SP Energy Networks

Cross Border Connection:

Gala North Substation to the Scottish Border

Routeing and Siting Consultation Document

September 2024

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Glossary and Abbreviations

Glossary

AIS Substation	AIS substations use air as the insultation medium for electrical equipment.
Border	The border between Scotland and England
CMNC	The term used to describe in the Project in NOA documents published in January 2021 and January 2022 as well as the NOA Refresh published July 2022
CMN3	The term used to describe in the Project in the transitional Centralised Strategic Network Plan 2 which was published in March 2024
Connection Point	The point in NGET's licence area where the Project will connect to the National Electricity Transmission System in the northwest of England.
Crossing Point	The point on the Scotland-England border where the Cross Border Connection crosses over from Scotland to England (or vice versa)
GIS Substation	GIS substations use gas as the insultation medium for electrical equipment
National Grid Electricity System Operator (NGESO)	NGESO is the electricity system operator for Great Britain. It supports and guides the development of the electricity transmission system as well as it operates it ensuring that supply and demand are balanced.
National Grid Electricity Transmission (NGET)	NGET is a Transmission Licence Holder under the Electricity Act 1989. It owns and maintains the high voltage electricity network (275 and 400kV) in England and Wales.
The NGET Project	The components of the Cross Border Connection within NGET's licence area, from the Scotland-England border to a connection in the northwest of England..
Network Options Assessment (NOA)	An economic assessment of electricity transmission projects proposed by Transmission Owners to provide network capacity and meet the future needs of the electricity transmission network.
Overhead line	Conductors or 'wires' which are suspended at a specified height above ground and carried by wood poles or steel lattice towers
The Project	The Cross Border Connection project from the proposed Gala North Substation in south of Scotland to a connection point in the Carlise area in the northwest of England.
SP Energy Networks	SP Enegy Networks owns and operates the electricity transmission and distribution networks in central and southern Scotland through its wholly-owned subsidiaries SP Transmission plc and SP Distribution plc.

The SP Energy Networks Project	The components of the Cross Border Connection within SP Transmission's licence area, from the proposed Gala North Substation to the Scotland-England border.
SP Transmission	SP Transmission is a Transmission Licence Holder under the Electricity Act 1989. It owns and maintains the high voltage electricity network (132, 275 and 400kV) in central and southern Scotland.
Steel Lattice Tower	Structure used to carry overhead line electrical conductors ('wires'), insulators and other fittings.
Substation	Substations manage and control electricity flows on the network including transforming voltages and allowing energy to be transmitted or distributed.

Abbreviations

AIS	Air Insulated Switchgear
AWI	Ancient Woodland Inventory
CBC	Cross Border Connection
CEGB	Central Electricity Generating Board
CES	Crown Estate Scotland
D&GC	Dumfried and Galloway Council
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ECU	Energy Consents Unit
ENA	Electricity Networks Assocation
FLS	Forest and Land Scotland
GB	Great Britain
GCR	Geological Conservation Review
GDL	Garden and Designed Landscape
GIS	Gas Insulated Switchg\ear
GW	gigawatt
HND	Holistic Network Design
km	kilometre
kV	kilovolt
LBS	Local Biological Sites
LCA	Landscape Character Area
LCT	Landscape Character Type

LDP	Local Development Plan
LNCS	Local Nature Conservation Sites
LPA	Local Planning Authority
m	metre
mAOD	metres Above Ordnance Datum
MOD	Ministry of Defence
MW	megawatt
NESO	National Energy System Operator
NETS	National Electricity Transmission System
NGESO	National Grid Electricity System Operation
NGET	National Grid Electricity Transmission
NOA	Network Options Assessment
NPF	National Planning Framework
NSA	National Scenic Area
NWSS	Native Woodland Survey of Scotland
Ofgem	Office of Gas and Electricity Markets
OHL	Overhead Line
RSA	Regional Scenic Area
RSCD	Routeing and Siting Consultation Document
SAC	Special Area of Conservation
SBC	Scottish Borders Council
SLA	Special Lansdcape Area
SPA	Special Protection Area
SPEN	SP Energy Networks
SPT	SP Transmission
SSEN	Scottish and Southern Electricity Networks
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust
TCE	The Crown Estate
tCSNP	Transitional Centralised Strategic Network Plan
TO	Transmission Owner
TTA	Tactical Training Area
UGC	Underground Cable
UK	United Kingdom

01.
Introduction

1. Introduction

1.1 Introduction

This Routeing and Siting Consultation Document has been prepared by AECOM on behalf of SP Energy Networks[1]. It informs the development of a new cross-border double circuit 400 kilovolt (kV) overhead line (OHL) between Gala North Substation in the southeast of Scotland and a connection point to the electricity transmission system in the northwest of England (hereafter referred to as the 'Cross Border Connection' or 'the Project'). While the Project is being jointly developed by SP Energy Networks and National Grid Electricity Transmission (NGET), the Document describes the approach to and results of a routeing and siting study considering the Project components in Scotland only (referred to as the 'SP Energy Networks Project' in this document). These comprise:

- A new double circuit 400kV OHL between the proposed Gala North Substation and a new Teviot Substation,
- The new Teviot Substation which will also connect the proposed Teviot and Liddesdale (also referred to as Borders) Wind Farms to the electricity transmission network, and
- A new double circuit 400kV OHL from the new Teviot Substation to the Scotland-England border where the Cross Border Connection would enter NGET's licence area.

The objective of the routeing and siting study has been to identify and assess alternative route and site options for the new OHLs and Teviot Substation and identify a Preferred Option to be taken forward to be consulted on and developed through subsequent stages. It should be noted that NGET will be undertaking complementary activities with regard to the components of the Cross Border Connection in its licence area in England and that further work may be required to confirm where the Cross Border Connection crosses the Scotland-England border in light of NGET's work. Figure 1 at the end of this section provides an overview of the general geography of the SP Energy Networks Project including the locations of the proposed Gala North Substation and proposed Teviot and Liddesdale (Borders) Wind Farms as well as existing electricity transmission network infrastructure in the region.

1.2 Background to the Project

The UK and Scottish Governments have set legally binding targets to reach net zero in greenhouse gas emissions and end their contributions to climate change by 2050 and 2045 in the Climate change Act 2008 and Climate Change (Scotland) Act 2009 respectively. Decarbonisation of the energy sector is a central pillar of both governments' net zero strategies meaning the way in which energy is generated, transported and used is undergoing transformational change. Traditional fossil fuel-based forms of generation are being retired

[1] SP Energy Networks is the trading name for Scottish Power Energy Network Holdings Limited. It owns and operates the electricity transmission and distribution networks in central and southern Scotland through its wholly-owned subsidiaries SP Transmission plc and SP Distribution plc. These businesses are 'asset-owner companies' holding the regulated assets and Electricity Transmission and Distribution Licenses. SP Transmission plc is the transmission licensee.

and replaced by renewable and low carbon sources of energy generation including onshore and offshore wind as well as being supported by increased interconnection with Europe.

Offshore wind is a critical component of the UK Government's energy strategy with targets to increase installed capacity from around 10 gigawatts (GW) today to 40GW by 2030 originally being set in the Energy White Paper (2020)[2], and then increased to 50GW by 2030 in the British Energy Security Strategy (2022)[3]. The scale of the offshore wind development pipeline is also reflected in the most recent seabed leasing rounds; Round 4 (2021) overseen by The Crown Estate (TCE) and ScotWind (2022) overseen by Crown Estate Scotland (CES) have awarded seabed leasing rights for 8GW in English Waters and 25GW in Scottish Waters respectively.

In 2023 the Scottish Government consulted on its draft Energy Strategy and Just Transition Plan[4]. The draft Strategy sets out objectives for Scotland to increase production of renewable energy including 8-11GW of installed offshore wind capacity by 2030 and an additional 12GW of installed onshore wind capacity by 2030. This is consistent with the Scottish Government's Onshore Wind Policy Statement (2022)[5] which also sets out a target to achieve a minimum of 20GW of installed capacity of onshore wind in Scotland by 2030. The 20GW target was most recently reaffirmed in late 2023 with the publication of the Onshore Wind Sector Deal[6] which sets out commitments from the Scottish Government and the onshore wind industry to deliver on the 2030 target.

To facilitate renewable forms of generation supported by UK and Scottish Government policy and targets such as offshore and onshore wind, new electricity network infrastructure is needed to ensure that energy can be transported from where it is generated to where it is used. Traditionally the electricity transmission system was developed to transport electricity in bulk from power stations to cities and towns where it is transported via the electricity distribution network, but as renewable energy sources are typically located in more geographically remote and/or disparate locations this requires new electricity network infrastructure both to connect it to the network as well as to transport it to areas of demand.

With electricity demand predominantly located in the south of the Great Britain and considerable renewable energy resources in the north this leads to high north-south power flows on the electricity transmission system. Reflecting prevailing policy objectives and the pipeline of offshore and onshore wind and other renewable energy projects in Scotland this requires an increase in cross-border electricity transmission capability so that energy can be transported to areas of increased demand further south in Great Britain and to avoid constraints on the system.

[2] Energy White Paper (2020), UK Government https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future/energy-white-paper-powering-our-net-zero-future-accessible-html-version
[3] British Energy Security Strategy (2022), UK Government https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy
[4] Draft Energy Strategy Just Transition Plan (2023), Scottish Government https://www.gov.scot/publications/draft-energy-strategy-transition-plan/
[5] Onshore Wind Policy Statement (2022), Scottish Government https://www.gov.scot/publications/onshore-wind-policy-statement-2022/
[6] Onshore Wind Sector Deal (2023), Scottish Government https://www.gov.scot/publications/onshore-wind-sector-deal-scotland/

SP Transmission, the Transmission Owner (TO) and Licence Holder responsible for the electricity transmission network in central and southern Scotland therefore has a crucial role to play. Its transmission network enables the bulk transfer of renewable energy generated within its licence area as well as that generated within SSEN Transmission's (SSENT) licence area to the north, southwards to NGET's licence area and large centres of demand.

1.3 SP Transmission's Statutory Duties and Licence Obligations

As the holder of a transmission licence under the Act, SP Transmission is subject to a number of statutory duties and licence obligations. These include requirements "*to develop and maintain an efficient, coordinated and economical system of electricity transmission*" and "*to facilitate competition in the generation and supply of electricity*". This requires SP Transmission to provide for new electricity generators such as wind farm developers wishing to connect to the transmission system in its licence area; to make its transmission system available for these purposes and to ensure that the transmission system is fit for purpose through appropriate reinforcements to accommodate the contracted capacity.

In addition, in formulating proposals for electricity transmission infrastructure, SP Transmission is subject to duties under Schedule 9 of the Act: "*(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 effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.*"

SP Energy Networks, acting on behalf of SP Transmission, is undertaking further studies including this routeing and siting study to inform the development of the Project. This work is undertaken in accordance with SP Transmission's statutory duties and licence obligations with the objective of ensuring that the Project is technically feasible, economically viable and on balance, causes the least disturbance to both the environment and the people who live, work and enjoy recreation within it.

1.4 Need for the SP Energy Networks Project

As described in the previous section, SP Transmission has a number of statutory duties and licence obligations which underpin the need for the SP Energy Networks Project; firstly reinforcing the network to increase cross-border network capacity and enable increased north-south flows on the transmission system and secondly, facilitating the connection of proposed wind farms in the Scottish Borders.

