possible to avoid these areas entirely for the G-T connection.
- 11.13 The residual effect on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **major** and **significant**. Whilst SPEN will implement best practice in managing these areas, and will seek to undertake replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 11.14 The residual effect associated with loss of broadleaf woodland including Ancient Woodland and Native Woodland Resource due to felling of trees within the wayleave corridor will be **major** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 11.15 The residual effect of loss of the forest resource associated with the felling of trees for the creation of temporary construction compounds, quarries and construction access tracks will be **moderate** and **significant**. Agreements between SPEN and the landowners will be in place which gives a high level of confidence that the replanting will take place, however as it's not directly under SPEN's control, the replanting cannot be considered committed mitigation.
- 11.16 Effects on forestry management during construction will be **none** and **not significant**. During operation, effects on forest management will be **minor** and **not significant**.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Existing Conditions

Watercourses and Surface Water

- 11.17 The main watercourses in the Study Area include the Craigshinnie Burn (also known as the Park Burn), Knocknairling Burn, Darsalloch Burn, Pultarson Burn, Mid Burn, Acre Burn, Clachrum Burn, River Dee (or Black Water of Dee), Slogarie Burn, Kenick Burn and Gatehouse Burn which all flow in a south-easterly direction towards the Water of Ken/River Dee along with many other smaller, unnamed watercourses. The Barstobrick Burn and several other small watercourses flow in a south-westerly direction to enter the Tarff Water catchment.

- 11.18 There are several small lochs, namely Stroan Loch (on the Black Water of Dee); Lochenbreck Loch; Edgarton Loch; Bargatton Loch; and Meiklewood Loch within the Study Area. Several areas of wet, boggy ground or marshland are located within the Study Area.

Hydrology and Flood Risk

- 11.19 There is a SEPA gauging station on the River Dee at Glenlochar. The flows at this location are controlled by Glenlochar Barrage, which is located approximately 500m upstream of the gauge.
- 11.20 SEPA flood maps show some flooding from the Water of Ken/River Dee along the watercourse. However, most of the OHL and associated infrastructure is located at distance from the floodplain area. Several sections of the existing OHL (R route south) fall within the floodplain. SEPA maps show fluvial flooding on the Craigshinnie Burn and on the Black Water of Dee in the vicinity of the Study Area. SEPA flood maps identified several localised areas of predicted surface water (rainwater) flooding close to or within this connection.

Watercourse Crossings

- 11.21 The G-T connection infrastructure has 186 watercourse crossings. Of these, 70 are crossings by the OHL itself, 52 are new access track crossing, two are timber extraction spurs and 62 are existing track crossings. Some watercourses are crossed more than once, either by existing access tracks, proposed new access tracks or the OHL itself. Most watercourses to be crossed are also generally small (<2.5m wide) except for the Craigshinnie Burn (also known as the Park Burn), Knocknairling Burn, Darsalloch Burn, Pultarson Burn, Mid Burn, Acre Burn, Clachrum Burn, River Dee (or Black Water of Dee), Slogarie Burn, Kenick Burn, Gatehouse Burn and Camelon Lane.

Water Supplies, Discharge and Abstractions, and Services

- 11.22 There are 37 PWS sources within 1km of the G-T connection, and 14 PWS within 1km of the existing OHL (R route (south)). SEPA provided details of one licenced groundwater abstraction in the Study Area at Kenmure Fish Farm where groundwater is abstracted for the fish farm hatchery that is too far from the proposed G-T connection to be affected. There are Scottish Water utilities close to the connection at several locations (including near Glenlee and Tongland substations, and on the local road network); exact locations of the Scottish Water utilities will be confirmed on site prior to construction.

Water Quality and Protected Areas

- 11.23 Water Quality of the watercourses that have been classified by SEPA within the Study Area is as follows:
- The Water of Ken: Bad ecological potential.
 - The Knocknairling Burn: Moderate ecological potential.
 - Loch Ken/River Dee Marshes: Moderate.
 - Black Water of Dee (Pullaugh Burn to Loch Ken): Poor ecological potential.
 - Crae Lane (downstream of Woodhall Loch): Good.
 - Woodhall Loch: Moderate.
 - Camelon Lane: Good.
 - Tarff Water: Good ecological potential.
 - River Dee: Moderate ecological potential.

- 11.24 There are seven protected sites within or close to this connection, including Water of Ken Woods SSSI, Loch Ken and River Dee Marshes SPA and Wetlands of International Importance (Ramsar), Kenmure Holms SSSI, River Dee (Parton to Crossmichael) SSSI, Woodhall Loch SSSI, Laughenghie and Airie Hills SSSI, and Threave and Carlingwark Loch SSSI.

Soils, Geology and Peat

- 11.25 Scottish Soil mapping shows the majority of the G-T connection is underlain by brown soils with some areas of peaty gleys, peaty podsols and peat, and some areas on brown earths at the south.

- 11.26 The R route (south) is predominantly on brown earth with the exception of the Water of Ken valley near Glenlee which is located on alluvial soils.
- 11.27 Whilst peat is absent across much of the connection, there are some deeper peat deposits in localised areas, mostly within valleys and plateaus, in particular between Stroan Loch and Bennan Hill. Where possible the route was designed to avoid peat deposits with the result that peat was not recorded along much of the connection infrastructure. However, there are areas of peat >1.0m along the new OHL route and associated infrastructure (tracks, construction areas and quarries).

Groundwater

- 11.28 The majority of the connection route is underlain by non-aquifers or low productivity aquifers that are generally without groundwater except at shallow depths. However, there are also areas of aquifer within the Loch Ken valley which are classified low productivity aquifers of limited or local potential, and some superficial deposits south of Woodhall Loch which have the potential to be productive aquifers and are therefore locally important.

Groundwater Dependent Terrestrial Ecosystem (GWDTE)

- 11.29 Two moderately dependent GWDTEs are present within the Study Area and are located in the northern part of the G-T connection.

Assessment Findings

- 11.30 During construction the potential effect on water quality of downstream watercourses and waterbodies is assessed as being **minor** and **not significant**. However, additional mitigation is proposed at the following locations to ensure that the effects remain **minor** and **not significant**:
- Additional silt fences and drainage ponds at tower GT13 and at the new access track between towers GT55 and GT58.
 - Ensuring that a buffer of at least 25m to the Pultarson Burn is maintained for the working quarry area at Hind Craig Quarry.
 - Micrositing works or diversion of the minor watercourse close to Tower GT86 and construction Compound No. 3 to avoid potential pollution/silt from entering the water environment.
- 11.31 There are 14 PWS sources and 30 supplied properties within 250m of the G-T connection. Effects on PWS during construction are assessed as **minor to none** and **not significant**. However, monitoring before and after construction and provision of alternative water supplies will be put in place if required, thereby reducing the significance of the effect on all PWS to **none** and **not significant**.
- 11.32 Effects on bank erosion and channel form, run-off rates and flood risk during construction will be **none** and **not significant**.
- 11.33 Effects on ground-water levels and recharge during construction will be **none** and **not significant** as a result of avoiding physical dewatering and cut-offs as far as possible.
- 11.34 Effects on GWDTEs are assessed as **moderate** due to the potential for works around Towers GT8 and GT10 to affect subsurface flows to these areas of habitat. Proposed additional mitigation includes the replacement of material round the tower bases without compaction and ensuring the access track will have sufficient drainage to maintain water flows below the surface. However, the residual effect on GWDTEs during construction remains as **moderate** and therefore **significant**.
- 11.35 Prior to implementation of additional mitigation, the significance of potential effects on peat loss/disturbance is assessed as being **moderate to none**. Through the implementation of additional mitigation measures, including further ground investigation and use of different foundations and construction techniques at certain areas, the effect will be reduced to **minor to none** and **not significant**.
- 11.36 There is the potential for a **moderate** effect associated with peat stability due to the moderate risk of a peat landslide in close proximity to Knocknairling Burn which is of high sensitivity. Through the implementation of good engineering practice including drainage management, work phasing and installation of temporary catch fences during construction at this location, the risk of

a peat landslide is reduced to low, and therefore the residual effect on peat in this area is **minor** and **not significant**. The risk of peat slide risk in all other areas is assessed as **none**.

- 11.37 The effect of removal of the existing R route (south) on surface water quality of watercourses will be **none** and **not significant**.
- 11.38 Existing towers 99R to 100AR are within the Loch Ken and River Dee Marshes SPA and Wetlands of International Importance (Ramsar) site. Towers 98R and 101R are just outside the boundary of the SPA/Ramsar site. The effect of removal of these towers on the marshlands and wetlands during decommissioning will be short-term and will be **minor** and **not significant**. Timing of the removal of the existing infrastructure and the requirement for additional pollution control will be agreed with SNH. Together with low impact access to the marshes, the effect will be reduced to **none**.
- 11.39 Effects on PWS during removal of the existing R route (south) are assessed as **minor to none** and **not significant**. However, monitoring before and after construction and provision of alternative water supplies will be put in place if required, thereby reducing the significance of the effect on all PWS to **none**.
- 11.40 Effects on bank erosion and channel form and flood risk will be **none** and **not significant** as a result of removal of the existing R route (south).
- 11.41 The effect of operation of the G-T connection on hydrology/flood risk will be **none** and **not significant**.
- 11.42 Cumulative effects on geology, hydrology, hydrogeology, water resources and peat for the G-T connection were scoped out of detailed assessment.

Ecology

Existing Conditions

Designated Sites

- 11.43 There are no statutory designated sites within proposed development footprint, wayleave, or windthrow areas, designated for their ecological features. Excluding sites designated for their ornithological features, the nearest (< 1km) designated site is Water of Ken Woods SSSI (approximately 700m north west and 400m south-east) designated for lichen assemblages and upland oak woodland. The Water of Ken SSSI comprises a series of units across a wider area of woodland. While the G-T connection does not cross any of the units, it does pass through woodland that provides connectivity between units. There are four AWI features within the proposed wayleave at Black Bank wood, Knocknairling Burn, Ross Hill Forest and the Kenick Burn.
- 11.44 A Unit of the Water of Ken Woods SSSI is crossed by the existing R route (south) to the north of New Galloway. There are no further ecologically designated sites within the existing R route (south), however Kenmure Holms SSSI (approximately 700m) is designated for beetle and dragonfly assemblages and fen habitat. There is no structural or functional connectivity between the existing R route (south) and the Kenmure Holms SSSI.

Habitats

- 11.45 The north of the Study Area is dominated by agricultural grasslands, which have been previously improved for grazing livestock however woodland and scrub are the most dominant habitat feature of this Study Area, with the commercial forest blocks of Bennan and Laurieston being the largest areas of habitat recorded. Areas of heath and mire are found throughout the connection, particularly south of Laurieston forest block, near Bargatton Loch. The southern section from tower 92-120, of the connection is predominantly composed of grassland used for grazing livestock.
- 11.46 Habitats along the R Route (south) are primarily characterised by their agricultural context with areas of marshy grassland habitats. Broadleaved woodland is present, particularly associated with watercourses, while occasional stands of commercial coniferous plantation were also recorded.

- 11.47 The majority of the habitats within the G-T and R (south) Study Areas are considered to be common and widespread.

Protected Species

- 11.48 Protected species surveys identified the presence of red squirrel, pine marten, badger, otter and bats within the G-T Study Area.

Assessment Findings

- 11.49 The potential effects prior to mitigation during construction on habitats of conservation concern are considered to be **not significant** for habitat loss. The effect on connectivity of Ancient Woodland features associated with the Water of Ken Woods SSSI would be **significant** at the Study Area level but **minor** and **not significant** in EIA terms. Construction effects in relation to direct habitat loss and severance on habitats would be **not significant**.
- 11.50 Effects on pine marten and red squirrel would be **not significant** for direct habitat loss, severance and disturbance. Effects on mortality would be significant at the Study Area level which is **minor** and **not significant** in EIA terms.
- 11.51 Effects on badger would be **significant** at the local level which is **minor** and **not significant** in EIA terms. Effects on severance would be **not significant**. All effects on otter would be **not significant**.
- 11.52 Effects on bats of direct habitat loss, mortality and disturbance would be **significant** at the Study Area level and therefore **minor** and **not significant** in EIA terms. There would be a **minor positive** effect in EIA terms (**significant** at the Study Area level) on severance through creation of new wayleaves and the potential to create more varied habitat structure with greater foraging potential for bats.
- 11.53 Although the assessment did not identify any significant effects, a number of additional specific measures were identified to minimise any potential effects, including but not limited to:
- Limiting vegetation removal where possible and identifying areas within the wayleave where replanting can achieve mixed scrub/woodland habitats.
 - Pre-construction surveys, no more than six months prior to felling, to identify changes in baseline as well as the retention of trees with bat roost potential where possible.
 - Obtain protected species license from SNH where surveys suggest presence of resting sites.
 - Sensitive timing of felling works to avoid the relevant breeding season of respective protected species (March to July for pine marten and red squirrel, November to June for badger and April to September for bats).
 - Delivery of 'toolbox talks' to all workers on the site to advise them of what to do in the event that any protected species are found during the works.
 - Preparation of Species Protection Plans for felling and construction phases, as part of the project's wider CDEMP. The Species Protection Plans will set out measures to protect all species covered by legislation in the UK.
 - Presence of an ECoW during all operations to provide ongoing support and monitoring. The ECoW role will be developed in accordance with current good practice guidelines.
- 11.54 As no operational or cumulative effects on ecological features are anticipated, these have been scoped out of the detailed assessment.
- 11.55 The Forest Design Concept (FDC) has given consideration to potential enhancement opportunities in the wayleave and, where possible, windthrow areas. This includes proposals for restoration/enhancement planting in areas of highest ecological importance. While it will not be possible to vegetate the entire wayleave, for technical reasons, the FDC introduces the concept of a 'wildlife bridge' which will allow the re-connection of severed habitats in key locations, for example where evidence of red squirrel or pine marten has been recorded.

Ornithology

Existing Conditions

Designated Sites

- 11.56 The new components of the G-T connection do not intersect with any site that is designated at international or national levels for ornithological interests. The nearest internationally designated ornithological site is the Loch Ken and River Dee Marshes SPA (and Ramsar Site), which at its closest is situated around 2.2km east of the G-T connection.
- 11.57 The existing R route (south), which is being removed as part of G-T Connection, has a short section located within this internationally designated site. The notified features of this SPA (and Ramsar site) are non-breeding Greenland white-fronted goose and greylag goose populations.
- 11.58 The nearest nationally designated site to the new components of the G-T connection, which cites ornithological features is the Laughenghie and Airie Hills SSSI which at is closest is around 0.1km from the proposed G-T connection. The notified features of this SSSI are breeding bird assemblage and non-breeding hen harrier.

Wildfowl

- 11.59 Low levels of flight activity by greylag goose and whooper swan was recorded in the potential collision risk height bands for the G-T connection.

Scarce Raptors and Owls

- 11.60 Red kite, peregrine, goshawk, osprey, hen harrier, honey-buzzard, golden eagle and barn owl were all recorded in the scarce bird survey area. Red kite, goshawk, osprey, honey-buzzard, golden eagle and barn owl bred within the survey areas during the survey period. Hen harriers and red kites were present during the winter months at communal roost locations (one and two locations within the survey areas respectively).

Nightjar

- 11.61 During surveys by the Dumfries and Galloway Nightjar Study Group (DGNSG) in 2017 eight males were estimated to have territories which at least partly lay within the 500m buffer of the G-T connection, whilst in 2018 six territorial males were estimated from these surveys. The 2019 surveys estimated thirteen males within this 500m buffer.

Waders

- 11.62 Curlew and lapwing were recorded as breeding within 500m of the G-T connection.

Assessment Findings

- 11.63 For the G-T connection, **no significant** adverse effects are predicted during construction or operation on any identified bird species within the Study Area (wildfowl, nightjar, waders, scarce raptors and owls i.e. greylag goose, whooper swan, red kite, peregrine, goshawk, osprey, hen harrier, honey-buzzard, golden eagle, barn owl, nightjar, curlew and lapwing) with all effects either **none** or **minor** (for nightjar during operation only) and therefore **not significant** prior to mitigation.
- 11.64 As part of the embedded mitigation for nightjar (which are only present in the Study Area between May and September), all construction within the core nightjar management area, defined by FLS, will be avoided during this time. Furthermore, nightjar forage between dusk and dawn and thus it will be highly unlikely that any overlap with their daily foraging period and construction activities will occur. Therefore, as noted above, effects on nightjar will not be significant. Habitat enhancement suitable for nightjar is proposed, as part of the Forest Design Concept, which should increase their foraging habitat in an area beyond the current core nightjar management area. A programme of nightjar monitoring will be discussed with SNH, FLS and the RSPB for the nightjar in the core management area post construction
- 11.65 Embedded mitigation will prevent disturbance of the SPA species (Greenland white-fronted goose and greylag goose) during the dismantling of the R route.

- 11.66 There will be permanent operational beneficial effects of the removal of the R route (south) on Greenland white-fronted goose, greylag goose and whooper swan.
- 11.67 The assessment identified that cumulative effects will be **not significant** for the G-T connection.

Cultural Heritage

Existing Conditions

- 11.68 In total, 76 heritage assets have been identified within the G-T Inner Study Area. The majority of these relate to medieval or later rural land use. However, metal working finds at Glenlee, which suggests the potential for a 'bloomery' site and find-spots of stone axes discovered around Tongland indicate the potential for other prehistoric remains to be present.
- 11.69 There are 371 heritage assets within 5km that have predicted visibility of the G-T connection. Of these, 20 Scheduled Monuments, four Category A Listed Buildings, three Category B Listed Buildings, two Conservation Areas, one Garden and Designated Landscapes (GDL), three ASAs, 12 NIDLs and 14 NSR Sites, have settings that will potentially be affected by the G-T connection.

Assessment Findings

- 11.70 It is predicted that there would be **major (significant)** direct effects on three heritage assets prior to mitigation (a possible bloomery / metal working site (66), the site of a former burial cairn (190) and Park of Tongland Stone Circle (192)). **Minor (not significant)** effects are predicted on 13 assets prior to mitigation (Stroan Settlement (106), a burnt mound (126), Grobdale ASA (166), a field system (84), a former road (87), enclosures/fields (111), a findspot (159), 'Pin Stone' (98), a pond (137), an enclosure (96), a field system (97), a cairnfield (135) and a group of shepherds' cairns (197)³². There is also moderate to high potential for buried archaeological remains to survive in areas where the ground within the ILA has not been disturbed by modern commercial forestry activity.
- 11.71 Additional mitigation to prevent, reduce or offset the effects identified is proposed, including preservation in-situ if remains are found, and archaeological investigations (i.e. watching briefs and excavations) in areas with high potential for buried remains. Following implementation of these measures, eight **minor (not significant)** residual effects are considered likely on: the possible bloomery / metal working site, a field system, a former road, 'Pin Stone', enclosure/fields, a pond, Grobdale ASA, site of a former burial cairn and Park of Tongland Stone Circle. **Minor** effects are also predicted on three assets located in the windthrow felling area (an enclosure, a field system, a cairnfield and a group of shepherds' cairns).
- 11.72 Once the KTR Project is operational one **significant (moderate)** effect has been predicted on the setting of Stroan settlement, which comprises the remains of a former township scattered across Stroan Hill and which forms part of the Grobdale ASA. **Minor** adverse effects have been predicted on 26 heritage assets as noted below, and the effects on all other assets is assessed as **none**.
- Bargatton Farm, cairn (SM1002);
 - Park, stone circle (SM1039);
 - Arden, fort (SM1050);
 - Carse Mote, fort (SM1058);
 - Kirkland, fort (SM1080);
 - Miekle Sypland, fort (SM1097);
 - Blamaclellan Motte (SM1109);
 - Edgerton Mote, motte (SM1119);
 - Trostrie Mote, motte (SM1133);

³² The enclosure (96) field system (97), cairnfield (135) and group of shepherds' cairns (197) are all outside the wayleave located within the windthrow area and effects are therefore considered to be indirect as a result of felling.

- Craig Hill, fort (SM2891);
- Castle Earthworks, enclosure (SM6110);
- Miekle Wood Hill, fort (SM8367);
- Threave Castle (SM90301);
- Threave House (LB9829);
- Threave Gardens (GDL372);
- Loch Mannoch ASA (ASA10);
- Garroch NIDL (MDG25540);
- Bargatton, Cairn (MDG3770);
- Neilson's Monument, Barstobrick Hill (MDG3772);
- Giant's Dike / Barstobrick Hill, fort (MDG3780);
- High Banks, Find-spot, Cairn (MDG3994);
- High Banks, Cairn (MDG4005);
- Netherthird, earthwork (MDG4100);
- Gillfoot Mote, settlement (MDG4102);
- Laughenghie Hill, Cairn, Bank, Hut Circle (MDG8247); and,
- Dinnance Cairn (MDG8405).

- 11.73 **No significant** cumulative effects of the G-T connection, in combination with other existing and proposed developments in the vicinity, are considered likely.

Traffic and Transport

Existing Conditions

- 11.74 Sections of the A77, A76, A75, A713, A712, A711, A702, A762, B795, C50s, C31s, C13s, C45s, U137s, U133s, U107s, U103s, U62s, U43s, U34s, U3s and U2s will be used for construction of the G-T Connection, all of which are currently operating under capacity. The locality is popular for leisure and tourist trips, focusing on outdoors activities, with road cycling being a common pursuit. There are no notable crash clusters (accident 'blackspots') and there is no apparent safety problem specifically relating to vulnerable road users.

Assessment Findings

- 11.75 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the CTMP is considered a 'live' document. The assessment has also taken account of road upgrades that will be undertaken for the Glenlee substation extension including infrastructure improvements to the A762 (between the A713 and the U2s) and on the U2s and additional mitigation in the form of localised widening of strategic sections of C45s, C13s, U3s (between the A712 and worksite access reference 37) and U43s will be implemented to ease access to the worksites for HGV construction traffic and general traffic sharing these route sections notably including upgraded passing places.
- 11.76 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** for the G-T connection and **not significant**.

- 11.77 Due to the implementation of the infrastructure improvements noted above and the CTMP, the residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the G-T connection, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Existing Conditions

- 11.78 The Study Area is generally rural in character and background noise levels will likely vary according to specific conditions, particularly in relation to natural noise levels such as wind disturbed foliage and watercourse noise, as well as the varying influence of traffic on the road network in some cases. There are a number of highly sensitive receptor locations (i.e. residential dwellings) and a representative sample has been assessed for potential effects associated with construction and operation of the G-T Connection.

Assessment Findings

- 11.79 Prior to mitigation, potential temporary **moderate** effects are predicted during construction of the G-T connection at Carville, Dunston, The Upper Cottage, Argrennan Mains, Woodlands, Brennan Cottage, Ken Tor, Boatknowe, Mosscroft, Craigend and Glentoo Farm/Cottage. Additional mitigation is proposed in the form of limiting working hours at weekends, and therefore the effects will be reduced **minor** and **not significant**. All other effects will be at worst **minor** and temporary and **not significant** in EIA terms.
- 11.80 There are **no adverse significant** effects from operational noise from the proposed OHL for the G-T connection.
- 11.81 There are **no significant** cumulative effects due to the influence of the other proposed connections of the KTR Project or other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Existing Conditions

- 11.82 Existing settlements in close proximity to the G-T connection include the town of Kirkcudbright and the small settlements of New Galloway, Balmaclellan, Mossdale, Slogarie, Laurieston, Garroch, Ringford, Barcaple, Twynholm and Tongland. There are also smaller residential clusters, hamlets and farm buildings in the locality. A number of local roads are located in close proximity to this connection, including multiple stretches of the A713 Galloway Tourist Route and the A762 Scottish Castle Route. Other key roads with the potential to be affected by this connection are noted in relation to traffic and transport above. A number of Core Paths intersect with or overlap with proposed public road construction routes for the G-T connection of the KTR Project.
- 11.83 Tourism and recreation is recognised as an important component of the economy within Dumfries and Galloway and key tourism assets located within close proximity of this connection include³³:
- Mulloch Hill, situated south-east of St John's Town of Dalry;
 - Loch Ken (including Marina and Waterski School);
 - Robert the Bruce Trail and Galloway Red Kite Trail;
 - Numerous cultural heritage assets, including Scheduled Monuments, Listed Buildings and other heritage based outdoor visitor attractions;
 - Other outdoor tourist destinations and visitor attractions (golf clubs, caravan parks etc.);

³³ Note that this is not an exhaustive list.

- Indoor tourism destinations and visitor attractions (museums etc.);
- Hospitality businesses including restaurants and cafés; and
- Visitor Accommodation.

Assessment Findings

- 11.84 A **moderate adverse (significant)** effect was identified for recreational access during construction of the G-T connection as a result of the number of Core Paths, and thus the extent of the public access network, likely to be temporarily disrupted. Good practice measures for recreational access will be put in place; however the residual effect will remain **moderate adverse (significant)**. **Minor adverse** effects were predicted for designated walking and recreational routes and outdoor tourist destinations. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**.
- 11.85 During operation, a **moderate adverse (significant)** effect is predicted on designated walking and recreational routes. The routes will remain open and fulfil their purpose of providing countryside access, however, it is considered that owing to the increased number and level of visual amenity effects on relevant recreational routes and the distribution of likely significant visual effects across the Core Path network in terms of effects on visual amenity, a significant effect will arise. **Minor adverse** effects were identified for outdoor tourist destinations, visitor accommodation and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 11.86 **No cumulative** residual effects are considered likely to arise from the G-T connection.

Other Issues

Existing Conditions

EMFs

- 11.87 EMFs and the electromagnetic forces they represent are an essential part of the physical world. Their sources are the charged fundamental particles of matter (principally electrons and protons) and they occur naturally within the body and in the natural world. Energised high voltage power-transmission equipment, along with all other uses of electricity, is a source of EMFs.

Dust

- 11.88 There are 57 residential properties within 200m of the G-T connection and these are therefore judged to be potential receptors of dust emissions from the associated construction works and construction traffic movements.

Assessment Findings

EMFs

- 11.89 The G-T OHL would be fully compliant with Government policy. Specifically, all the EMFs produced would be below the relevant exposure limits, and the proposed OHLs would comply with required policy and safety standards. Therefore, EMF effects resulting from the KTR Project would be **not significant**.

Dust

- 11.90 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the site are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised and associated dust effects for the G-T connection will be **not significant**.

Intra-Connection Effects

Existing Conditions

- 11.91 Details of the existing conditions in relation to the topics where it is considered that there could be interactions that could result in 'intra-connection' effects on residential receptors are set out above (i.e. LVIA, hydrology, traffic, noise and dust).

Assessment Findings

- 11.92 No new significant effects have been identified over and above those associated with the original landscape, hydrology, noise, traffic and dust assessments for the G-T connection. As such, 11 **moderate** effects (**significant**) were identified for properties/property groups which are primarily associated with the effects on residential visual amenity during construction. These were Glenlee Power Station properties x 9, Airie Cottage, Darsalloch, Upper Balannan Cottages x 3, Woodlands, Argrennan Farm and properties x 5, Hilldrop Lodge, High Clachan, Tongland properties x 15, Langbarns and Weir House.
- 11.93 Six property groups and four individual properties will experience a **moderate** effect (**significant**) once operational.
- 11.94 Nine properties will experience **moderate beneficial** effects (**significant**) associated with the removal of the existing N and R route infrastructure. All other effects will be **minor** or **none** and **not significant**.