Need for the Network Reinforcement

The SP Energy Networks Project forms part of a wider cross-border scheme being jointly developed by SP Energy Networks and NGET. The need for network reinforcement such as the Cross Border Connection is assessed by National Grid Electricity System Operator (NGESO)[7], the electricity system operator for Great Britain, as part of a number of activities it undertakes on annual basis to ensure the economic and efficient operation of the electricity

[7] NGESO will become the National Energy System Operator (NESO) during 2024: https://www.nationalgrideso.com/what-we-do/becoming-national-energy-system-operator-neso

transmission system. These include the Network Options Assessment (NOA), an economic assessment of projects proposed by TOs to provide network capacity and meet the future needs of the electricity transmission network. The analysis in NOA allows recommendations to be made as to which projects will be economic and efficient to develop and the optimal timing of those projects.

The Cross Border Connection has evolved over a number of years. It was first identified in the NOA as 'CMNC' where it was described as an onshore reinforcement from southeast Scotland to northwest England. CMNC was given a 'proceed' signal in successive NOA documents published in January 2021[8] and January 2022[9]. Subsequently the NOA Refresh[10] was published July 2022 in parallel with the publication of the Holistic Network Design (HND). This set out a blueprint for the connection of offshore wind needed to meet the Government's 2030 targets (also referred to as the 'Pathway to 2030'), and also recommended the development of 'CMNC'.

More recently the need for the Project was re-evaluated as part of the development of the transitional Centralised Strategic Network Plan 2 (tCSNP2)[11] (also referred to as 'Beyond 2030'). This was published in March 2024 and recommended the development of 'CMN3', a cross-border reinforcement between southeast Scotland and northwest England increasing north-south network capability while also increasing access to the transmission network for generators in the Borders area. Since then, SP Energy Networks and NGET have been working jointly to develop 'CMN3', now known as the Cross Border Connection.

Need for the Wind Farm Connections

The SP Energy Networks Project will connect a number of wind farms under development in southern Scotland via Teviot Substation, including the proposed Teviot Wind Farm and Borders Wind Farm:

- The developers of the proposed Teviot Wind Farm, Muirhall Energy, have a contract with NGESO and SP Transmission to provide a 522.9 megawatt (MW) connection to the electricity transmission system by 2033. The proposed Teviot Wind Farm is subject to a separate consent application under section 36 of the Electricity Act 1989 which is pending consideration[12].
- EDF Energy, the developers of Borders Wind Farm (also known as Liddesdale Wind Farm), have a contract with NGESO and SP Transmission to provide a 400MW connection to the electricity transmission system by 2033. The proposed Borders Wind Farm is also subject to a separate consent application under section 36 of the Electricity Act 1989.

[8] Network Options Assessment (January 2021), NGESO
https://www.nationalgrideso.com/document/185881/download
[9] Network Options Assessment (January 2022), NGESO
https://www.nationalgrideso.com/document/233081/download
[10] Network Options Assessment Refresh, NGESO (July 2022)
https://www.nationalgrideso.com/document/262981/download
[11] Transitional Centralised Strategic Network Plan 2 (March 2024), NGESO
https://www.nationalgrideso.com/document/304756/download
[12] Teviot Wind Farm Consent Application, Muirhall Energy
https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00003249&T=0

No application has been submitted as yet, however the developer has requested a Scoping Opinion[13].

1.5 Development and Consenting of the SP Energy Networks Project

The approach taken to developing the SP Energy Networks Project comprises the following key phases:

- Phase 1. Routeing. Phase 1 comprises this routeing and siting study in which alternative route and site options for the Project components are identified and assessed taking into account a range of environmental, technical and economic considerations in line with SP Transmission's statutory duties. It concludes with the identification of a Preferred Option which is then subject to consultation (referred to as Phase 1 Consultation). SP Energy Networks is committed to ongoing consultation with interested parties, including statutory and non-statutory consultees and local communities. Whilst there is no statutory requirement to consult during the early routeing and siting stages, SP Energy Networks consider it good practice to introduce consultation at this stage. Responses to consultation will be evaluated and inform confirmation of a Proposed Option to be taken forward to Phase 2.
- Phase 2. Environmental Impact Assessment (EIA). The Cross Border Connection, including the SP Energy Networks Project will require to be subject to EIA. Specifically, the SP Energy Networks Project will be subject to EIA under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Through Phase 2 the EIA process seeks to identify, assess and mitigate the likely significant adverse effects of the SP Energy Networks Project on the environment. The EIA process comprises several steps starting with scoping and concluding with the production of an EIA Report (EIAR) which will accompany the application for consent. During this phase SP Energy Networks will also undertake a second round of public consultation (referred to as Phase 2 Consultation) on the detailed design of the SP Energy Networks Project.
- Phase 3. Application for Consent. SP Energy Networks will be applying to the Scottish Ministers for consent under Section 37 of the Electricity Act 1989, as amended, to install, and keep installed, the SP Energy Networks Project. The EIAR will accompany the application for Section 37 consent. At the same time, SP Energy Networks will also apply to Scottish Ministers for deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, as amended, for the SP Energy Networks Project including ancillary development. While the Scottish Ministers will be responsible for the decision to approve the SP Energy Networks Project or not, in reaching their decision they will consult with statutory stakeholders, relevant Local Planning Authorities (LPAs) and members of the public.

[13] Borders Wind Farm (referred to as Liddesdale Wind Farm) Scoping Opinion Request, EDF Energy https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00004833

1.6 Purpose and Structure of this Document

The primary purpose of this document is to report on Phase 1 of the SP Energy Networks Project; the routeing and siting study which has been undertaken in order to identify a Preferred Option. The Routeing and Siting Consultation Document has been published in parallel with the start of public consultation on the SP Energy Networks Project. The objective of this is to seek feedback on the Preferred Option from statutory and non-statutory consultees, as well as local communities and use this feedback to inform subsequent stages of the development and assessment of the SP Energy Networks Project ahead of making the relevant consent applications.

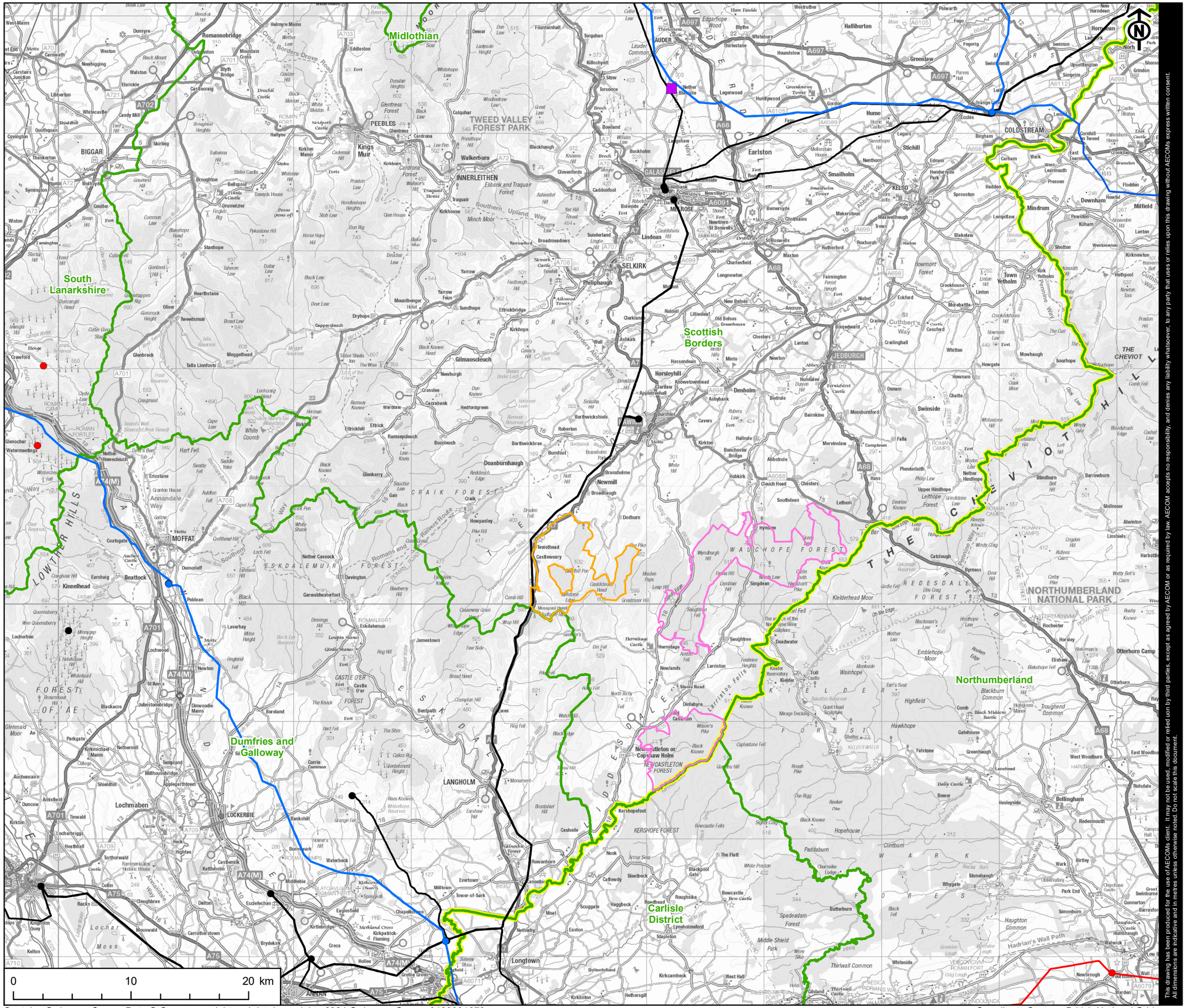
The structure of the document is set out below in Table 1. It describes the approach taken to identifying and assessing alternative route and site options in a clear, systematic manner in accordance with SP Transmission's statutory duties and licence obligations and taking into account industry-recognised approaches to the routeing of OHLs and siting of substations.

Table 1 Routeing and Siting Consultation Document Structure

Section	Description of Content
1. Introduction	Provides an introduction to the Project and an overview of why it is needed, SP Transmission's statutory obligations and an outline of the purpose and structure of the RCD.
2. Description of the Project	Provides an overview of the SP Energy Networks Project and the key physical components which it comprises including details of construction requirements.
3. Approach to Routeing and Siting	Describes SP Energy Network's general approach to routeing and siting of new electricity transmission infrastructure following established practices and sets out the approach to the Project in Scotland.
4. The Study Area	Identifies and describes the Study Area in which the routeing and siting study is undertaken as well as key constraints or features within it.
5. Routeing and Siting Strategy	Describes the Routeing Strategy applied specifically to the SP Energy Networks Project and the key routeing and siting considerations present within the Study Area.
6. Substation Siting	Describes the identification and assessment of alternative substation sites considered for the new Teviot Substation in the vicinity of the proposed Teviot Wind Farm.
7. Strategic Routeing – Route Corridors	Describes the identification and assessment of alternative route corridors between the proposed Gala North Substation, potential Teviot Substation sites and the Scotland-England border.