12 What are the Environmental Effects of the KTR Project as a Whole?

KTR as a Whole

- 12.1 In addition to undertaking an assessment of the potential effects associated with each individual connection, an assessment was also undertaken of the inter-related nature of the different connections of the KTR Project in its entirety (KTR Project as a Whole) i.e. the combined effects of P-G via K (and the removal of N route and R route (north)) + C-K + E-G + BG Deviation + G-T (and the removal of the R route (south)). 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.

Landscape and Visual Amenity

Assessment Findings

- 12.2 There is potential for construction related activities associated with more than one connection of the KTR Project to overlap in such a way that they could combine to result in an increased level of effect for a particular receptor.
- 12.3 The KTR Project as a Whole will result in a **moderate** (adverse, short-term) (**significant** – locally, **Minor** (adverse, short-term) **not significant** for LCT as a whole) effects during construction for Upper Dale – Dumfries & Galloway (165) and Foothills with Forest – Dumfries and Galloway LCT (176).
- 12.4 Significant residual effects for the KTR Project as a Whole have been identified for the following receptors during construction (all adverse and short-term):
- VP4: Footbridge access to Kendoon: **Major**;
 - VP5: B7000 west of Glenhoul Hill: **Moderate**;
 - VP7: Southern Upland Way near Waterside Hill: **Moderate**;
 - VP8: Southern Upland Way near St John's Town of Dalry: **Moderate**;
 - VP10: A762 north of Glenlee: **Moderate**;
 - VP11: Unclassified road (U3S) south-west of Glenlee: **Moderate**;
 - VP12: Core Path 516 south-west of Glenlee: **Major**;
 - Dundough: **Moderate**;
 - Kendoon: **Major**;
 - St Johns Town of Dalry: **Moderate**;
 - Glenlee: **Moderate**;
 - P56: Waterside, Glenlee: **Moderate**;
 - A713 (Galloway Tourist Route, Scottish Castle Route, Loch Ken and River Dee Biosphere Route): **Moderate**;

- A762 (Scottish Castle Route, Loch Ken and River Dee Biosphere Route): **Moderate**;
 - Southern Upland Way: **Moderate**.
- 12.5 Once operational, significant landscape effects are predicted for Upper Dale – Dumfries & Galloway (165), Foothills with Forest – Dumfries and Galloway LCT (176), Flooded Valley LCT (164) and Drumlin Pastures LCT (169) (**moderate**, adverse, long-term).
- 12.6 **Significant** residual effects for the KTR Project as a Whole have been identified for the following receptors during operation (adverse and long-term):
- VP4: Footbridge access to Kendoon: **Moderate**;
 - VP7: Southern Upland Way near Waterside Hill: **Moderate**;
 - VP8: Southern Upland Way near St John’s Town of Dalry: **Moderate**;
 - VP12: Core Path 516 south-west of Glenlee: **Major**;
 - Dundee: **Moderate**;
 - Kendoon: **Moderate**;
 - Glenlee: **Moderate**;
 - A713 (Galloway Tourist Route, Scottish Castle Route, Loch Ken and River Dee Biosphere Route): **Moderate**;
 - A762 (Scottish Castle Route, Loch Ken and River Dee Biosphere Route): **Moderate**.
- 12.7 Once operational, **significant** cumulative effects are predicted for the following receptors as a result of interactions all of the proposed KTR Connections and a number of wind farms in the Study Area as detailed in Chapter 6 of the NTS (all effects are **moderate**, adverse and long-term):
- Upper Dale – Dumfries & Galloway LCT (165);
 - Foothills with Forest – Dumfries and Galloway LCT (176);
 - VP4: Footbridge access to Kendoon;
 - VP7: Southern Upland Way near Waterside Hill;
 - VP12: Core Path 516 south-west of Glenlee;
 - VP29: Barstobrick Hill (Neilson’s Monument);
 - Dundee settlement;
 - Kendoon settlement; and
 - Glenlee settlement.
- 12.8 As part of the KTR Project, SPEN has set out objectives and processes to be applied to re-planting within the wayleave and the windthrow areas to mitigate for potential landscape and visual effects. Opportunities for potential enhancement are also set out, to be delivered through the Forest Design Concept.
- 12.9 SPEN is also proposing to deliver a Green Networks Scheme for the KTR Project, which will be agreed with stakeholders once the applications for the KTR Project have been determined by the Scottish Ministers. The overall aim of the KTR GNS will be to promote and secure environmental mitigation within the areas and communities affected by the OHLs, and likely to comprise areas within 1-2km of the proposed OHLs, where schemes can be expected to provide landscape mitigation linked to the KTR Project which maximises benefits for communities. Schemes which focus on landscape and visual enhancement will be encouraged, such as:
- Additional forestry and woodland planting (hedgerows/shelterbelts/screening of the overhead lines);
 - Planting around and within settlements;
 - Integrated habitat networks; and

- Greenspace improvements.

12.10 As these potential measures, which may deliver further mitigation of landscape and visual effects, will be devised and developed post-consent no certainty can currently be attached to their potential delivery as negotiation and agreement with communities and third-party landowners will be required.

Forestry

Assessment Findings

- 12.11 Felling proposed during construction of the KTR Project as a Whole incorporates 163.47ha of trees within the 70/80m wide wayleave corridor. As a mitigation measure against the risk of windthrow it is also proposed to fell a further 113.52ha of forestry outwith the wayleave corridor up to an existing windfirm edge. The assessment has been undertaken on the assumption that these areas will be required to be replanted by the landowners, albeit that SPEN has no control over these areas.
- 12.12 An additional 69.99ha of forestry is required to be felled associated with the KTR Project as a Whole for the creation of access tracks, construction compounds and stone quarries required during construction, including decommissioning of the existing N and R routes.
- 12.13 These areas to be felled include 29.04ha of broadleaf woodland including areas designated as ASNW or NWSS. In addition to this there is a 16.36ha of PAWS which also within ASNW/NWSS designations. Whilst care has been taken to minimise the extent to which the KTR Project as a Whole will require the felling of broadleaf woodland, it has not been possible to avoid this entirely.
- 12.14 The residual effect on long-term loss of forestry resources due to felling of trees within the wayleave corridor is predicted to be **moderate** and **significant**. Whilst SPEN will implement best practice in managing these areas, and will seek to undertake replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 12.15 The residual effect associated with loss of broadleaf woodland including Ancient Woodland and Native Woodland Resource due to felling of trees within the wayleave corridor will be **major** and **significant**. Whilst measures to reduce this are proposed, including undertaking replanting within the wayleave, this is subject to landowner agreement and therefore cannot be considered committed mitigation.
- 12.16 The residual effect of loss of the forest resource associated with the felling of trees for the creation of temporary construction compounds, quarries and construction access tracks will be **moderate** and **significant**. Agreements between SPEN and the landowners will be in place which gives a high level of confidence that the replanting will take place, however as it's not directly under SPEN's control, the replanting cannot be considered committed mitigation.
- 12.17 As part of the KTR Project, SPEN has set out objectives and processes to be applied to re-planting within the wayleave and the windthrow areas to mitigate for potential direct and indirect effects. Opportunities for potential enhancement of the local woodland environment are also set out, to be delivered through the Forest Design Concept.
- 12.18 As noted in the LVIA section above, SPEN is proposing to deliver a Green Networks Scheme for the KTR Project, which will be focussed on landscape and visual enhancement, including additional forestry and woodland planting (hedgerows/shelterbelts/screening of the overhead lines); planting around and within settlements; integrated habitat networks; and greenspace improvements.
- 12.19 Effects on forestry management during construction will be **none** and **not significant**.
- 12.20 Effects on forestry management during operation will be **minor** and **not significant**.

Geology, Hydrology, Hydrogeology, Water Resources and Peat

Assessment Findings

- 12.21 **No significant** residual hydrological or hydrogeological effects were identified during construction for any of the connections comprising the KTR Project in relation to surface and ground water quality and PWS, channel morphology, runoff rates and flood risk, or effects on peat. Residual effects for the individual connections in isolation are either **minor** or **none**. A potential **moderate** significant effect was identified for GWDTEs for G-T connection.
- 12.22 Combining the residual effects of all connections to assess the KTR Project as a Whole would result in an overall effect significance of either **none** (for PWS, channel morphology, flood risk during construction and operation), **minor** (for water quality, groundwater levels and recharge and peat), and **moderate** for GWDTEs. No additional significant effects are predicted for the KTR Project as a Whole.

Ecology

Assessment Findings

- 12.23 The KTR Project as a Whole will have potential effects on the connectivity of the Water of Ken Woods SSSI, while a number of ancient woodland features will be severed. Considering these effects across the KTR Project as a Whole, it is recognised that there will still only be effects on one SSSI, and so the significance of the potential effect at a whole project level does not change and will be i.e. **none** and **not significant**.
- 12.24 Across the KTR Project as a whole, a number of ancient woodland areas will be affected. However, the effect is relatively limited in an otherwise large and well-connected area. Most of these effects will be associated with the G-T Connection.
- 12.25 When considering the effects of the KTR Project as a Whole on habitats there is a greater area of broadleaved woodland habitat loss than for the individual connections, however this corresponds with a greater availability of broadleaved woodland resource across the corresponding Study Area. As such, effects for the KTR Project as a Whole will be **none** and **not significant**.
- 12.26 Protected species, primarily red squirrel, pine marten, badger and otter, were present throughout the KTR Project as a Whole project Study Area. At a KTR Project as a Whole level, there is a greater risk of habitat loss, severance and mortality for these species, however in the context of the wider Study Area, effects are no more or less significant at this scale than at the individual connection level. As such, effects of the KTR Project as a Whole on protected species will be **none** and **not significant**.
- 12.27 The Forest Design Concept has given consideration to potential enhancement opportunities in the wayleave and, where possible, windthrow areas. This includes proposals for restoration/enhancement planting in areas of highest ecological importance. While it will not be possible to vegetate the entire wayleave, for technical reasons, the FDC introduces the concept of a 'wildlife bridge' which will allow the re-connection of severed habitats in key locations, for example where evidence of red squirrel or pine marten has been recorded.

Ornithology

Assessment Findings

- 12.28 **No significant** residual effects are predicted on any ornithological interests for the KTR Project as a Whole, and the residual effects predicted for construction disturbance and displacement, including removal of N and R Routes, and operation will be **none** and therefore **not significant** in terms of the EIA Regulations. Whilst not significant, there will be permanent operational beneficial effects of the removal of the R route (south) on Greenland white-fronted goose, greylag goose and whooper swan.

- 12.29 Habitat enhancement suitable for nightjar is proposed, as part of the Forest Design Concept, which should increase their foraging habitat in an area beyond the current core nightjar management area. A programme of nightjar monitoring will be discussed with SNH, FLS and the RSPB for the nightjar in the core management area post construction.

Cultural Heritage

Assessment Findings

- 12.30 Overall there are 72 heritage assets identified within the ILA for the KTR Project as a Whole that are predicted to be directly affected by one or more of the connections of the KTR Project. Taking the additional mitigation into account, it is assessed that there will be no significant (major or moderate) residual construction effects on cultural heritage from the construction of the KTR Project as a Whole. Twelve **minor (not significant)** residual effects are considered likely on:
- Knocknalling NIDL (34);
 - former enclosure (62),
 - possible bloomery / metal working site (66),
 - field system (84);
 - road (87);
 - 'Pin Stone' (98);
 - Enclosures/Fields (111);
 - pond (137);
 - Polharrow Burn ASA (165);
 - Grobdale ASA (166);
 - site of burial cairn (190); and
 - Park of Tongland Stone Circle (192).
- 12.31 There are 406 heritage assets that have theoretical visibility of one or more connection of the KTR Project as a Whole. The majority of these are listed buildings that have localised settings which will not be affected by the presence of the KTR Project as a Whole in the wider landscape. 69 of the heritage assets have been assessed as having settings that are potentially sensitive to the KTR Project. One effect of **moderate** significance is considered likely to result from the KTR Project as a Whole on the setting of Stroan settlement (MDG8225) (arising from the G-T connection).
- 12.32 No cumulative effects are predicted for the KTR Project as a Whole during construction or operation.

Traffic and Transport

Assessment Findings

- 12.33 A number of embedded mitigation measures will be put in place as part of standard good practice to avoid or minimise traffic and transport effects, delivered through the CTMP. The framework CTMP provides preliminary details of proposed traffic management measures and associated interventions to be implemented during the construction phase of the KTR Project to minimise disruption and improve safety. The CTMP will be enhanced and expanded as appropriate by SPEN's appointed contractor(s) in consultation with Roads Authorities and the Police prior to commencement of construction activities and as necessary during the construction phase; the CTMP is considered a 'live' document. The assessment has also taken account of road upgrades that will be undertaken for the Glenlee substation extension and additional mitigation in the form of localised widening of strategic sections of C45s, C13s, U3s (between the A712 and worksite

access reference 37) and U43s will be implemented to ease access to the worksites for HGV construction traffic and general traffic sharing these route sections notably including upgraded passing places.

- 12.34 On the basis that the CTMP will be in place, construction effects on driver delay, road safety and community impacts will be **minor** the residual effects will be **minor** and **not significant** for the KTR Project as a Whole.
- 12.35 Due to the implementation of the infrastructure improvements noted above and the CTMP, the residual cumulative effects will also be **minor** and **not significant**. If the construction of any notably sized development(s), e.g. wind farm development(s) (as considered in the cumulative assessment) appears likely to overlap with the KTR Project as a Whole, SPEN will liaise with the appropriate developer organisation regarding the scheduling of deliveries and potential means of reducing the impact of combined construction traffic.