Section	Description of Content
8. Detailed Routeing – Route Options	Describes the identification and assessment of alternative route options within shortlisted corridors between Gala North, shortlisted Teviot Substation sites and the Scotland-England border.
9. The Preferred Option	Describes the end-to-end options for the SP Energy Networks Project based on alternative substation sites and route options and identifies a Preferred Option and the reasons for its selection.
10. Consultation and Next Steps	Provides an outline of the Phase 1 consultation activities being undertaken and how to provide feedback as well as the next steps in the development and consenting of the SP Energy Networks Project.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- ■ Proposed Gala North Substation Location
- ▭ Proposed Teviot Wind Farm Boundary
- ▭ Proposed Liddesdale (Borders) Wind Farm Boundary
- ▭ Local Authority Boundary
- ▬ Scotland / England Border

Existing Transmission System
- ● 132 kV Substation
- ● 275 kV Substation
- ● 400 kV Substation
- — 132kV OHL
- — 275kV OHL
- — 400kV OHL

TITLE
Figure 1
Overview of the Project

REFERENCE
GH_20241003_RS_1_v3

SHEET NUMBER	DATE
1 of 1	03/10/24

02.
Project Description

2. Project Description

2.1 Introduction

This section provides an overview of the infrastructure which would be required for the SP Energy Networks Project. As described in the previous section, the SP Energy Networks Project will comprise a new double circuit 400kV OHL from the proposed Gala North Substation[14] to a point on the Scotland-England border via a new Teviot Substation. At the border, the OHL will cross into NGET's licence area where they will be responsible for the onwards OHL route to a final connection point in the northwest of England.

It should be noted that given the early stage in the Project's development, the information contained in this chapter is not confirmation of a final design, however, it is considered appropriate for the purposes of the routeing and siting study and to inform the Phase 1 Consultation. In particular, SP Energy Networks will work with NGET to establish a crossing point of the Scotland-England Border that best balances both TOs statutory duties under the Electricity Act 1989.

2.2 Key Elements of the SP Energy Networks Project

The SP Energy Networks Project comprises the following key elements:

- A new double circuit 400kV OHL carried on steel lattice towers between the proposed Gala North Substation and a new Teviot Substation,
- The new Teviot Substation which will also connect the proposed Teviot and Liddesdale (also referred to as Borders) Wind Farms to the electricity transmission network, and
- A new double circuit 400kV OHL carried on steel lattice towers from the new Teviot Substation to the Scotland-England border.

2.3 The New Overhead Lines

Overview of an OHL

OHLs transmit electricity by conductors (often also referred to as 'wires') which are suspended at a specified height above ground and carried by wood poles or steel lattice towers (also referred to as pylons) which are located at regularly spaced intervals. The conductors can be made of aluminium or steel strands. Most OHLs operating at 132kV and above carry two 3-phase circuits, with one circuit strung on each side of a steel tower as shown in the image in Figure 2. The conductors are strung from insulators which are attached to the cross arms of the towers and prevent the electric current from crossing to the tower. Insulators are made of material with a high resistance to electricity flow, for example glass or porcelain. An earth wire may also be required to provide protection from lightning strikes.

[14] The proposed Gala North Substation is outside of the scope of this study. It will be subject to a separate planning application to Scottish Borders Council under the Town and Country Planning (Scotland) Act 1997. More information about it can be found here: https://www.spenergynetworks.co.uk/pages/gala_north_substation.aspx

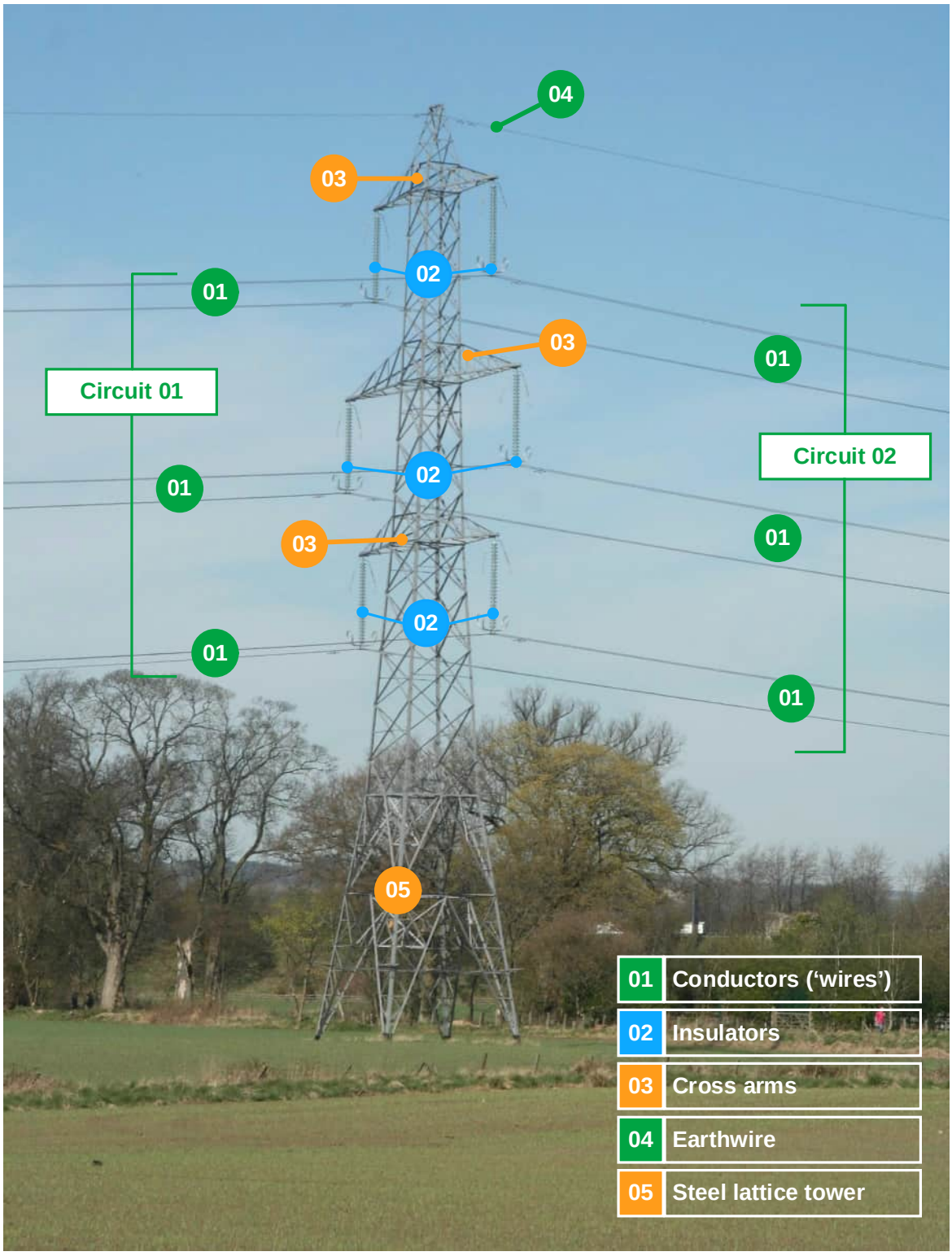


Figure 2 Typical Operational 400kV Double Circuit OHL

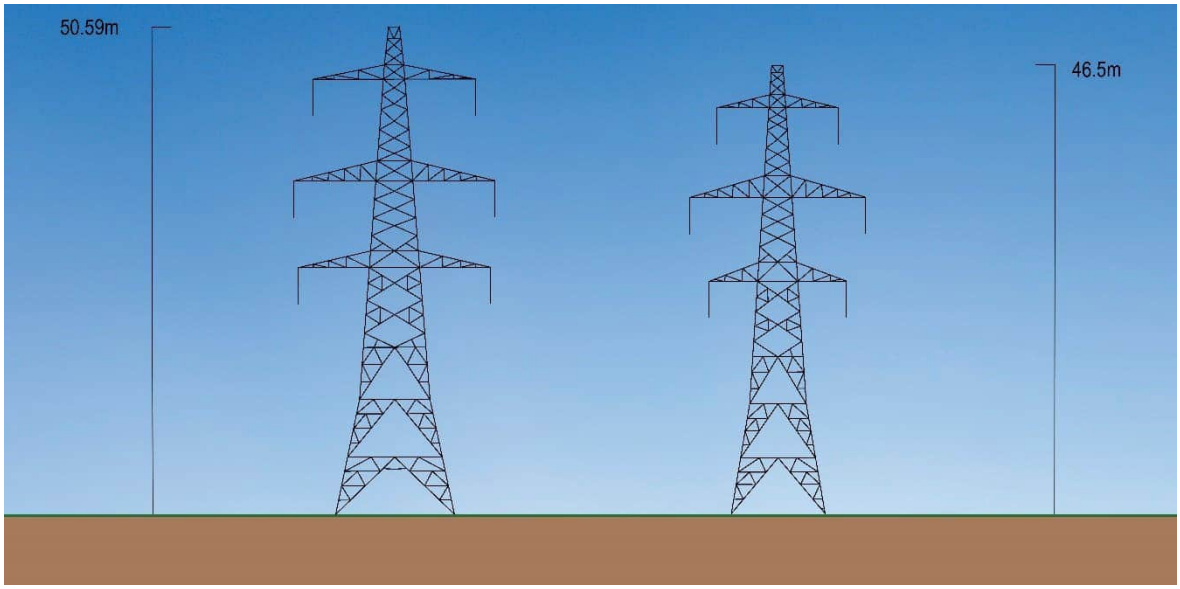
Tower Types, Heights and Span Lengths

The SP Energy Networks Project will be carried on steel lattice towers, however, the precise tower model to be used is subject to detailed design. The height of the steel lattice towers will varies according to the operating voltage of the conductors and relevant electrical safety clearances to the ground. For high voltage overhead lines such as the Cross Border Connection, tower heights would typically range from 46 m to 61m, however, this may increase subject to the route design. In addition to the precise tower model, there are broadly three types of tower which may be required at various points along the new OHL routes subject to detailed design as set out in Table 2.

Table 2 Overhead Line Tower Types

Tower Type	Description
Suspension or Line Tower	These typically form most of an OHL route and are used where the tower is part of a straight-line section of the OHL route.
Tension or Angle Tower	These are used where an OHL route changes direction where there is a horizontal or vertical deviation.
Terminal Tower	These are used when an OHL terminates at a substation or on to an underground cable section via a separate cable sealing end compound or platform.

Figure 3 Typical Overhead Line Tower Designs



The distance between adjacent towers, known as the 'span length', is approximately 300m but this can be increased where there is a requirement to span obstacles or decreased where a route traverses higher altitudes. The exact span distance will depend on site specific constraints or obstacles, however, in general there would typically be 3-4 steel towers per kilometre.

Steel towers are constructed from galvanised steel and typically grey in colour which becomes duller over time (approximately 18 months). The shade of grey is not distinguishable at distance and normally appears as grades of light and dark. Where towers are viewed against the sky, colour cannot be relied upon to diminish visibility, since the lighting characteristics of the sky vary greatly.

Overhead Line – Construction

The construction of OHLs follows a well-established process. As well as the OHL it also requires additional temporary land-take and infrastructure, for example temporary accesses to steel tower locations and temporary construction compounds to store materials. Key phases of construction comprise the following activities:

- Tree felling or lopping (where required) to establish wayleaves or clearances;
- Preparation of temporary construction accesses;
- Excavation of foundations;
- Tower delivery;
- Erection of steel towers;
- Delivery of conductors and stringing equipment;
- Insulator and conductor erection and tensioning; and
- Clearance and reinstatement.

The total duration of construction activity at any single tower site is approximately two weeks for tower foundations, one to two weeks for tower construction, and up to four weeks for conductor erection and stringing depending on the size of the tower and the number of the conductors to be strung. These periods are spread over about four months, with periods of inactivity between, or longer if construction difficulties are experienced elsewhere along the route or ground conditions prevent normal progress.

Prior to constructing the OHL, temporary accesses will be constructed, as necessary, and laydown/storage areas established. Any trees which may impact on safety clearances will be removed or lopped. Following commissioning of the OHL, all equipment and temporary access to construction areas will be removed with the land being reinstated to its former use/condition.

Overhead Line – Operation and Maintenance

OHLs require minimal maintenance. The condition of tower steelwork and foundations is monitored regularly. Periodic painting of the tower steelwork may be required, and components are regularly inspected for corrosion, wear and deterioration. Towers which have deteriorated significantly may be dismantled carefully and replaced. There is also an ongoing requirement to ensure that any vegetation within proximity to the OHL does not impact on safety clearances.

Overhead Line – Decommissioning

The requirement to decommission an OHL depends on a number of factors. At the end of its operational life, if an OHL was required to it could be repaired or refurbished in order to extend its operational life. If an OHL line is to be decommissioned, steel towers will be removed with components re-used where possible. Foundations are removed to a minimum depth of approximately 1m below ground level, the area around the base of the tower is cleared and the ground reinstated.

2.4 The New Teviot Substation

Overview

Substations play a key role in the electricity transmission system. They help to manage and control electricity flows as well as (1) connecting generators such as wind farms and/or (2) connecting to the electricity distribution network at grid supply points (GSPs). They transform the voltage of electricity from high to low ratings or vice versa (also referred to as stepping up or stepping down the voltage). For example, generators such as wind farms may connect at a substation and the voltage be increased or stepped up for onwards transmission or reduced so that it distributed to homes and businesses. Substations are also key in helping to isolate and fix faults and allow maintenance to be carried out safely on the electricity network. In the case of the new Teviot Substation it will facilitate connection of new renewable wind generation to the electricity network.

Substation Technology

There are broadly two main types of substation; those which use Air Insulated Switchgear (AIS) and those which use Gas Insulated Switchgear (GIS). AIS substations use air as the insultation medium for electrical equipment. Equipment is predominantly located outdoors requiring a larger footprint to ensure the necessary safety clearance areas between equipment. In GIS substations some equipment including switchgear can be located within buildings as it uses gas as the insultation medium. This enables safety clearance areas to be reduced meaning that the footprint of a GIS substation is therefore smaller than that of an equivalent AIS substation. For all of its new substations, SP Energy Networks evaluates the merit of both AIS and GIS technology. This includes but is not limited to consideration of environmental impacts, land availability, technical considerations such as required switchgear rating and the economics of each option.

Figure 4 Typical AIS and GIS Substations

GIS Substation

AIS Substation

03.

Approach to Routeing and Siting

3. Approach to Routeing and Siting

3.1 SP Energy Networks' Approach to Routeing

Overview

In 2015, as part of a wider industry review involving the UK and Scottish Governments as well as the Office of Gas and Electricity Markets (Ofgem), SP Energy Networks (acting on behalf of SP Transmission) reviewed its approach to routeing of new overhead lines. This review concluded that the requirement to balance statutory duties and licence obligations comprising economic, technical and environmental factors continues to support the development of an OHL in most circumstances. However, SP Energy Networks also concluded that there are certain circumstances in which development of an underground cable (UGC) should be considered.

A further review of the approach was undertaken in 2020 as part of preparing SP Transmission's RIIO-T2[15] Business Plan which reaffirmed these conclusions. As part of the review SP Energy Networks consulted on and published an updated version of '*Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment*'[16] which describes their general approach to the routeing and siting of new electricity transmission infrastructure.

The basic premise of SP Energy Network's approach is that the main effect of an OHL is visual and that the degree of visual impact can be reduced by careful route selection; for example by using topography and trees to provide screening and/or background to the OHL and by routeing the OHL at a distance from settlements and roads. In addition, OHL routeing takes into account other environmental and technical considerations and will avoid, wherever possible, the most sensitive and valued natural and man-made sites, areas or features.

Routeing Considerations

In line with SP Transmission's statutory duties and licence obligations and drawing upon established practice, routeing considerations comprise environmental, technical and economic factors. The routeing considerations inform the identification and assessment of route options ensuring that it is robust and transparent.

- Environmental factors: route options must take account of their potential environmental impact. Following SP Transmission's statutory obligations this is interpreted as seeking to preserve features of natural and cultural heritage interest and to mitigate as far as possible any effects route options may have on such features as well as more widely

[15] RIIO-T2 is the current price control and runs from April 2021 to March 2026. RIIO stands for 'Revenue = Incentives + Innovation + Outputs'. It's a framework used by Ofgem to ensure that network companies, like SP Transmission, provide a safe and reliable service, value for money, maximise performance, operate efficiently, innovate and ensure the resilience of their networks for current and future customers.
[16] Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment: https://www.spenergynetworks.co.uk/userfiles/file/SPEN_Approach_to_Routeing_Document_2nd_version.pdf

taking account of potential impact of route options on the environment and people including on:

- Landscape including landscape designations and landscape character;
- Visual amenity;
- Biodiversity including ecology and ornithology;
- Cultural heritage including archaeology;
- Forestry and woodland including ancient and native woodland;
- Water resources and ground conditions such as peat;
- Land use; and
- Tourism and recreation.

- Technical factors: route options must be technically feasible. This is interpreted by SP Energy Networks as it must be possible to build, operate and maintain route options. Technical considerations include matters which would affect these aspects for example existing electricity transmission or distribution infrastructure, topography, side slope gradients, altitude, ground conditions and accessibility as well as proximity to wind farms.
- Economic factors: route options must be economically viable. This is interpreted by SP Energy Networks as meaning that as far as is reasonably practicable, and all other routeing considerations being equal, route options should be as direct as possible and should avoid areas where technical constraints would render route options unviable on economic grounds.

3.2 Established Practice for Overhead Line Routeing

Overview of the Holford Rules

In 1959, Lord Holford, then advisor to the Central Electricity Generating Board (CEGB), developed a series of guidelines regarding the routeing of high voltage OHLs which have subsequently become known as the "Holford Rules" ('the Rules'). It is generally accepted across the industry that the Rules should continue to inform the routeing of high voltage OHLs. The Rules were reviewed in the early 1990s by the then National Grid Company (NGC) Plc. (now NGET) with notes of clarification added to update them and reflect up to date circumstances. A subsequent review of the Rules including the NGC clarification notes was undertaken by Scottish Hydro Electric Transmission Limited (SHETL) (now SSEN Transmission) in 2003 to reflect Scottish circumstances. A copy of the Rules as well including notes added through subsequent reviews by NGC, SHETL and most recently by SP Energy Networks is contained in Appendix A.

SP Energy Networks' general approach draws on the Rules including avoidance of areas of highest or high amenity value where possible as well as consideration of landform, topography and vegetation in order to reduce landscape and visual effects.

Interpretation and Application of the Holford Rules to the SP Energy Networks Project

Routeing considerations take account of the guidance contained in the Holford Rules and relevant notes or clarifications. In identifying routeing considerations which are relevant to the SP Energy Networks Project and Study Area (defined in section 4), the Rules and relevant notes or clarifications have been interpreted and applied to this routeing and siting study.

The Rules are broadly hierarchical with Rules 1 and 2 placing considerable emphasis on avoiding areas of the highest or high amenity value. Rule 1 advises that routes should avoid major areas of the highest amenity value where possible and Rule 2 that routes should avoid smaller areas of high amenity value by deviation. The term "*amenity*" has generally been interpreted as designated areas or sites of scenic, landscape, nature conservation, scientific, architectural or historical interest. This is consistent with SP Transmission's duties under Schedule 9 to the Electricity Act 1989. For the purposes of this routeing and siting study, the term 'amenity' has been replaced by 'environmental' to more appropriately reflect the intrinsic environmental, social and cultural value of such designated areas.

The review undertaken by SHETL in 2003 provides examples of areas of the "*highest*" or "*high*" amenity or environmental value and states that such areas "require to be established on a project-by-project basis considering Schedule 9 of the Electricity Act 1989". For the purpose of this routeing and siting study, such areas are considered to include international and national designations such as sites designated for landscape, nature, built heritage or archaeological conservation reasons.

The Rules do not identify what constitutes "*major areas*" or "*smaller areas*" but indicate that consideration should also be given to the spatial extent of areas of highest or high amenity or environmental value. Value is not considered to be related to the size of an area, so for the purposes of this routeing and siting study this has been interpreted as the extent to which areas of the highest or high amenity or environmental value are avoidable by careful route and/or site selection.

The notes and clarifications provide guidance with regard to areas of moderate or low amenity or environmental value noting that regional or local areas or sites should be identified from development plans. For the purposes of this routeing and siting study this includes locally designated landscapes, local wildlife sites or reserves, undesignated woodland and outdoor recreational areas such as country parks.

While the Rules do not address residential areas, the supplementary notes and clarifications provide guidance stating "*avoid routeing close to residential areas as far as possible on grounds of general amenity*" and "*in rural areas avoid as far as possible dominating isolated house, farms or other small-scale settlements*". For the purposes of this routeing and siting study, settlements have been defined as areas of high amenity or environmental value. Smaller clusters of properties or individual properties are considered to be a deviation issue and while they are of similar importance to settlements they are a detailed routeing consideration that may be more appropriately addressed through the identification of a detailed route alignment in subsequent stages of developing the SP Energy Networks Project.

Rules 3, 4, 5 and 6 highlight the importance of considering landscape and visual matters in routeing including giving consideration to landscape character including sensitivity to OHLs, the use of landform and woodland to reduce visual intrusion or prevent skylining and the

presence of other OHLs and the potential to create 'wirescapes'. For the purposes of this study, landscape and visual considerations have informed the identification of route options taking account of other routeing and siting considerations described above as far as possible.

Specific technical or economic considerations are not identified in the Rules or notes and clarifications, however, these form part of SP Transmission's statutory duties. For the purposes of this study this includes the directness of route options (i.e. subject to other routeing considerations route options should be as direct as possible) as well as matters affecting SP Energy Networks's ability to build, operate and maintain an OHL within the route options identified, for example taking account of existing electricity transmission or distribution infrastructure, topography, side slope gradients, altitude, ground conditions and accessibility.

Forestry Guidelines

SP Energy Networks' '*Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment*' provides guidance with respect to routeing and forestry. While it is generally preferable to avoid forestry and woodland (in particular ancient and/or native woodland), in some cases this may not be possible. Where routeing is required through forested areas key considerations relate to reducing landscape and forestry impacts while also taking account of safety standards and forestry design guidelines including those set out in Scottish Forestry guidance '*Design techniques for forest management planning: practice guide*'.

3.3 Established Practice for Substation Siting

Overview of the Horlock Rules

The Horlock Rules were devised in 2003 and updated in 2006 by National Grid Company (NGC) plc. They contain guidelines to inform the siting and design of substations with the objective of mitigating the environmental effects of such developments as far as reasonably possible. They are widely used within the industry to inform the siting of substations and other similar electricity network infrastructure such as converter stations. A copy of the Horlock Rules is contained in Appendix B.