Noise

Assessment Findings

- 12.36 There is the potential for increased effects due to the combination of the different proposed connections of the KTR Project, on the basis that in some cases different activities associated with more than one individual connection may overlap in such a way that they could combine to result in an increased magnitude of effect on a receptor.
- 12.37 On this basis, prior to mitigation, potential temporary **moderate** effects are predicted at the Glenlee properties during construction of the KTR Project as a Whole. Additional mitigation is proposed in the form of limiting working hours at weekends and avoiding simultaneous work on some activities (access tracks construction, building working area and laying of underground cable) in close proximity to the properties Glenlee properties. Therefore the effects will be reduced **minor** and **not significant**. All other combined effects of the KTR Project as a Whole will be at worst **minor** and **temporary** and **not significant** in EIA terms.
- 12.38 Whilst a number of other properties may experience increased noise levels for the KTR Project as a Whole compared with individual connections, there will be **no adverse significant** effects during operation.
- 12.39 There are **no significant** cumulative effects due to the influence of the other proposed developments in the area.

Socioeconomics, Tourism and Recreation

Assessment Findings

- 12.40 **Moderate beneficial (significant)** effects are predicted for the forestry sector and the energy (electricity transmission) sector during construction of KTR as a Whole. During construction **minor adverse** effects are predicted for designated walking and recreational routes and outdoor tourist destinations. A **minor beneficial** effect was predicted for visitor accommodation during construction. All other effects would be **none**.
- 12.41 During operation, a **Moderate Beneficial (significant)** long term sectoral effect is predicted for the energy (Electricity Transmission) sector across the Wider Socio-Economic Study Area. A **moderate adverse (significant)** effect was identified for recreational access. The recreational routes will remain open, however, it is considered that due to the number and level of effects on visual amenity on recreational routes and the distribution of likely significant visual effects across the Core Path network, a significant effect will arise. Whilst it is not committed mitigation, implementation of the KTR Green Networks referred to in the LVIA section above will aim to promote and secure additional schemes of environmental mitigation within the areas and communities affected by the OHLs.

- 12.42 **Minor adverse** effects were identified for outdoor tourist destinations, visitor accommodation and recreational activities in the open countryside. All other effects would be **none**. No mitigation measures are proposed.
- 12.43 No cumulative residual effects are considered likely to arise from the KTR Project as a Whole.

Other Issues

Assessment Findings

EMFs

- 12.44 The OHLs associated with the KTR Project as a Whole would be fully compliant with Government policy in relation to EMF. Specifically, the EMFs produced would be below the relevant exposure limits, and the proposed OHLs would comply with required policy and safety standards. Therefore, EMF effects resulting from the KTR Project as a Whole would be **not significant**.

Dust

- 12.45 Through the implementation of embedded mitigation (e.g. ensuring all loads which will enter the site are covered where practicable; enforcing an appropriate speed limit; and making use of netting screens for construction activities within 200m of receptors) the predicted magnitude of the temporary dust effects will be minimised and associated dust effects for the KTR Project as a Whole will be **not significant**.

Intra-KTR Effects

Assessment Findings

- 12.46 No new significant effects have been identified over and above those associated with the main landscape, hydrology, noise, traffic and dust assessments for KTR Project as a Whole. As such, **moderate** effects (**significant**) were identified for three properties/property groups during construction. These were the Glenlee Power Station properties x 9, the Kendoon properties x 14 and Waterside, Glenlee. Two **moderate** effects (**significant**) were identified during operation which are primarily associated with the effects on residential visual amenity. These were the Glenlee Power Station properties and the Kendoon properties. A **moderate beneficial** effect (**significant**) for Boatknowe was also identified during operation as a result of the removal of the existing R Route (South)

13 Summary and Conclusion

- 13.1 The EIA for the KTR Project has been carried out in accordance with regulatory requirements and guidance on good practice. The findings of the surveys and consultation with stakeholders have informed the design process. As a result, modifications to the design have been introduced to avoid and/or minimise effects on landscape and visual amenity, cultural heritage, ecology and ornithology, geology, hydrology, hydrogeology, water resources, peat and forestry. These modifications to the design, in combination with mitigation included as part of the design process reflecting best practice and industry standard measures for construction of projects of this nature are considered to be 'embedded mitigation'. The best practice/industry standard measures which form the embedded mitigation to be implemented during the construction process across all topic areas are well understood and it is highly likely that these measures will be successful. The embedded mitigation, which forms an integral part of the KTR Project, is therefore considered to be in place for assessment purposes, to ensure the EIA Report focuses on the likely significant effects of the KTR Project.
- 13.2 In addition to the embedded mitigation, 'additional mitigation' measures which are specific to a particular location or issue have been identified through the EIA process.
- 13.3 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 have been documented within the EIA Report as 'residual effects'. The residual significant effects arising from each connection are set out below and are illustrated on **Figure 7** to **Figure 11**.

Polquhanity to Glenlee via Kendoon (P-G via K)

- 13.4 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics; the locations of the residual significant effects is illustrated on **Figure 7.1** and **7.2**:
- Construction:
 - Landscape and Visual Amenity;
 - Forestry;
 - Cultural Heritage; and
 - Intra-Connection and Intra-KTR Effects.
 - Operation:
 - Landscape and Visual Amenity; and
 - Intra-Connection and Intra-KTR Effects.

Carsfad to Kendoon (C-K)

- 13.5 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics; the locations of the residual significant effects is illustrated on **Figure 8**:
- Construction:
 - Landscape and Visual Amenity;
 - Forestry; and
 - Intra-Connection and Intra-KTR Effects.

Earlstoun to Glenlee (E-G)

- 13.6 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics; the locations of the residual significant effects is illustrated on **Figure 9**:

- Construction:
 - Landscape and Visual Amenity; and
 - Forestry.

BG Route Deviation

- 13.7 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics; the locations of the residual significant effects is illustrated on **Figure 10.1** and **10.2**:

- Construction:
 - Landscape and Visual Amenity;
 - Forestry; and
 - Intra-Connection and Intra-KTR Effects.
- Operation:
 - Landscape and Visual Amenity; and
 - Intra-Connection and Intra-KTR Effects.

Glenlee to Tongland (G-T)

- 13.8 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics; the locations of the residual significant effects is illustrated on **Figure 11.1** and **11.2**:

- Construction:
 - Landscape and Visual Amenity;
 - Forestry;
 - Geology, Hydrology, Hydrogeology, Water Resources and Peat;
 - Socioeconomics, Tourism and Recreation (including positive effects on the energy and forestry sectors); and
 - Intra-Connection and Intra-KTR Effects.
- Operation:
 - Landscape and Visual Amenity (including beneficial effects associated with removal of the existing R route infrastructure);
 - Cultural Heritage;
 - Socioeconomics, Tourism and Recreation; and
 - Intra-Connection and Intra-KTR Effects.

KTR as a Whole

- 13.9 Following implementation of additional mitigation, residual significant effects will remain in relation to the following topics:

- Construction:
 - Landscape and Visual Amenity;
 - Forestry;

- Geology, Hydrology, Hydrogeology, Water Resources and Peat;
 - Socioeconomics, Tourism and Recreation (including positive effects for the forestry sector and the energy); and
 - Intra-Connection and Intra-KTR Effects.
- Operation:
 - Landscape and Visual Amenity (including a positive effect associated with removal of the existing R route infrastructure);
 - Cultural Heritage;
 - Socioeconomics, Tourism and Recreation; and
 - Intra-Connection and Intra-KTR Effects.

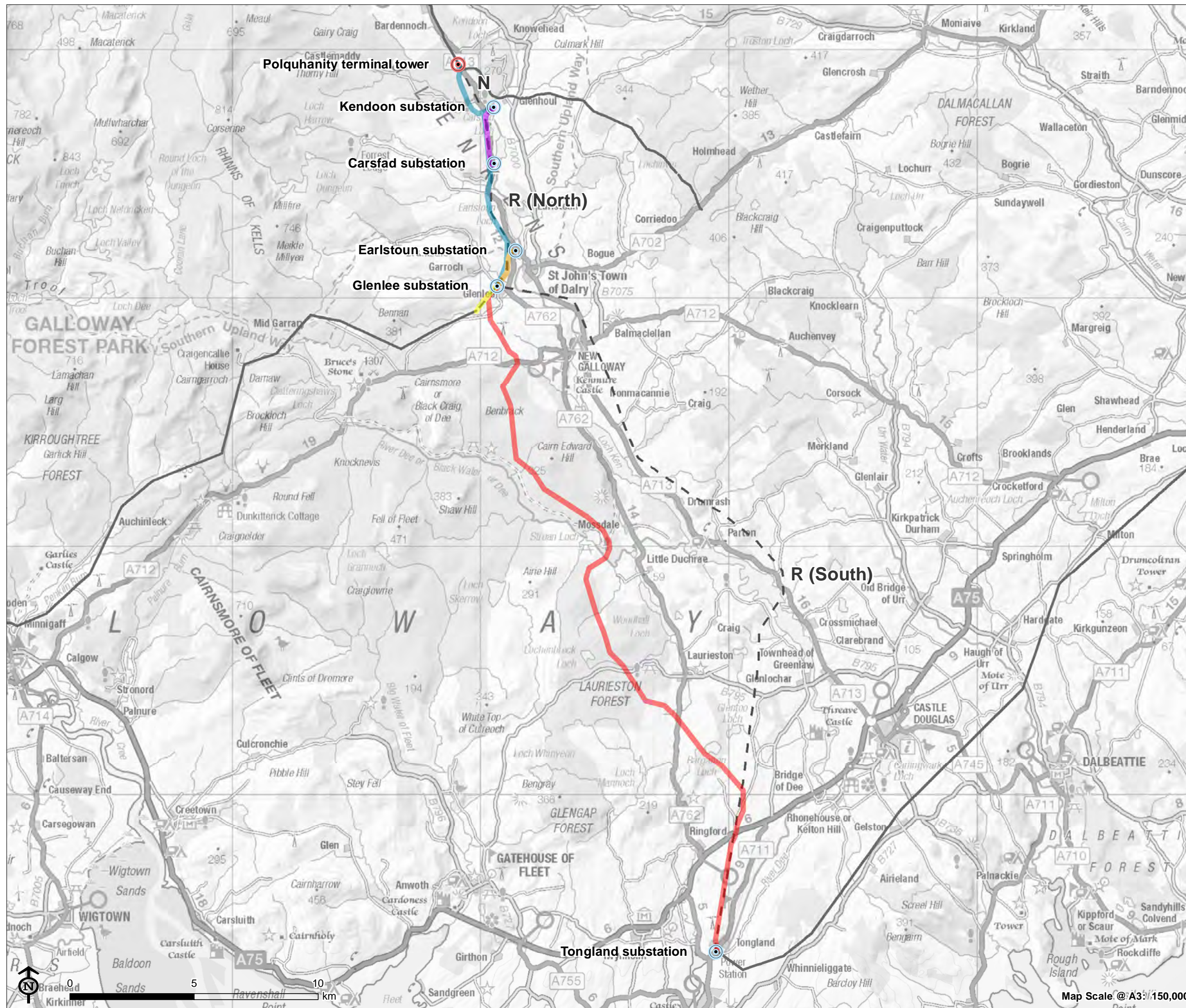
Conclusion

- 13.10 The EIA for the proposed KTR Project has been carried out in accordance with regulatory requirements and guidance on good practice. The findings of the surveys and the consultation have informed the design process. As a result, design changes have been introduced to avoid and/or minimise effects on the environment and SPEN has sought to meet the requirements of Section 38 and Schedule 9 of the Electricity Act 1989 which impose a 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."

- 13.11 Whilst some residual significant effects are inevitable for a development of this scale, the KTR Project will also result in some significant positive effects, including on landscape and visual amenity through the removal of existing infrastructure once operational, and socio-economic benefits for the forestry sector and energy (electricity transmission) sector during construction. There are also opportunities to further mitigate effects and potentially enhance the local woodland environment with biodiversity and landscape benefits through the FDC approach. SPEN is also supportive of the Scottish Government's stated aim in National Planning Framework 3 of promoting green places and active travel networks ('green networks') via the KTR Project. SPEN's overall aim for the KTR Green Networks Scheme is to promote and secure additional schemes of environmental mitigation within the areas and communities affected by the Project, working in partnership with local communities, the Scottish Government and D&GC.