Interpretation and Application of the Horlock Rules to the Project

The guidelines cover a range of aspects promoting consideration of the potential environmental effects from the earliest stages of site selection through to design. Similar to the Holford Rules they set out a broadly hierarchical approach:

- Promoting avoidance of sites of amenity, cultural or scientific value (including international, national and local sites) in site selection. As above for the purposes of this study this is interpreted as avoiding sites of environmental value.
- Taking account of local context such as existing features such as landform or woodland to screen sites and reduce intrusion into surrounding areas as much as possible.
- Careful consideration of substation design including the size of building or other structures as well as consideration of colours and materials in order to integrate with surrounding development or features.

3.4 Approach to the SP Energy Networks Project

Overview

The approach to identifying and assessing alternative route and site options for the SP Energy Networks Project is illustrated below in Figure 5. It follows SP Energy Networks approach and draws upon established practice ensuring that it is robust and as transparent as possible. It is a systematic and iterative approach in which an increasing level of detail is applied at each step concluding with the identification of a Preferred Option to be subject to consultation. The outcome of each step is subject to a technical review and, where relevant, consultation with key stakeholders. Professional judgement is used to establish a balance between technical, economic viability and environmental factors influencing route and site options. It should be noted that while the process is illustrated sequentially the interdependencies of the SP Energy Networks Project's components and the influence that they have over each other (i.e. substation site selection informing route selection and vice versa) means that there is a necessary degree of overlap and iteration in the identification and assessment of route and site options.

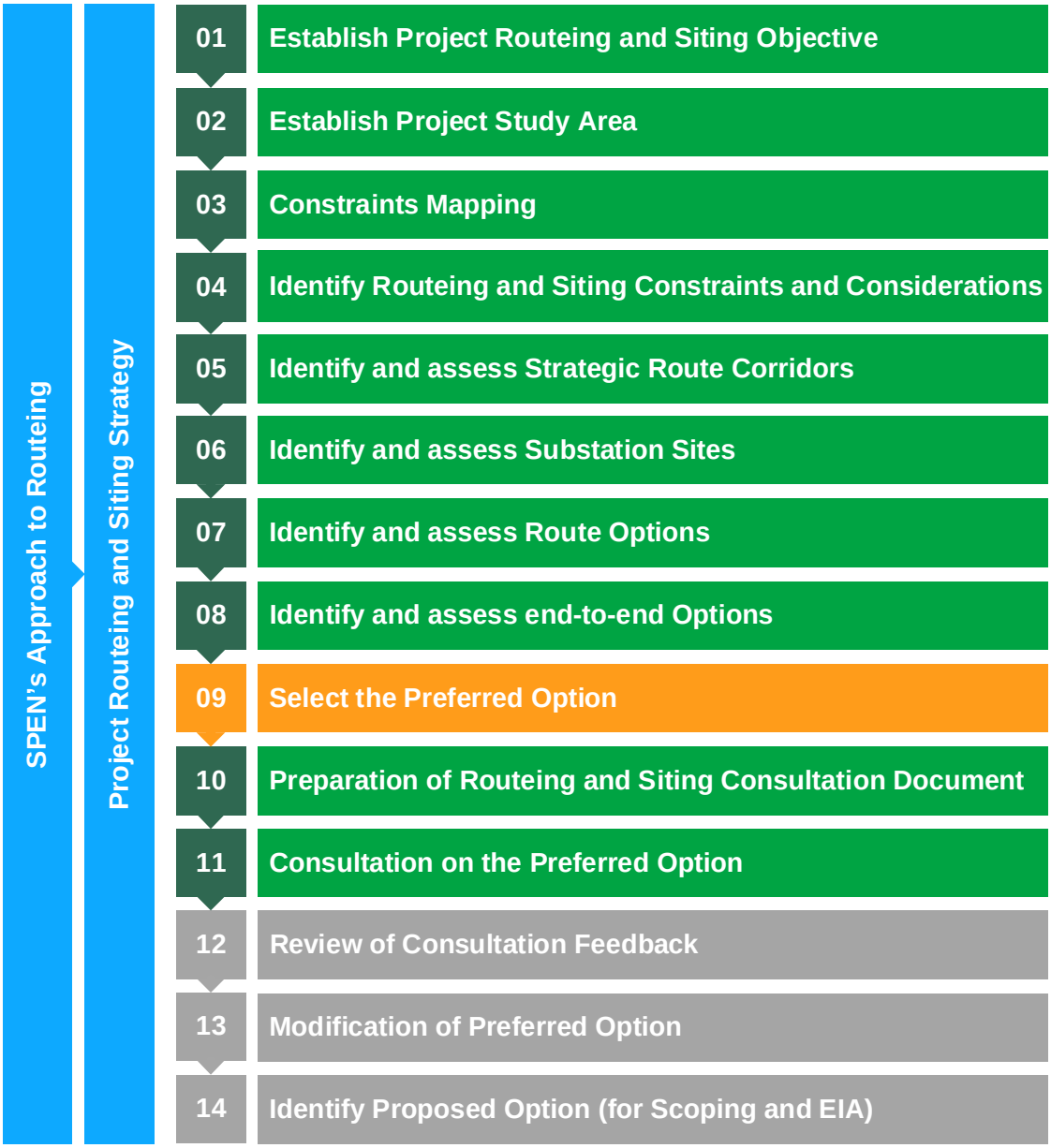


Figure 5 Approach to the Routeing and Siting Study

There are broadly three key activities with a series of steps within them:

- Firstly informed by Steps 1 to 4, the definition of a routeing and siting strategy specific to the SP Energy Networks Project that responds to the study area and key routeing constraints and considerations contained within it.
- Secondly in Steps 5 to 9, the application of the routeing and siting strategy to identify and assess substation site options, route corridors and route options within them concluding with identification of a complete or end to end Preferred Option.
- Finally, consultation on the Preferred Option through Steps 10 to 13 with feedback received being used to modify the Preferred Option where appropriate and inform the identification of a Proposed Option to take forward to subsequent stages.

Project Routeing and Siting Objective

The first step in the approach has been to identify a routeing objective which takes account of SP Transmission's statutory duties and licence obligations. In accordance with SP Energy Networks' overall approach to routeing, the routeing and siting objective for the SP Energy Networks Project is set out below:

"To identify a technically feasible and economically viable 400kV overhead line route between the proposed Gala North Substation and the Scotland-England border via a new Teviot Substation which causes, on balance, least disturbance to the environment of the Study Area and the people who live, work and enjoy recreation within it."

Establishment of a Study Area and Constraints Mapping

A constraints mapping exercise was undertaken to identify relevant environmental, technical and other constraints within the study area and inform the identification of routeing considerations. This includes environmental constraints such as area or sites designated for landscape, ecological or cultural heritage reasons, settlement including towns, villages and individual properties, physical environmental constraints such as ground conditions or waterbodies, land use or planning considerations including planning allocations or local designations as well as technical constraints including topography, other electricity network infrastructure and wind farms. Table 3 provides an overview of the constraints information collated and reviewed to inform the routeing and siting study. It should be noted that some constraint information relating to environmental constraints south of the Scotland-England Border has been collated and taken into account in so far as it may influence the identification of route options to the Scotland-England Border, however, detailed analysis of those constraints will be undertaken by NGET as part of its own routeing and siting studies.

Table 3 Constraints Mapping Information

Topic/sub-topic	Routeing and Siting Constraints or Considerations	Key Dataset Sources
Landscape	National Scenic Areas, Wildland Areas, Special Landscape Areas, Regional Scenic Areas, landscape character and Gardens and Designed Landscapes	• NatureScot Spatial Data Hub • Scottish Borders Local Development Plan • Dumfries and Galloway Local Development Plan • Historic Environment Scotland Download Portal
Ecology and Ornithology	Special Protections Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites and Sites of Special Scientific Interest (SSSIs), Scottish Wildlife Trust Reserves and Local Wildlife Sites	• NatureScot Spatial Data Hub • Scottish Borders Local Development Plan • Dumfries and Galloway Local Development Plan

Topic/sub-topic	Routeing and Siting Constraints or Considerations	Key Dataset Sources
Cultural Heritage and Archaeology	Scheduled Monuments, Inventory Battlefields, Listed Buildings, Gardens and Designed Landscapes, Conservation Areas and non-designated archaeology	• Historic Environment Scotland Download Portal • PastMap • Scottish Borders Local Development Plan • Dumfries and Galloway Local Development Plan
Settlements	Towns, villages and other residential dwellings including scattered rural properties	• Ordnance Survey mapping and date (Address Base) • Aerial Imagery
Tourism and Recreation	Country Parks, Regional Parks, long distance walking routes, Core Paths and other formal/informal open space or amenity areas	• Ordnance Survey mapping • NatureScot Spatial Data Hub • Scottish Borders Council • Dumfries and Galloway Council • Visit Scotland
Land use	Notable land uses including agricultural land and other major development including notable planning applications	• National Map – Land Capability for Agriculture • Scottish Borders Council • Dumfries and Galloway Council
Trees and Woodland	Sites identified on Ancient Woodland Inventory (AWI) or by the Native Woodland Survey of Scotland (NWSS) and commercial forestry	• NatureScot Spatial Data Hub • Scottish Forestry data
Water Environment	Flood risk areas and major waterbodies	• SEPA Flood maps • SEPA Water Environment Hub
Ground Conditions	Geological conservation review sites, carbon rich soils and peatland	• NatureScot Spatial Data Hub • Carbon and Peatland Map • British Geological Survey Online Viewer
Other infrastructure	Other infrastructure including roads and railway lines as well as wind farms (existing and proposed), existing transmission and distribution overhead lines and gas pipelines	• Ordnance Survey mapping • SP Transmission data (existing 132, 275 and 400kV network) • NGET data (existing 275 and 400kV network) • Energy Consents Unit • Scottish Borders Council

Topic/sub-topic	Routeing and Siting Constraints or Considerations	Key Dataset Sources
		• Dumfries and Galloway Council
Topography and landform	Slope, gradient and elevation/altitude	• Ordnance Survey data

Identification of OHL Routes

Given the scale of the SP Energy Networks Project a two-stage approach has been taken to the identification of OHL routes, firstly the identification of strategic corridors and secondly the identification of route options.

Strategic route corridors are typically wider having been identified taking account of a narrower range of routeing considerations including larger sites or areas of the highest or high environmental value such as designated sites and settlements as well as landscape and landform. This approach helps to focus development of route options within areas in which OHL routeing is considered most feasible and also allows for routeing work to be undertaken in parallel with substation siting.

Based on the appraisal of strategic route corridors, shortlisted route corridors have been taken forward for further development either refining them into route options or developing route options within them in response to more detailed or localising routeing considerations. Figure 6 provides a visual comparison of strategic route corridors and route options.

Identification of Substation Sites

The identification of potential substation sites has been informed by the basic technical requirements. While the substation itself would have an operational footprint of approximately 4ha, additional land would be required during construction such as for site offices, storage and laydown areas while subject to site specific characteristics additional land could be required for environmental mitigation. The basic operational footprint has been used as a starting point for the identification of potential sites.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

Strategic Corridor Options

Route Options

GALASHIELS

SELKIRK

Scale @ A3 1:100,000

0 2.5 5 km

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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Strategic Route Corridor
- Route Option

TITLE
Figure 6
Visual Comparison of Strategic Route Corridors versus Route Options

REFERENCE
GH_20240822_RS_6_v1

SHEET NUMBER
1 of 1

DATE
22/08/24

04.

The Study Area

4. The Study Area

4.1 Introduction

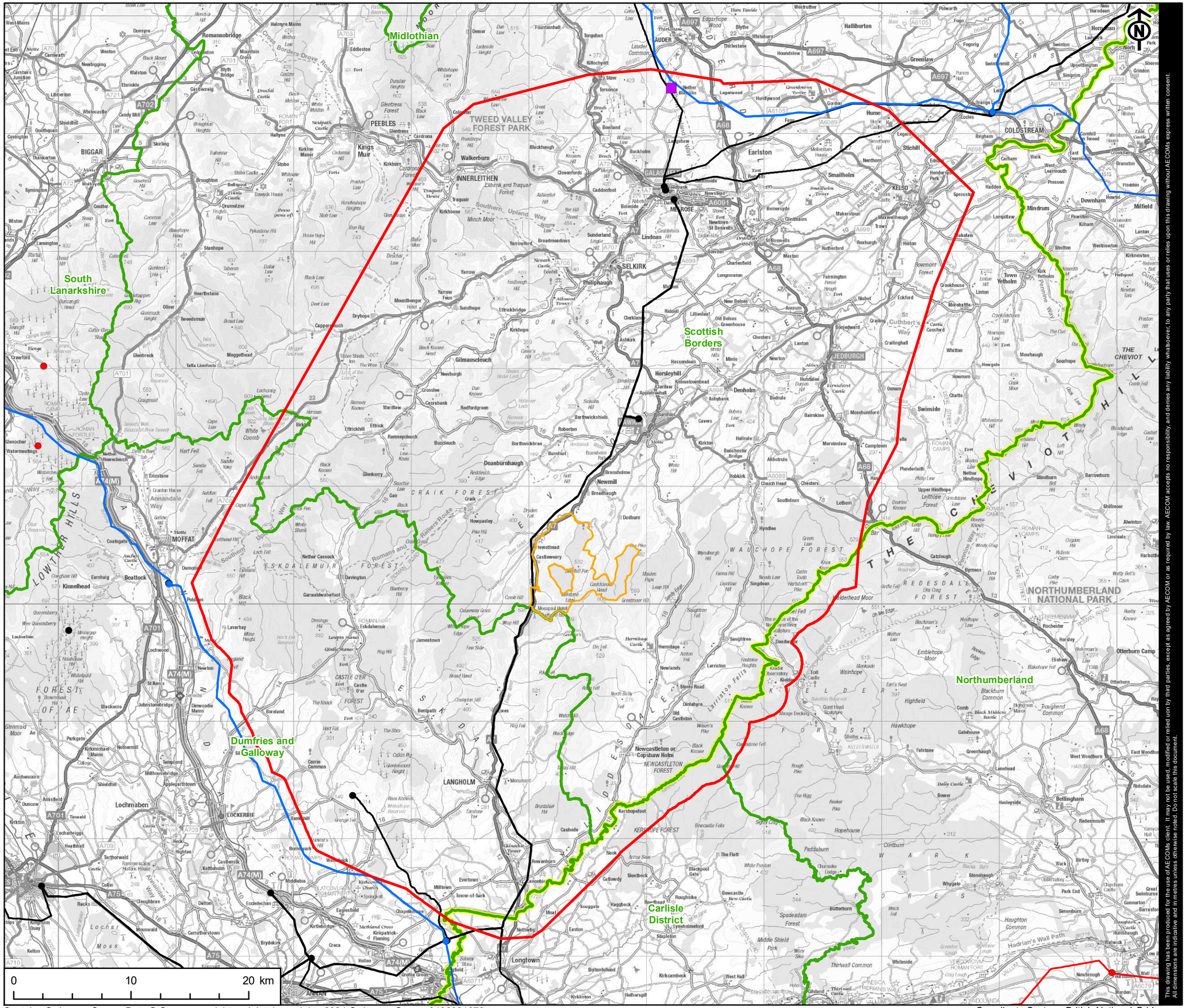
This section describes the Study Area and the key environmental and technical constraints within it. These form the basis of routeing and siting considerations which inform the identification and assessment of alternative route options and substation sites. The SP Energy Networks Project has a fixed 'start' point at the proposed Gala North Substation west of Lauder in the Scottish Borders, however, the 'end' point' (where it crosses the Scotland-England border into NGET's licence area) is dependent on the connection point in the northwest of England to which wider Project is routed to. For the purposes of this routeing and siting study the 'end' has been taken to be a section of the Scotland-England border extending from west to east from the River Sark to Kielder.

4.2 Description of the Study Area

The extents of the Study Area, illustrated in Figure 7, have been informed by the location of the 'start' and 'end' points as well as the requirement to connect proposed wind generation to the electricity network via a new substation in the south of Scotland. The northern extent of the Study Area has been defined by the proposed Gala North Substation and the southern extent by the Scotland-England border which coincides with the boundary between SP Transmission and NGET's licence areas. NGET will be responsible for identifying and assessing alternative routes within its licence area from south of the Scotland-England border to the Carlisle area. The western and eastern extents of the Study Area have largely been established taking account of SP Transmission's statutory duties and in particular the directness of route options which they would enable. Extending the Study Area too far east or west would only serve to increase the length of potential route options without any benefit. The western extent of the Study Area has largely been defined by the Tweedsmuir Hills and Moffat Hills while the eastern extent of the Study Area has been defined by the Cheviot Hills and Kielder Forest. This establishes a large Study Area which enables the identification and consideration of a range of route and site options while also seeking to balance potential adverse environmental effects with technical feasibility and economic viability.

As illustrated in Figure 7 the majority of the Study Area is within the Scottish Borders Council area with a small part to the south/southwest within the Dumfries and Galloway Council area. The southern extent of the Study Area extends over the Scotland-England border into Cumberland Council and Northumberland County Council to the east for completeness and to ensure that an appropriate level of consideration is given to routeing considerations that might influence or constrain route options in the border area including those which could affect onward routeing within NGET's licence area. As noted previously the identification and assessment of alternative route options within NGET's licence area is outside of the scope of this study.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:300,000

0 10 20 km

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Proposed Gala North Substation Location
- Proposed Teviot Wind Farm Boundary
- Local Authority Boundary
- Scotland / England Border

Existing Transmission System
- 132 kV Substation
- 275 kV Substation
- 400 kV Substation
- 132kV OHL
- 275kV OHL
- 400kV OHL

TITLE
Figure 7
The Study Area

REFERENCE
GH_20240827_RS_7_v2

SHEET NUMBER
1 of 1

DATE
27/08/24

4.3 Areas of the Highest or High Environmental Value

The following sub-sections identify areas or sites of the highest or high environmental value within the Study Area taking account of Holford Rule 1 and supplementary notes and clarifications. The following sections should be read with reference to Figure 8 and the plans contained in Appendix C.

Landscape Designations

Landscape designations of the highest or high environmental value comprise National Parks, National Scenic Areas (NSA) and Wild Land in Scotland and National Parks and National Landscapes (formerly Areas of Outstanding Natural Beauty (AONBs)) in England.

There is one designation of the highest environmental value wholly within the Study Area; the Eildon and Leaderfoot NSA located to the east of Melrose where the Leader Water drains into the River Tweed. The Wildland Area: 02. Talla- Hart Fell extends very slightly into the Study Area on its western edge. The Study Area does not encompass any nationally designated landscapes in England, although the Northumberland National Park lies immediately to the east at Carter Bar on the edge of the Cheviot Hills.

Ecology and Ornithology Designations

Ecological and ornithological sites of the highest or high environmental value comprise Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Sites of Special Scientific Interest (SSSIs) as well as Ramsar sites.

Special Areas of Conservation

There are seven SACs located wholly or partly within the Study Area and summarised in Table 4 below. Route options should be developed to avoid SACs in order to prevent directly impacting them. The location and/or scale of SACs within the Study Area is such that they are considered to be avoidable with careful routeing, however the River Tweed SAC is an exception. It comprises of the River Tweed and its tributaries many of which flow across the Study Area. Within the north of the Study Area (north of the River Tweed) tributaries flow in a southern or southeastern direction draining into the River Tweed while to the south tributaries typically flow northeast across the Study Area draining into the River Tweed. The number of tributaries, particularly to the south of the River Tweed, means that the designation cannot be avoided, and route options will be required to cross the SAC. However, where the River Tweed SAC requires to be crossed by route options, impacts can be avoided through design of the route alignment and careful consideration of tower locations.

Table 4 Special Areas of Conservation within the Study Area

Designated Site	SAC Qualifying Interests	Location
Moorfoot Hills (also SSSI)	Habitats comprising blanket bogs and dry heaths	Large-scale site located to northwest of the Study Area partly extending into it

Designated Site	SAC Qualifying Interests	Location
River Tweed	Habitats (floating vegetation dominated by crowfoot) and protected species (fish and mammals)	Linear site extending throughout the Study Area comprising multiple watercourses including the River Tweed and its tributaries
Threepwood Moss (also SSSI)	Habitats comprising active and degraded raised bogs	Small-scale site located entirely within the Study Area south of the proposed Gala North Substation
Borders Woods (also overlaps a number of different SSSIs)	Habitats comprising mixed woodland on base-rich soils associated with rocky slopes	Comprises a number of small-scale sites all located within the Study Area (south of Hawick, east of Newton St Boswells and south of Cleuch Head
Whitlaw and Branxholme (also overlaps a number of different SSSIs)	Habitats comprising fens, slender green feather moss and very wet mires	Small-scale site comprised of two discrete components located entirely within the Study Area to the southwest of Hawick, west of the A7
Moffat Hills (also SSSI)	Habitats including heaths, blanket bog and montane acidic grasslands	Relatively large-scale site located to west of the Study Area partly extending into it
Border Mires, Kielder-Butterburn	Habitats including blanket bogs, dry heaths, west heaths and transition mires	Large-scale comprising multiple components extending along the Scotland-England border
Moorfoot Hills (also SSSI)	Habitats comprising blanket bogs and dry heaths	Large-scale site located to northwest of the Study Area partly extending into it
River Tweed	Habitats (floating vegetation dominated by crowfoot) and protected species (fish and mammals)	Linear site extending throughout the Study Area comprising multiple watercourses including the River Tweed and its tributaries
Threepwood Moss (also SSSI)	Habitats comprising active and degraded raised bogs	Small-scale site located entirely within the Study Area south of the proposed Gala North Substation

Designated Site	SAC Qualifying Interests	Location
Borders Woods (also overlaps a number of different SSSIs)	Habitats comprising mixed woodland on base-rich soils associated with rocky slopes	Comprises a number of small-scale sites all located within the Study Area (south of Hawick, east of Newton St Boswells and south of Cleuch Head

Special Protection Areas

There is one SPA located wholly within the Study Area; the Langholm-Newcastleton Hills SPA described in Table 5. It occupies a large area (over 7,000ha) to the southeast of the Study Area straddling the boundary between Dumfries and Galloway and the Scottish Borders. Route options should be developed to avoid the SPA as well as take account of potentially functionally linked land in its vicinity in order to prevent directly impacting its qualifying interests.

Table 5 Special Areas of Conservation within the Study Area

Designated Site	SPA Qualifying Interests	Location
Langholm-Newcastleton Hills SPA (also SSSI)	Supports a breeding population of hen harrier	Large-scale site located to the southeast of the Study Area south of the proposed Teviot Wind Farm

Sites of Special Scientific Interest

There are more than 60 SSSIs located throughout the Study Area ranging in size and basis of designation (i.e. designated for biological and/or geological reasons). A number of the sites coincide with the SACs and SPA summarised above albeit the reasons for their designation may differ. Table 6 identifies the SSSIs designated for biological and geological reasons which are wholly or partly present within the Study Area (note those sites designated only for geological reasons are identified in Table 8). Route options should be developed to avoid SSSIs in order to prevent directly impacting them. There is a large number of SSSIs within the Study Area, however, a combination of their size and distribution is such that they are generally considered to be avoidable with careful routeing. As described in section 3 some smaller sites of high environmental value may be more appropriately addressed in developing a detailed route alignment. There are some localised areas where a small number of SSSIs are more closely clustered together such as east of Selkirk and south Hawick which are considered to be slightly more constrained and likely to have a greater influence on routeing.