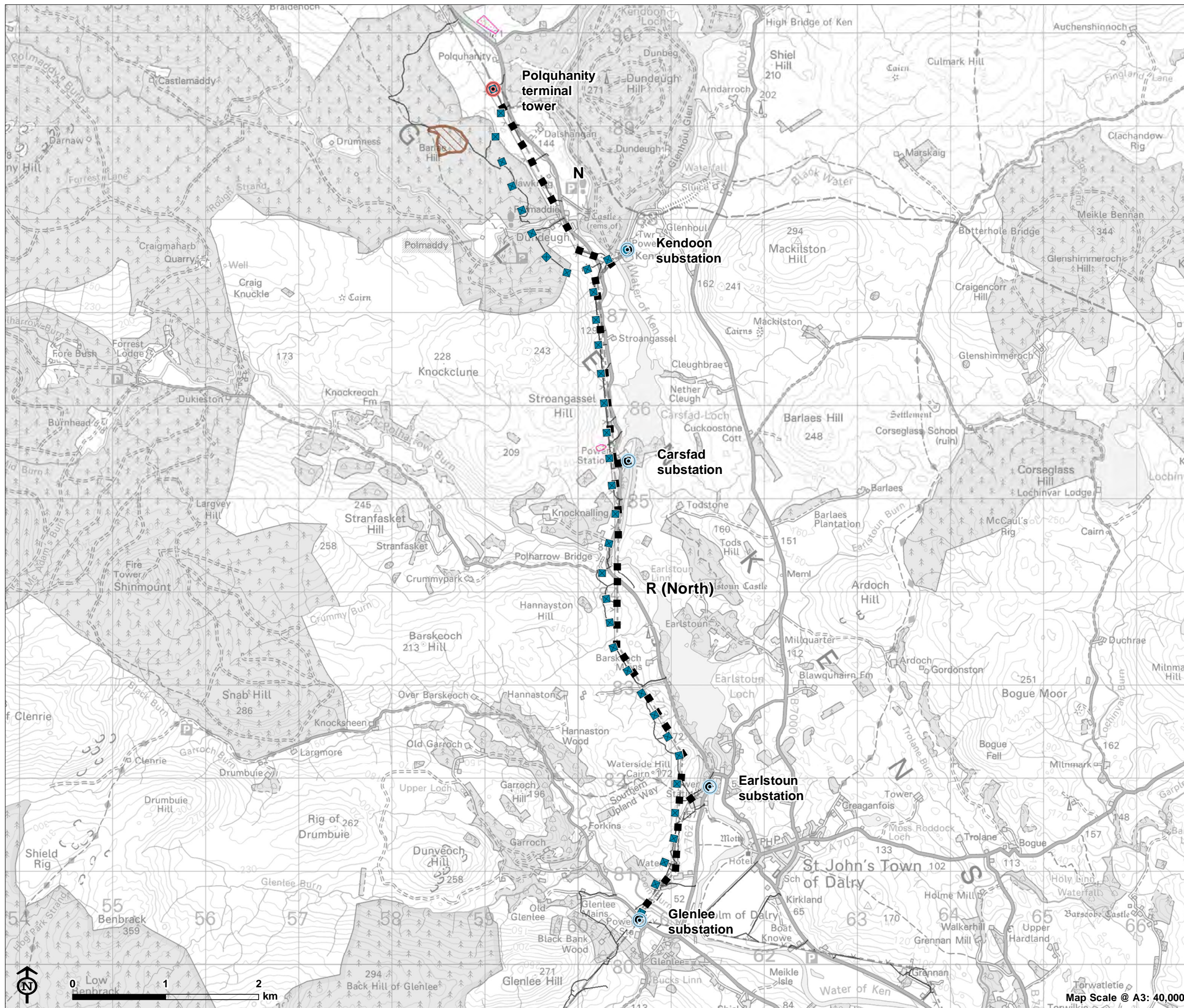
KTR Project Non Technical Summary

Figure 1: The Five Connections of the KTR Project

-  Polquhany sealing end and terminal tower
-  Substation and hydro electricity generating station
-  Polquhany to Glenlee via Kendoon
-  Carsfad to Kendoon
-  Earlstoun to Glenlee
-  BG route deviation
-  Glenlee to Tongland
-  Existing 132kV overhead line to be removed (following construction of the KTR Project)
-  Existing network

Note: For the purposes of the EIA and S37 application R route has been divided into North and South at the Glenlee substation



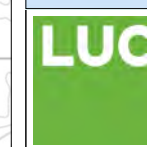


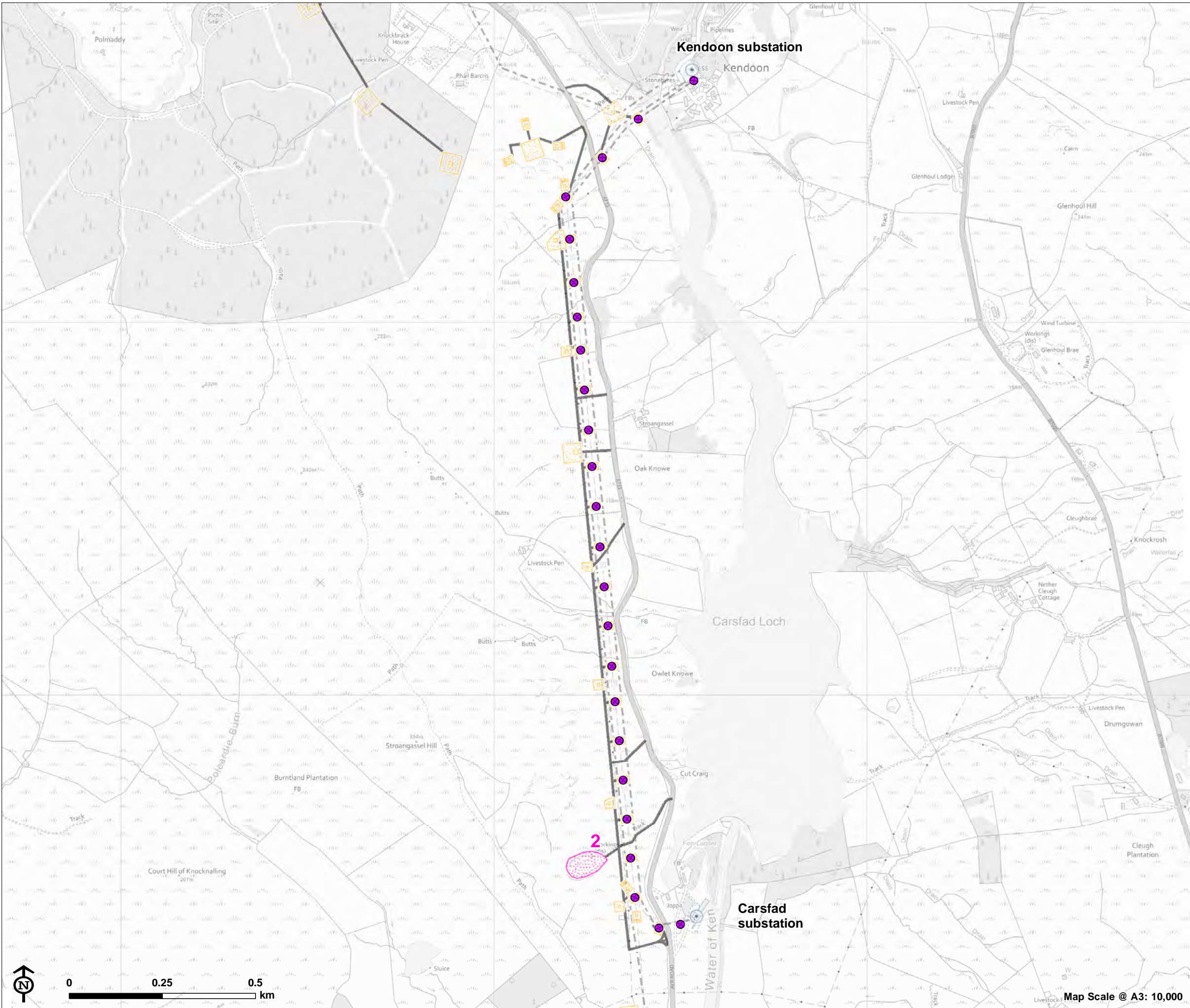
KTR Project Non Technical Summary

Figure 2: Polquhanity to Glenlee (via Kendoon) and Removal of N and R Route (North) - Location Plan

- Polquhanity sealing end and terminal tower
- Substation and hydro electricity generating station
- Polquhanity to Glenlee via Kendoon (steel lattice tower)
- Existing tower for removal - Routes 'N' and 'R (North)'
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Existing network
- Access track
- Construction compound
- Potential quarry working area

Note: Due to the scale working areas are not shown on this figure.



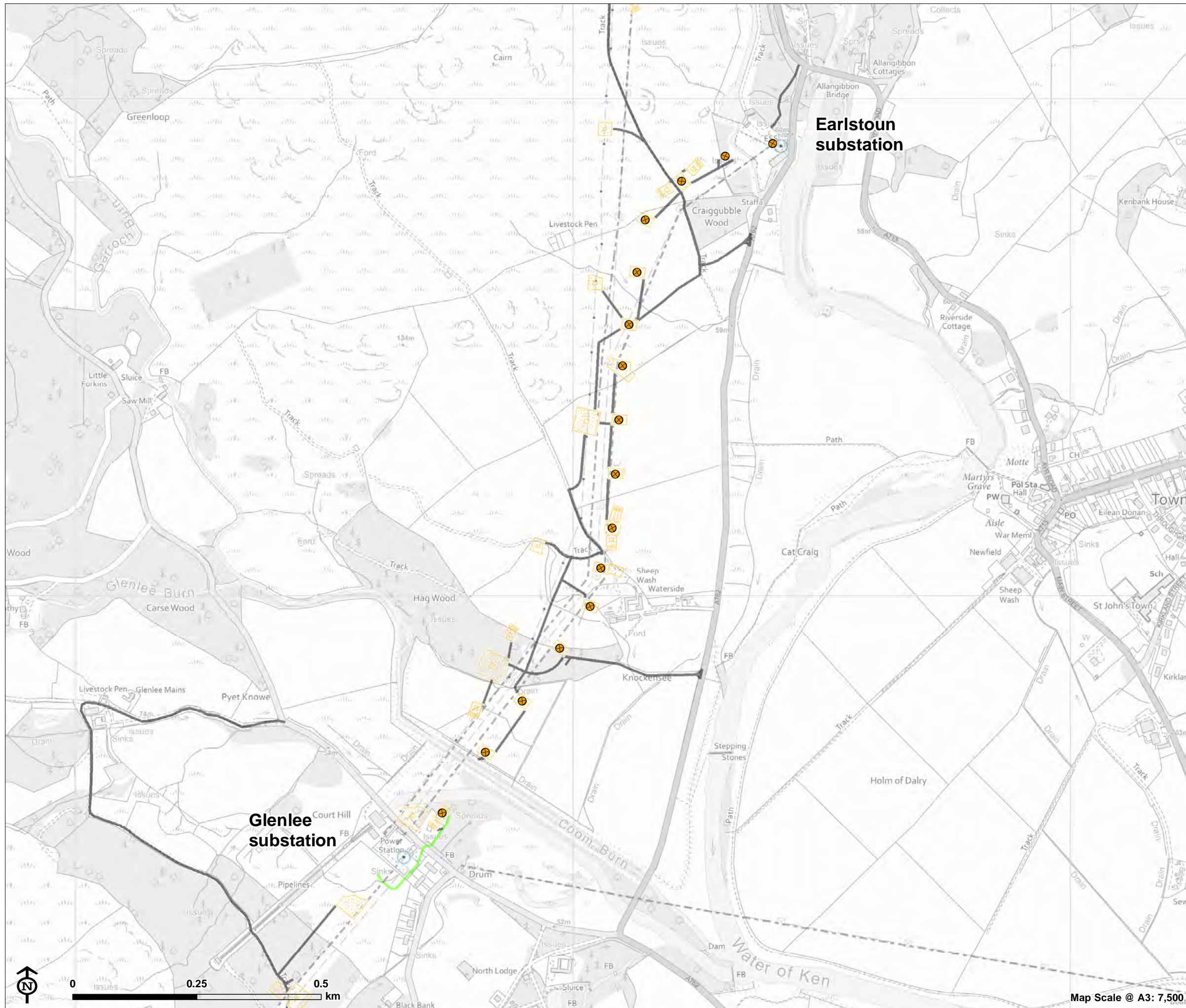


KTR Project Non Technical Summary

Figure 3: Carsfad to Kendoon - Location Plan







- Substation and hydro electricity generating station
- Carsfad to Kendoon (wood pole)
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Access track
- Construction compound
- Working area