Table 6 Sites of Special Scientific Interest (biological) within the Study Area

Designated Site	SSSI Qualifying Interests	Location
Long Moss-Drinkstone Hill	Habitats including fens and lowland grasslands	Small-scale site located wholly within the Study Area to the northwest of Hawick
Longnewton Cutting	Habitat comprising lowland grassland	Small-scale site located wholly within the Study Area to the southeast of Melrose
Avenel Hill and Gorge	Habitat comprising upland oak woodland as well as invertebrates	Small-scale site located wholly within the north of the Study Area to the north of Tweedbank
Lurgie Loch	Habitat comprising basin fen and invertebrates	Small-scale site located wholly within the northeast of the Study Area
Lynnwood-Whitlaw Wood, Slitrig	Habitat comprising upland mixed ash woodland	Small-scale site located south of Hawick coinciding with part of the Borders Wood SAC.
Minto Craigs	Habitat comprising upland mixed ash woodland as well as plants, lichens and invertebrates	Small-scale site located wholly within the Study Area to the northeast of Hawick
Moffat Hills	Geological and biological with the latter comprising upland habitats and plants	Relatively large-scale site located to west of the Study Area coinciding with the Moffat Hills SAC
Newtown St Boswells Woods	Habitat comprising upland mixed ash woodland	Small-scale site located east of Newton St Boswell coinciding with part of the Borders Wood SAC
Plora Wood	Habitat comprising upland oak woodland	Small-scale site located to the west of the Study Area south of Innerleithen
Selkirk Racecourse Moss	Habitat comprising basin fen as well as its plant assemblage	Small-scale site located towards the north of the Study Area east of Selkirk

Designated Site	SSSI Qualifying Interests	Location
St Mary's Loch	Freshwater habitat comprising oligo-mesotrophic loch	Small-scale site located on the western margins of the Study Area coinciding with the River Tweed SAC
Threepwood Moss	Habitat comprising raised bog	Small-scale site located entirely within the Study Area south of the proposed Gala North Substation coinciding with Threepwood Moss SAC
Tweedwood-Gateheugh	Habitat comprising upland oak woodland as well as invertebrates	Small-scale site located on the banks of the River Tweed to the east of Melrose
Whitlaw Mosses	Habitat comprising basin fen as well as invertebrates and plants	Small-scale site located entirely within the Study Area to the southwest of Hawick, west of the A7 coinciding with Whitlaw and Branxholme SAC
Whitlaw Rig	Habitat comprising lowland grassland	Small-scale site located entirely within the Study Area to the east of Selkirk
Whitmuirhall Loch	Habitat comprising fens including basin fen	Small-scale site located entirely within the Study Area to the east of Selkirk
Williamhope	Habitats including lowland grassland and heathland as well as fens	Moderate sized site located entirely within the Study Area to the east of Traquair Forest
Woodhead Moss	Habitats comprising basin fen and wet woodland	Small-scale site located entirely within the Study Area to the north of Ancrum
Whitlaw Bank to Hardies Hill	Habitat comprising lowland grassland as well as butterflies and invertebrates	Small-scale site located entirely within the Study Area to the south of Hawick
Adderstonlee Moss	Habitat comprising basin fen	Small-scale site located entirely within the Study Area to the southeast of Hawick

Designated Site	SSSI Qualifying Interests	Location
Bell's Flow	Habitat comprising intermediate bog	Small-scale site located to the south of the Study Area south of Langholm
Bemersyde Moss	Habitat comprising open water transition fen as well as breeding bird species	Small-scale site located to the north of the Study Area east of Newton St Boswells
Lindean Reservoir	Freshwater habitat comprising base-rich loch as well as invertebrates	Small-scale site located entirely within the Study Area to the east of Selkirk
Langholm-Newcastleton Hills	Geological and biological with the latter comprising upland habitats and breeding bird assemblages including moorland birds, wader and raptor species	Large-scale site located to the southeast of the Study Area south of the proposed Teviot Wind Farm coinciding with the Langholm-Newcastleton Hills SPA
Ashkirk Loch	Habitat comprising basin fen	Small-scale site located entirely within the Study Area to the northwest of Hawick
Kielderhead Moors: Carter Fell to Peel Fell	Habitat comprising blanket bog and heathland well as breeding bird assemblages	Moderate sized site located entirely within the Study Area on its eastern margin on the Scotland-England border
Kingside Loch	Habitats comprising basin fen and oligotrophic loch	Small-scale site located entirely within the Study Area to the north of Craik Forest
Kirkton Burn Meadow	Habitat comprising lowland grassland	Small-scale site located entirely within the Study Area to the east of Hawick
Kirkhope Linns	Habitat comprising upland mixed ash woodland	Small-scale site located entirely within the Study Area to the south of Ettrickbridge
Kippilaw Moss	Habitat comprising basin fen	Small-scale site located entirely within the Study Area to the west of Hawick

Designated Site	SSSI Qualifying Interests	Location
Slaidhills Moss	Plants comprising bryophyte assemblage	Small-scale site located entirely within the Study Area to the southwest of Hawick coinciding with Whitlaw and Branxholme SAC
Herman Law and Muchra Cleuchs	Habitat comprising upland birch woodland	Small-scale site comprising three closely located components on the western margins of the Study Area
Faldonside Loch	Freshwater habitat comprising base-rich loch	Small-scale site located entirely within the Study Area to the south of Galashiels
Gordon Moss	Habitat comprising wet woodland	Small-scale site located to the north of the Study Area to the east of the proposed Gala North Substation
Glenkinnon Burn	Habitats comprising upland mixed ash woodland and upland birchwood as well as lichen assemblage	Small-scale site comprising two components located entirely within the Study Area to the east of Traquair Forest adjacent to Williamhope SSSI
Dryfe Water	Habitats comprising upland mixed ash woodland	Small-scale site located on the southwestern margins of the Study Area
Akermoor Loch	Freshwater habitat comprising mesotrophic loch	Small-scale site located entirely within the Study Area to the south of Ettrickbridge
Clarilaw Grasslands	Habitats comprising lowland calcareous grassland and invertebrates	Small-scale site comprised of two components located entirely within the Study Area to the south of Melrose
Dunhog Moss	Habitat comprising basin fen and invertebrates	Small-scale site located entirely within the Study Area to the south of Selkirk

Designated Site	SSSI Qualifying Interests	Location
Gattonside Moss	Habitat comprising basin fen and invertebrates	Small-scale site located entirely within the Study Area to the north of Gattonside
Colmsliehill Junipers	Woodland comprising juniper scrub	Small-scale site located entirely within the Study Area south of the proposed Gala North Substation
Allan Water, Hillhead	Habitats comprising lowland calcareous grassland	Small-scale site located entirely within the Study Area to the southwest of Hawick east of the A7
Catshawhill	Habitat comprising lowland neutral grassland and basin fen	Small-scale site located entirely within the Study Area to the west of Jedburgh
Cragbank and Wolfehopelee	Habitat comprising upland mixed ash woodland and invertebrates	Small-scale site located entirely within the Study Area to the south of Cleuch Head
Buckstruther Moss	Habitat comprising basin fen and invertebrates	Small-scale site located entirely within the Study Area to the west of Bonchester Bridge
Makerstoun - Corbie Craigs to Trows' Craigs	Habitat comprising lowland neutral grassland	Small-scale site located entirely within the Study Area to the southwest of Kelso adjacent to the River Tweed SAC and SSSI
Branxholme Wester Loch	Freshwater habitats comprising oligotrophic loch and open water transition fen	Small-scale site located entirely within the Study Area to the southwest of Hawick, west of the A7 overlapping with part of Whitlaw and Branxholme SAC
Branxholme Easter Loch	Freshwater habitats comprising base-rich loch	Small-scale site located entirely within the Study Area to the southwest of Hawick, west of the A7
Jedwater Woodlands	Habitat comprising upland oak woodland and invertebrates	Small-scale site comprising three components located south of

Designated Site	SSSI Qualifying Interests	Location
		Jedburgh along the Jed Water Valley
Blind Moss	Habitat comprising basin fen and invertebrates	Small-scale site located entirely within the Study Area to the northwest of Hawick
Henderland Bank	Habitat comprising upland mixed ash woodland	Small-scale site located on the western margins of the Study Area west of St Mary's Loch SSSI
Moorfoot Hills	Habitats comprising blanket bog, upland habitats and upland birch woodland as well as breeding bird assemblages	Large-scale site located to northwest of the Study Area partly extending into it coinciding with the Moorfoot Hills SAC
River Tweed	Freshwater habitats as well as freshwater and estuarine fish species, otters and invertebrates	Linear site extending throughout the Study Area comprising multiple watercourses including the River Tweed, Whiteadder Water, Blackadder Water, Yarrow Water, Ettrick Water, River Teviot and Bowmont Water
Alemoor West Loch and Meadow	Habitat comprising flood plain fen and plant assemblage.	Small-scale site located entirely within the Study Area to the west of Hawick south of the B711
Riskinhope	Habitat comprising flood plain fen	Small-scale site located on the western margins of the Study Area adjacent to St Mary's Loch SSSI and part of the River Tweed SAC and SSSI
Hummelknowes Moss	Habitat comprising basin fen	Small-scale site located entirely within the Study Area to the south of Hawick
Kielder Mires	Habitat comprising a range of mire types including blanket mire, valley mires and intermediate mires	Large scale site comprising multiple components along the Scotland-England border

Designated Site	SSSI Qualifying Interests	Location
Jockie's Syke	Fossil assemblage	Small scale site located to the south of the Scotland-England border
Kielderhead and Emblehope Moors	Habitat comprising blanket bog, dry heathland, grassland complexes and wet heath	Large-scale located to the east of the Study Area on the Scotland-England border

Cultural Heritage and Archaeology

Cultural heritage and archaeological sites of the highest or high environmental value within the Study Area comprise scheduled monuments, inventory battlefields and listed buildings as well as Gardens and Designed Landscapes.

Scheduled Monuments

There are almost 400 scheduled monuments located within the Study Area (seven of which are located south of the Scotland-England border). These are present throughout the Study Area ranging in size from discrete small-scale sites such as the remains of hillforts or settlement to relatively larger sites such as Newstead Roman Military Complex north of Newtown St Boswells or Stobs Camp south of Hawick to linear features such as the Faldonside to Kippielaw linear earthwork or the Catrail. There are a number of locations where the distribution of scheduled monuments means that they are closely clustered together and assets may also be interrelated. These areas are generally considered to be slightly more constrained and likely to have a greater influence on routeing. The identification of route options in proximity to scheduled monuments considers their location as well as their setting as far as possible.

Inventory Battlefields

There are three inventory battlefields present within the Study Area, listed below. The boundaries of inventory battlefields define the area in which the main events of the battle are considered to have taken place and where associated physical remains and archaeological evidence occur or may be expected.