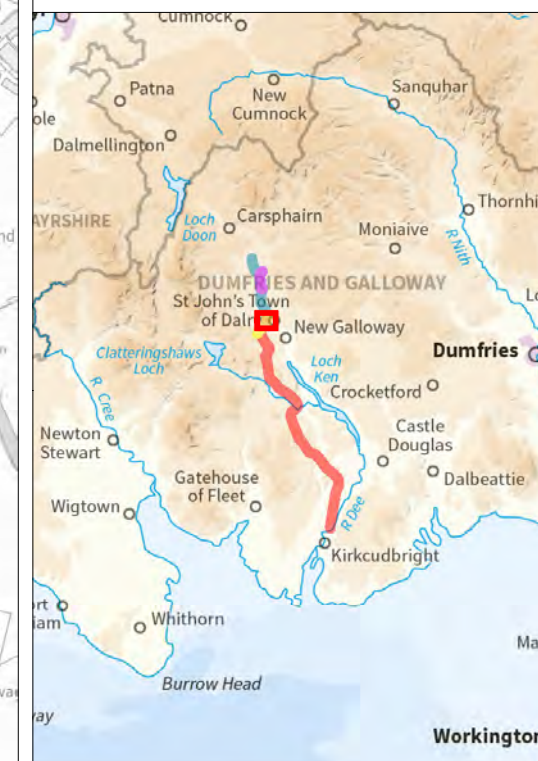


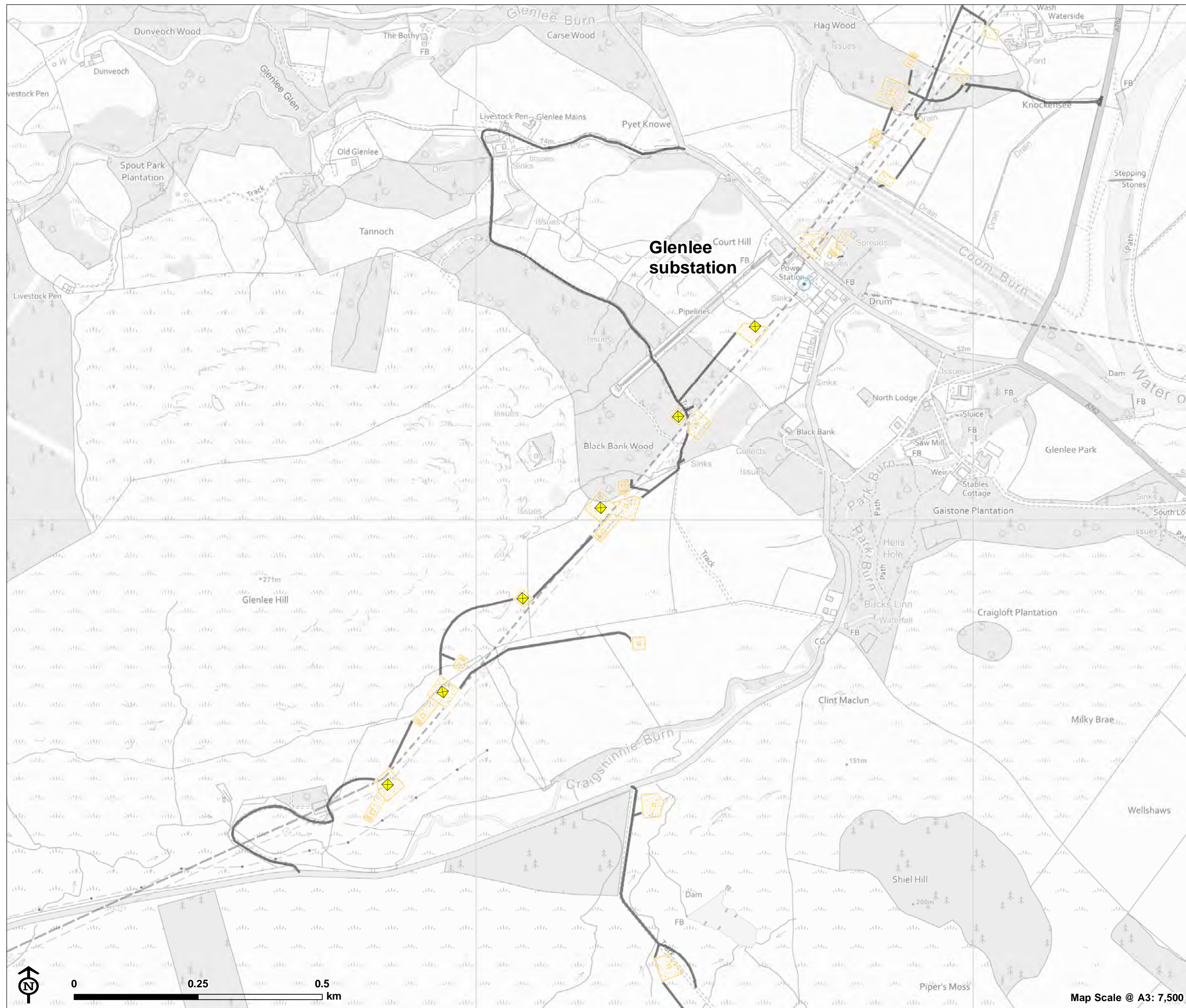


KTR Project Non Technical Summary

Figure 4: Earlstoun to Glenlee - Location Plan

-  Substation and hydro electricity generating station
-  Earlstoun to Glenlee (wood pole)
-  Existing 132kV overhead line to be removed (following construction of the KTR Project)
-  Underground cable
-  Access track
-  Working area



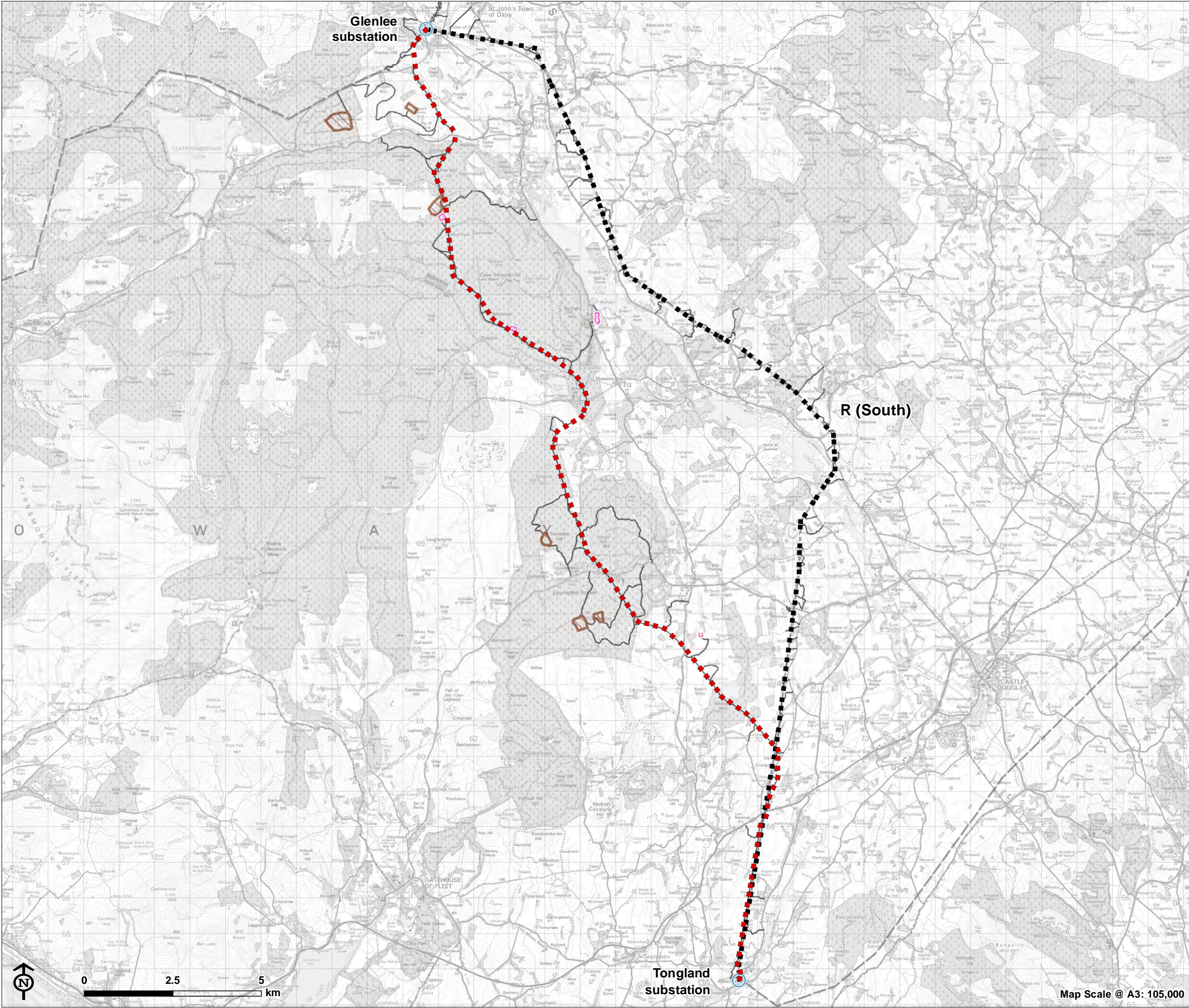


KTR Project Non Technical Summary

Figure 5: BG Route Deviation - Location Plan

- Substation and hydro electricity generating station
- BG route deviation (steel lattice tower)
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Existing network
- Access track
- Working area





KTR Project Non Technical Summary

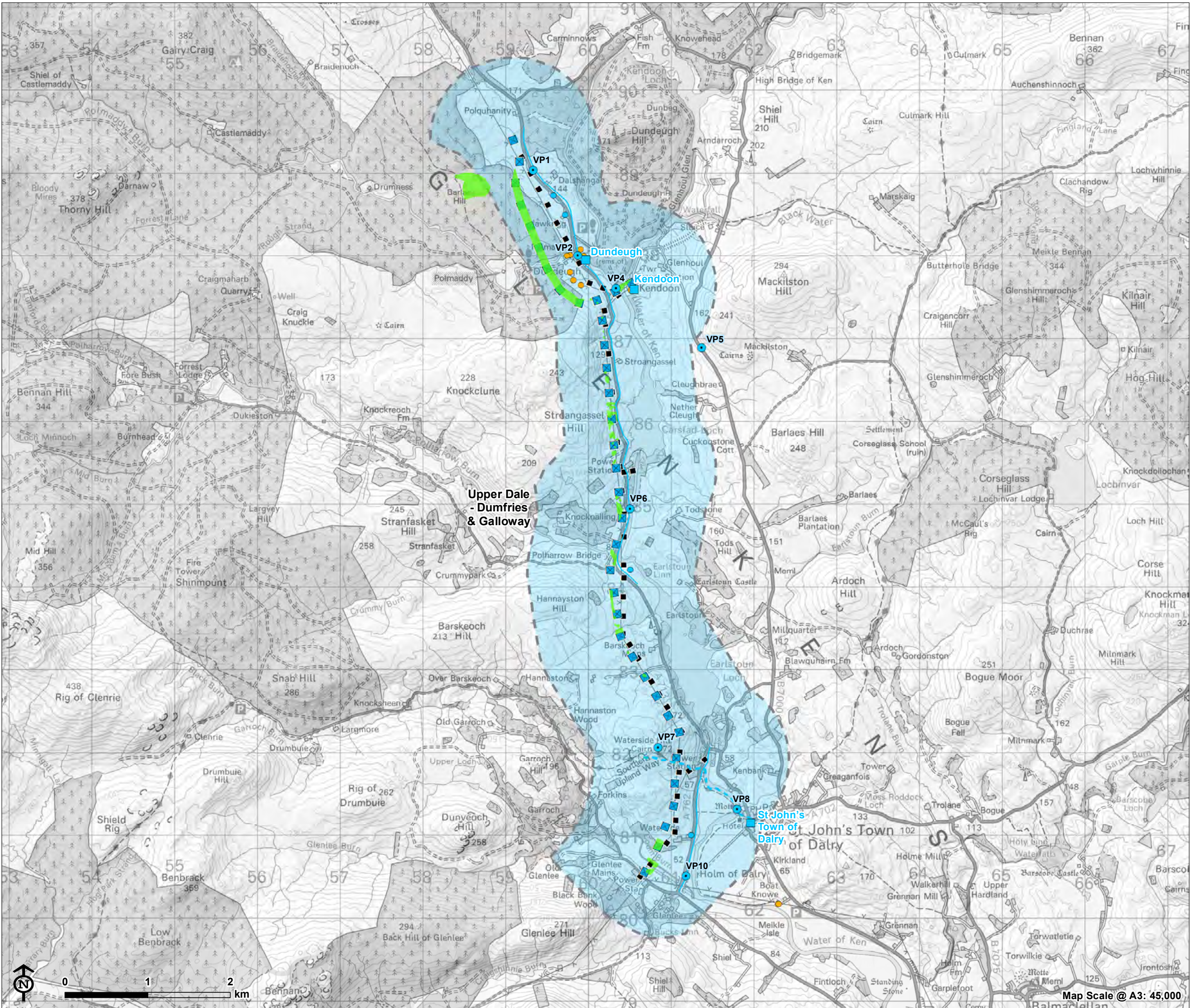
Figure 6: Glenlee to Tongland and Removal of R Route (South) - Location Plan

- Substation and hydro electricity generating station
- Glenlee to Tongland (steel lattice tower)
- Existing tower for removal - Route 'R' (South)
- Existing 132kV overhead line to be removed (following construction of the KTR Project)
- Existing network
- Access Track
- Construction compound
- Potential quarry working area

Note: Due to the scale working areas are not shown on this figure.



Figure 7.1: Summary of Likely Significant
Residual Effects During Construction
Polquhanity to Glenlee via Kendoon



- Overhead line Infrastructure**
- Polquhanity to Glenlee via Kendoon (steel lattice tower)
 - Existing tower for removal
- Landscape and Visual Amenity**
- Viewpoint
 - Residential property
 - Settlement
 - Southern Upland Way
 - Road Routes A713 and A762
 - 2019 SNH landscape character types with significant effects (Upper Dale LCT)
- Forestry**
- Forestry (to be felled)
- Intra Effects**
- Residential property

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report

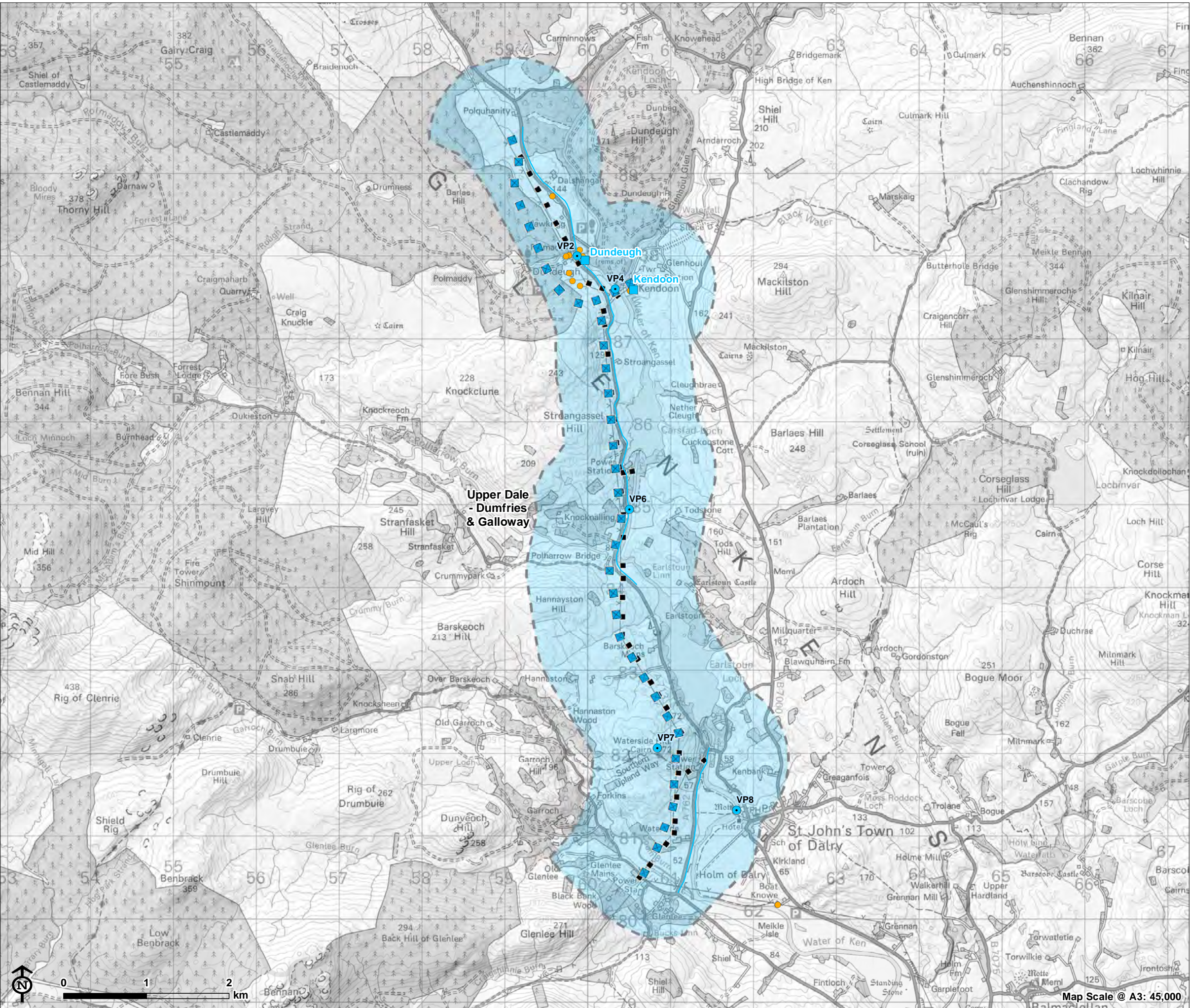


KTR Project
EIA Report

Figure 7.2: Summary of Likely Significant
Residual Effects During Operation
Polquhanity to Glenlee via Kendoon

- Overhead line Infrastructure**
- Polquhanity to Glenlee via Kendoon (steel lattice tower)
 - Existing tower for removal
- Landscape and Visual Amenity**
- Viewpoint
 - Settlement
 - Road Routes A713 and A762
 - 2019 SNH landscape character types with significant effects (Upper Dale LCT)
- Intra Effects**
- Residential property

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report

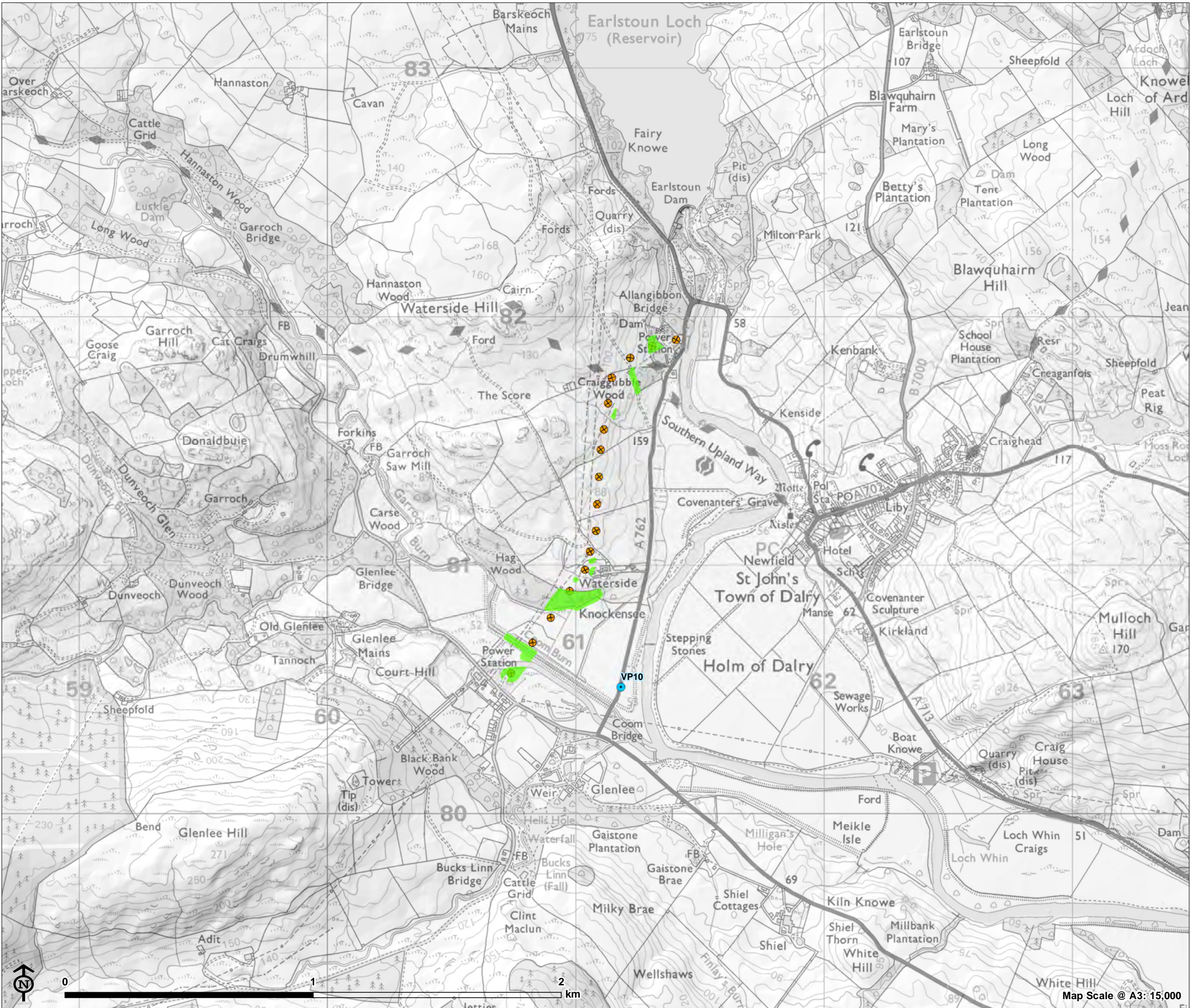


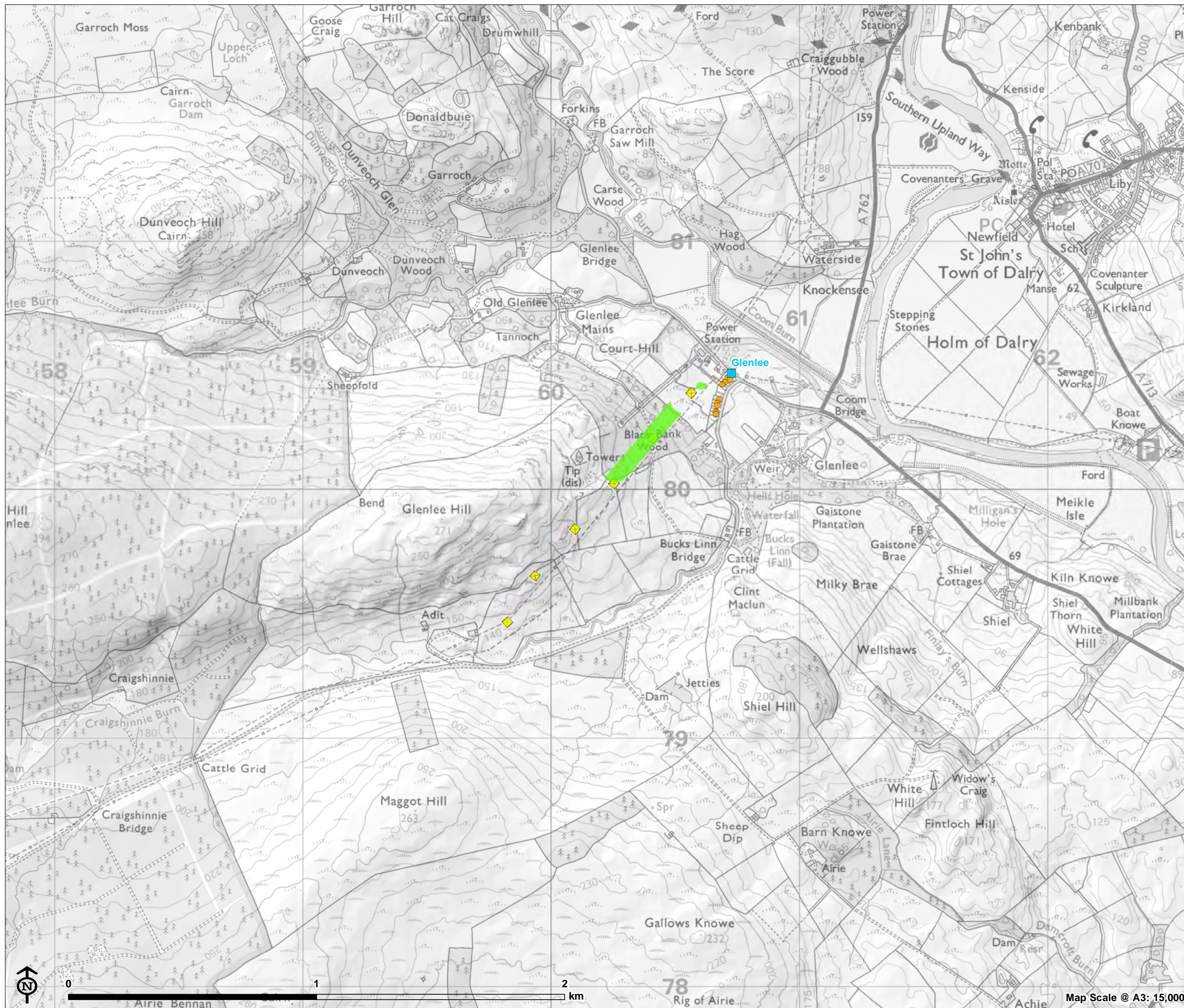
KTR Project
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Figure 9: Summary of Likely Significant
Residual Effects During Construction
Earlstoun to Glenlee

- Overhead line Infrastructure**
- Earlstoun to Glenlee (wood pole)
- Landscape and Visual Amenity**
- Viewpoint
- Forestry**
- Forestry (to be felled)

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report





KTR Project EIA Report

**Figure 10.1: Summary of Likely Significant Residual Effects During Construction
BG route deviation**

- Overhead line Infrastructure**
 - ✦ BG route deviation (steel lattice tower)
- Landscape and Visual Amenity**
 - Settlement
- Forestry**
 - Forestry (to be felled)
- Intra Effects**
 - Residential property

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report

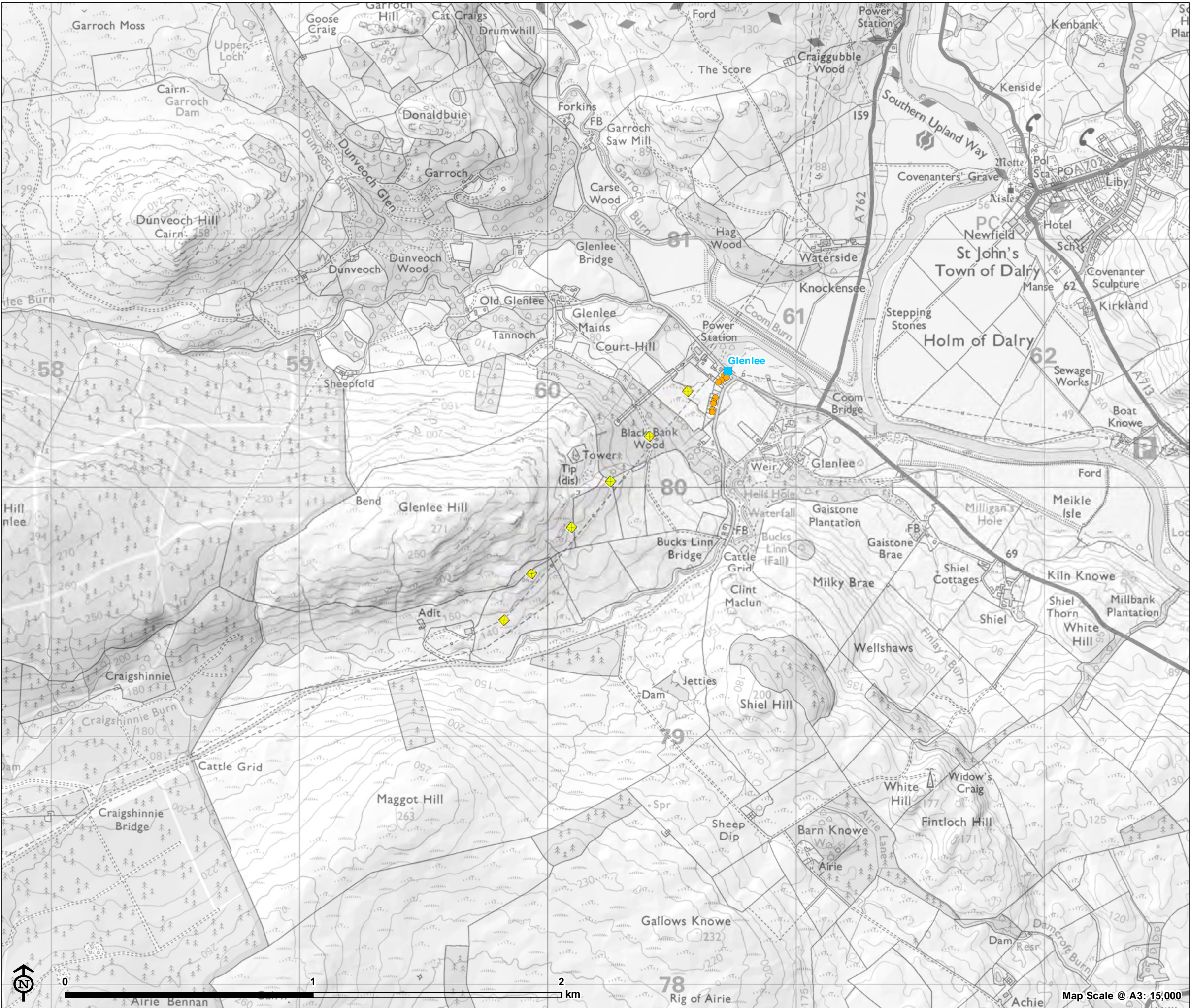


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Figure 10.2: Summary of Likely
Significant Residual Effects During
Operation
BG route deviation

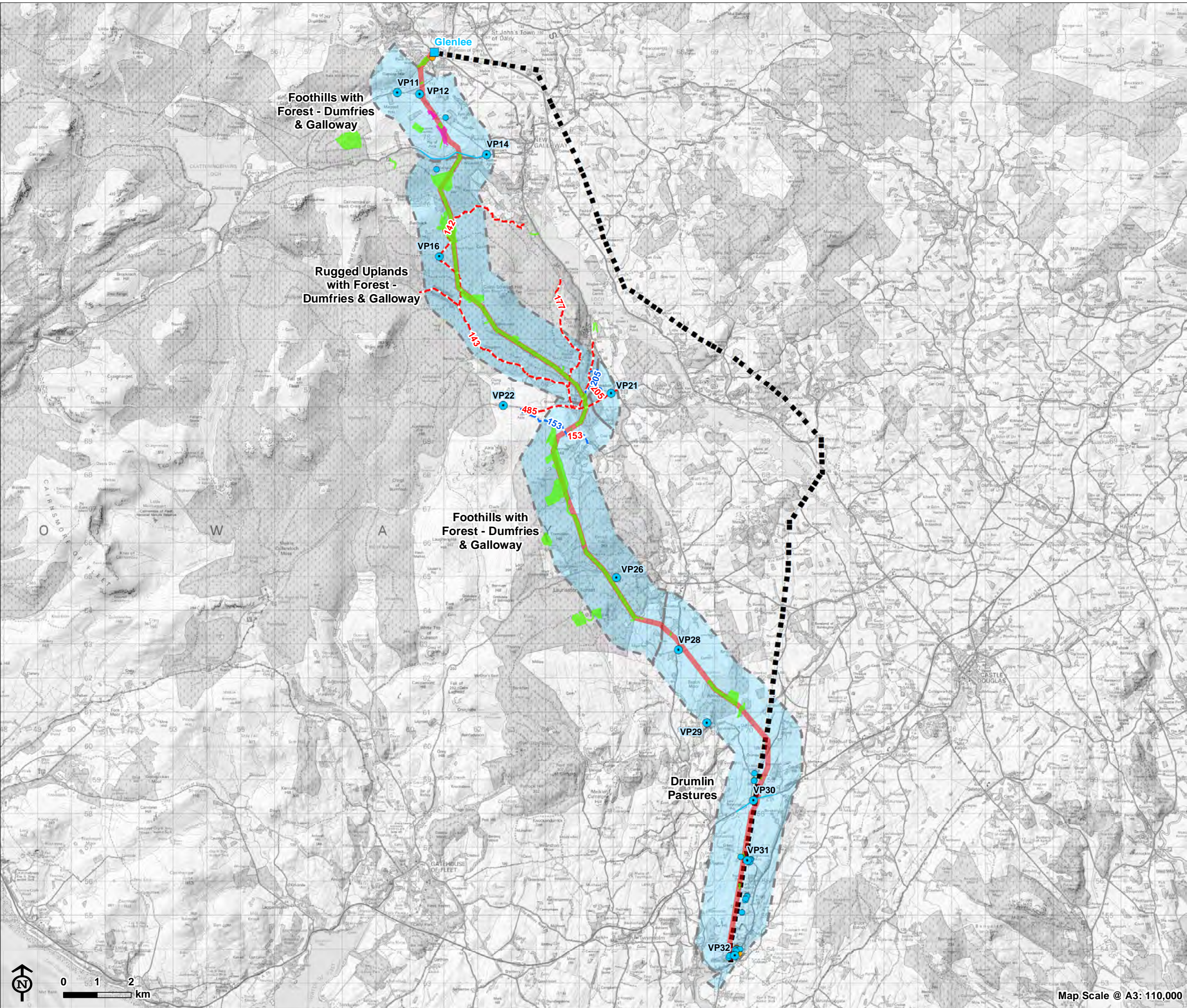
- Overhead line Infrastructure**
- ✦ BG route deviation (steel lattice tower)
- Landscape and Visual Amenity**
- Settlement
- Intra Effects**
- Residential property

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report



KTR Project
EIA Report

Figure 11.1: Summary of Likely Significant Residual Effects During Construction
Glenlee to Tongland



- Overhead line Infrastructure**
- Glenlee to Tongland
 - Existing tower for removal
- Landscape and Visual Amenity**
- Viewpoint
 - Residential property
 - Settlement
 - Core path
 - Road Routes A712 and A75
 - 2019 SNH landscape character types with significant effects (Drumlin Pastures LCT, Foothills with Forest LCT, Rugged Uplands with Forest LCT)
- Forestry**
- Forestry (to be felled)
- Ecology**
- GWDTE
- Intra Effects**
- Residential property
- Socio Economic**
- Effect on recreational access - Core path

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report

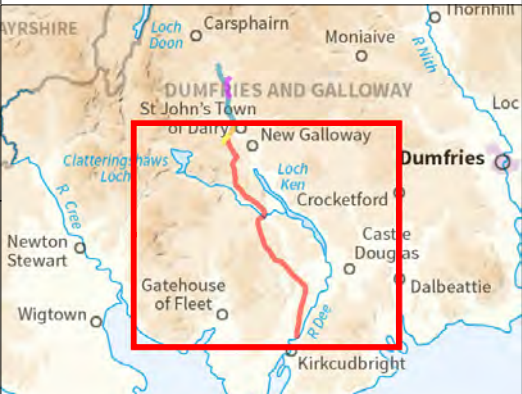
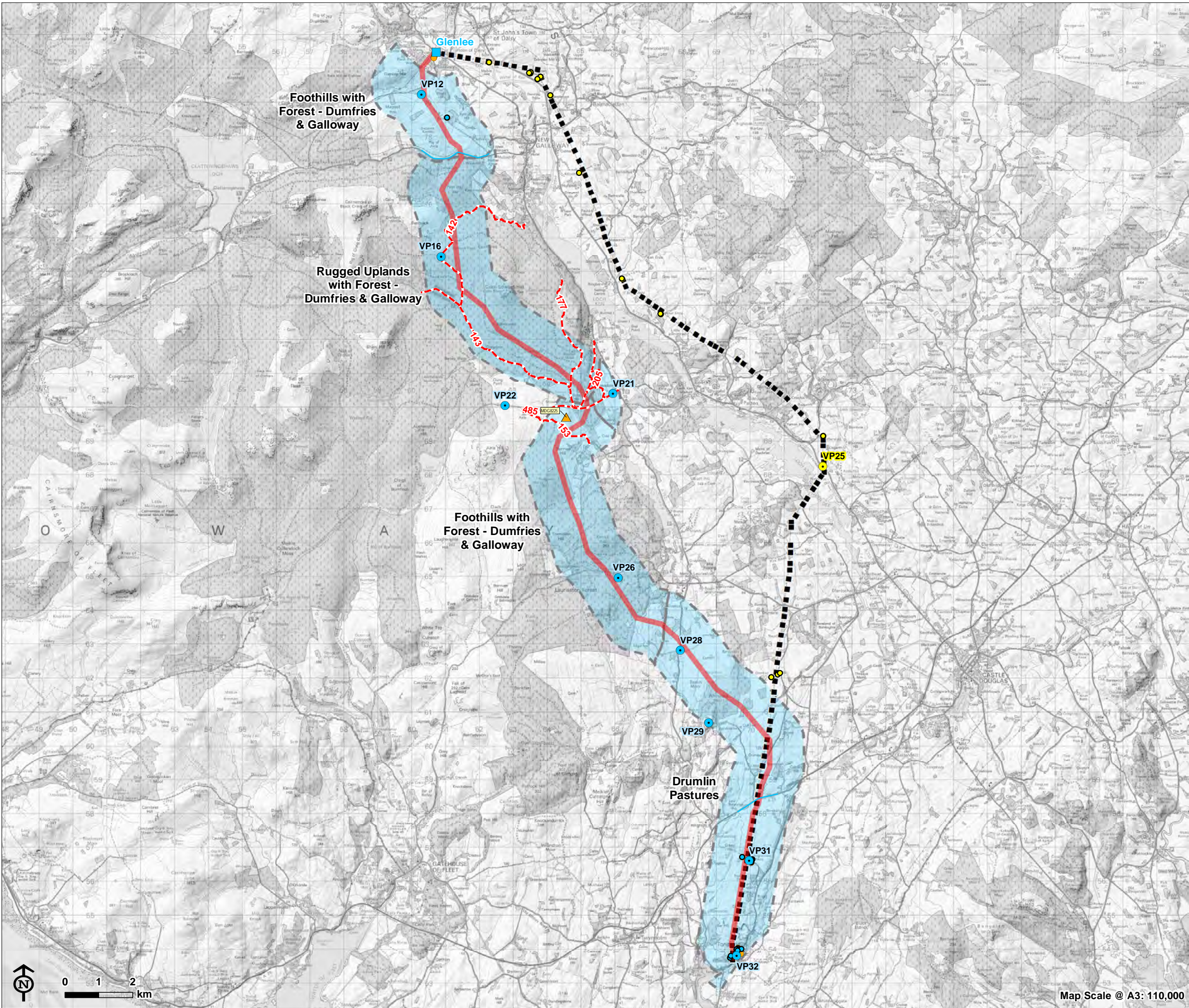
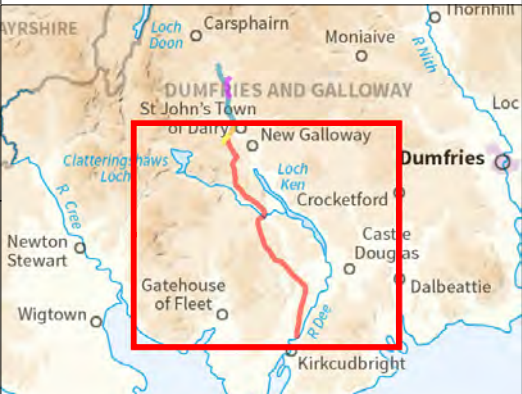


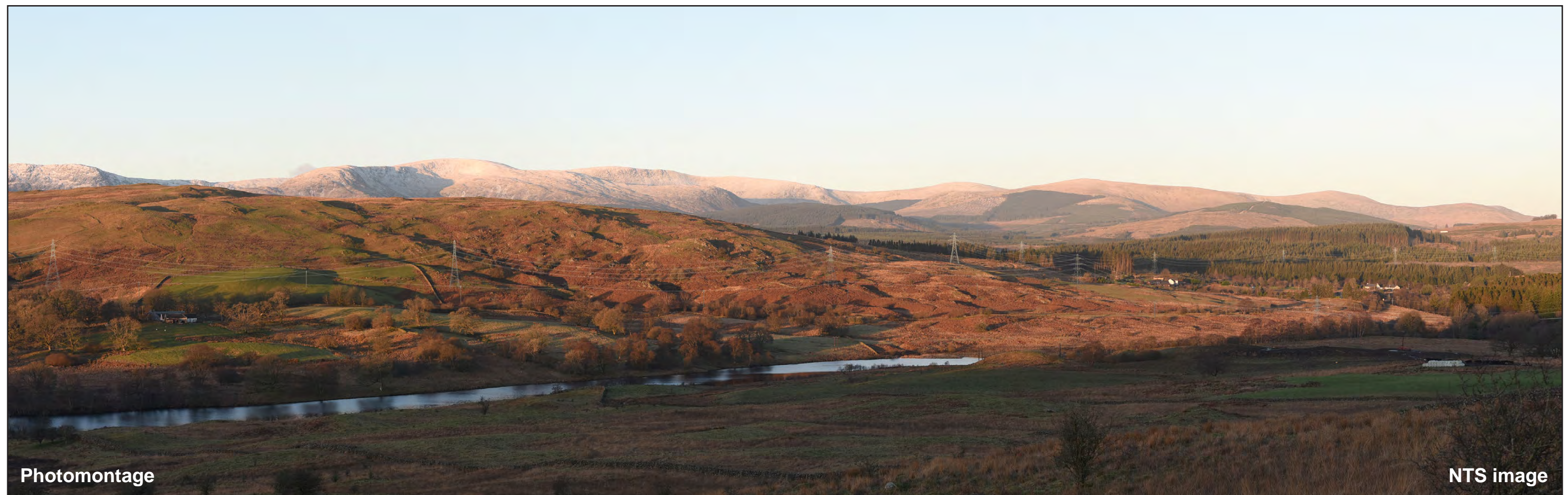
Figure 11.2: Summary of Likely Significant Residual Effects During Operation
Glenlee to Tongland



- Overhead line Infrastructure**
- Glenlee to Tongland
 - Existing tower for removal
- Landscape and Visual Amenity**
- Viewpoint
 - Viewpoint (beneficial effect)
 - Residential property
 - Residential property (beneficial effect)
 - Settlement
 - Road Routes A712 and A75
 - 2019 SNH landscape character types with significant effects (Drumlin Pastures LCT, Foothills with Forest LCT, Rugged Uplands with Forest LCT)
- Intra Effects**
- Residential property
 - Residential property (beneficial effect)
- Cultural Heritage**
- Non-Statutory Register (NSR) Site
- Socio Economic**
- Effect on recreational access - Core path

Note: It should be noted that some properties will experience visual amenity and intra-connection effects during construction. Full details of how the properties are affected are provided in Chapter 7: Landscape and Visual Amenity and Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects of the EIA Report





Visualisation 1

To view this visualisation at the correct printed size for landscape and visual assessment refer to Chapter 7 LVIA, Figure: 7.25

Viewpoint 5: B7000 west of Glenhoul Hill



Visualisation 2





Visualisation 4