- Battle of Darnick located at the village of Darnick to the west of Melrose. The inventory battlefield site occupies an area of approximately 110ha extending south and west from the River Tweed over the village to west of the A6091.
- Battle of Ancrum Moor located to the north of the village of Ancrum. The inventory battlefield site occupies a large area of countryside (approximately 1,300ha) with some development most notably the A68 which bisects it in south-easterly direction.
- Battle of Philiphaugh located within and to the west of the town of Selkirk. The inventory battlefield site occupies an area of just over 500ha extending from within the town of Selkirk over the village of Philiphaugh to the A708 and the Ettrick Water.

Listed Buildings

There are nearly 2,000 listed buildings present within the Study Area (Category A: 133, Category B: 822 and Category C: 964). The majority of listed buildings are located within settlements where they coincide with conservations areas. Some listed buildings are present in more rural open areas, however, they are much less prevalent particularly within the central part of the Study Area moving south of Hawick where terrain and landform are more elevated.

Gardens and Designed Landscapes

There are 16 Gardens and Designed Landscapes located within the Study Area. These are predominantly located within the northern part of the Study Area with a number of Gardens and Designed Landscapes extending west to east along the River Tweed Valley from Innerleithen to Kelso. A number of the Gardens and Designed Landscapes coincide with other sites or features of cultural heritage interest including scheduled monuments and listed buildings.

Table 7 Gardens and Designed Landscapes within the Study Area

Garden and Designed Landscape	Location
The Glen	Located on the western margins of the Study Area and within which there are a number of listed buildings
Traquair House	Located to the west of the Study Area south of Innerleithen and within which there are a number of listed buildings
Bowland	Located to the north of the Study Area southwest of the proposed Gala North Substation and within which there are listed buildings
Fairnilee	Located to the north of the Study Area south/southwest of Galashiels on the River Tweed and within which there are listed buildings
Abbotsford	Located in the northern part of the Study Area south of Galashiels and within which there are listed buildings as well as a scheduled monument
Bowhill	Located in the northern part of the Study Area west/southwest of Selkirk and within which there are listed buildings and a scheduled monument
The Haining	Located in the northern part of the Study Area south of Selkirk and within which there are listed buildings and a scheduled monument

Garden and Designed Landscape	Location
Carolside And Leadervale	Located to the north of the Study Area southeast of the proposed Gala North Substation and within which there are listed building
Bemersyde	Located to the east of Melrose between the River Tweed to its west and the B6356 to its east within which there are listed buildings
Dryburgh Abbey	Located to the east of Newton St Boswells within which there is Dryburgh Abbey scheduled monument as well as a number of listed buildings
Mertoun	Located to the east of St Boswells which is bisected by the River Tweed and within which there are a number of listed buildings
Monteviot	Located to the north of Jedburgh which is bisected by the River Tweed and the A68 and within which there are a number of listed buildings
Mellerstain	Located to the east of Earlston in the northeast of the Study Area adjacent to the A6809 and within which there are number of listed buildings
Newton Don	Located to the north of Kelso the northeast of the Study Area adjacent to the A6809 and within which there are number of listed buildings
Floors Castle	Located on the western margins of the Study Area and within which there are a number of listed buildings
Hendersyde	Located to the west of the Study Area south of Innerleithen and within which there are a number of listed buildings

Other Designations

Other sites of the highest or high environmental value within the Study Area include designations relating to geology and woodland.

Geological Designations

There are a number of Geological Conservation Review (GCR) sites present within the Study Area containing geological and/or geomorphological features of national or international importance. While GCR sites are not identified in the Holford Rules and supplementary notes or clarifications as being of the highest or high environmental value, the majority of GCR sites are also designated as SSSIs for their geological interests. As a result, such sites

are considered to be sites of high environmental value for the purposes of this study. Table 8 identifies the SSSIs/GCRs are present within the Study Area.

Table 8 Sites of Special Scientific Interest (geological) within the Study Area

Designated Site	SSSI Qualifying Interests	Location
Palmers Hill Railway Cutting	Geological	Small-scale site located to the east of the Study Area east of Hermitage Castle
River Esk, Glencartholm	Geological	Small-scale site located east of the Study Area south of Langholm
Thornylee Quarry	Geological	Small-scale site located to the north of the Study Area adjacent to the A72
Bigholms Burn	Geological	Small-scale site located to the south of the Study Area south of Langholm
Hareheugh Craigs	Geological	Small-scale site located on the northeastern margins of the Study Area
Kershope Bridge	Geological	Small-scale site located on the southeastern margins of the Study Area straddling the Scotland-England border
Grieston Quarry	Geological	Small-scale site located on the northwestern margins of the Study Area
Penton Linns	Geological	Small-scale site located on the Liddel Water to the north and south of the Scotland-England border

Woodland designations

The Ancient Woodland Inventory (AWI) identifies three main categories of woodland which are considered likely to be of value for biodiversity and/or cultural reasons: ancient woodland of semi-natural origin (category 1a and 2a), long-established woodland of plantation origin (category 1b and 2b) or other woodlands (category 3). While ancient woodland is not identified in the Holford Rules as an area or site of highest or high environmental value, the notes advise that such areas should be identified on a project-by-project basis having regard to factors including policy. National Planning Framework 4 (NPF4) highlights the importance irreplaceable habitats and while this does not include specific reference to ancient woodland such sites may be considered to be irreplaceable. Adopting a precautionary approach,

noting NatureScot's guidance on AWI which highlights the provisional nature of the inventory, AWI sites are considered to be sites of high environmental value and should be avoided as much as possible.

There are more than 500 sites on the AWI present within the Study Area (comprising 1a: 202 sites, 1b: 20 sites, 2a: 126 sites, 2b: 130 sites and 3: 31 sites). Sites are scattered throughout the Study Area and include sites on periphery of larger scale plantation forestry, sites within Gardens and Designed Landscapes as well as more isolated woodlands in open countryside. Towards the south of the Study Area, to the north and south of Langholm following the A7 as well as extending south of Kershope Foot there are a larger number of AWI sites more closely located together which may increase the level of constraint in these areas.

Settlement

As described in section 3 the Holford Rules do not address settlements or residential properties, however, the guidance set out in supplementary notes and clarifications advise "avoid routeing close to residential areas as far as possible on grounds of general amenity" and "in rural areas avoid as far as possible dominating isolated house, farms or other small-scale settlements". For the purposes of this routeing and siting study, settlements and properties have been defined as areas of the highest amenity or environmental value. Smaller clusters of properties or individual properties are considered to be of similar importance to settlements, however, their relative small-scale is such that they may be appropriately addressed through the identification of a detailed route alignment.

Larger towns and villages tend to be present to the north of the Study Area, for example along the River Tweed Valley including Innerleithen, Galashiels, Melrose and Kelso. Moving southwards in the Study Area larger settlements coalesce along the road network including Selkirk, Hawick and Langholm on the A7 and Jedburgh on the A68. Smaller villages are scattered in the wider areas surrounding these towns, however, south of Hawick, large parts of the Study Area are relatively unsettled due to the upland terrain and topography. Smaller villages and scattered properties are present along the A6068 which connects the A7 and the A68 as well as along the Liddesdale valley on the eastern boundary of the Study Area. This includes Bonchester Bridge on the A6068 and Newcastleton in the Liddesdale Valley.

4.4 Areas of Moderate or Low Environmental Value

The following sub-sections identify areas or sites of moderate or low environmental value within the Study Area. The Holford Rules do not refer to areas of moderate or low environmental value, however, the supplementary notes do highlight that consideration should be given to designations of regional and local importance. The following sections should be read with reference to Figure 8 and the plans contained in Appendix C.

Landscape Designations

There are a number of local landscape designations present within the Study Area that have been designated by Scottish Borders (Special Landscape Areas (SLAs)) or Dumfries and Galloway Councils (Regional Scenic Areas (RSAs)). These include:

- Tweedsmuir Uplands SLA1 – Located on the western margins of the Study Area in the Scottish Borders and extending northeast to southwest along the Tweedsmuir Hills.

- Tweed Valley SLA 2 – Located to the northwest of the Study Area in the Scottish Borders and extending west to east along the Tweed Valley to the east of Innerleithen.
- Tweed, Ettrick and Yarrow Confluences SLA 3 – Located adjacent to SLA1 and 2 in the and extending along the Tweed Valley and south towards Ettrickbridge.
- Tweed Lowlands SLA 4 – located to the east of the Study Area in the Scottish Borders extending eastwards from Newtown St Boswells along the Tweed Valley towards Kelso.
- Teviot Valleys SLA 5 – located to the east of the Study Area in the Scottish Borders extending southwest from Jedburgh to Hawick following the A698 and River Teviot.
- Cheviot Foothills SLA 8 – slightly extends into the Study Area on its eastern margin close to the Scotland-England border at Carter Bar.
- Moffat Hills RSA – Located on the western margins of the Study Area in Dumfries and Galloway where it follows the route of the A708.
- Langholm Hills RSA – Located to the south of the Study Area in Dumfries and Galloway straddling the A7 and extending over the hills to the west and east of the road.

Ecology and Ornithology Designations

Ecological sites or areas of moderate or low environmental value comprise Local Biological Sites (LBS) in the Scottish Borders and Local Nature Conservation Sites (LNCS) in Dumfries and Galloway as well as Scottish Wildlife Trust (SWT) Reserves:

- There are a number of LBS identified from Technical Note 4 which forms part of the proposed Scottish Borders Local Development Plan (LDP). These are typically small-scale sites which are scattered throughout the Study Area.
- No LNCS have been identified within the Study Area from a review of Technical Paper which forms part of the adopted Dumfries and Galloway LDP.
- There are a small number of SWT Reserves present within the Study Area (Gordon Moss, Bemersyde Moss, Hare and Dunhog Mosses and Whitlaw Wood) all of which are small-scale sites and, in some instances coincide with statutory designations.
- The Tarras Valley Nature Reserve is a community owned initiative occupying a large area extending north/northeast from Langholm along the Tarras Valley. Much of the Reserve coincides with the Langholm-Newcastleton SPA and SSSI.

Cultural Heritage and Archaeology

There are no cultural heritage or archaeological sites of moderate or low environmental designated within the Scottish Borders LDP, however, the Dumfries and Galloway LDP identifies Archaeologically Sensitive Areas and non-inventory Gardens and Designed Landscapes. Other non-designated assets, for example Historic Environment Record (HER) data is not considered as part of this study but would be taken into account as the detailed route alignment is developed.

Within the southwest of the Study Area there are:

- Four Archaeologically Sensitive Areas (17. Raeburfoot, 18. Tanlawhill, 19. Boyken Burn and 20. Dryfe Water) which also coincide with clusters of scheduled monuments.

- Six non-inventory Gardens and Designed Landscapes (Gillesbie House, Castle O'er, Grange, Westerhall, Langholm Lodge/Holmhead and Broomholm).

Tourism and Recreational Interests

There are a diverse range of tourism and recreational interests present within the Study Area ranging from visitor attractions such as historic homes or monuments to recreational walking and cycling routes or outdoor activities such as mountain biking as well as tourism-related businesses such as hotels, bed and breakfasts and camping sites. While the Holford Rules do not make reference to such interests, the supplementary notes and clarifications highlight that consideration should be given to potential effects on users of tourist and recreational routes. For the purposes of this study, this has included consideration of potential effects on key visitor attractions as well as tourist and recreational routes.

Tourism and recreational interests within the Study Area include:

- Long distance routes and trails that are within the Study Area including the Southern Upland Way, Borders Abbey Way, St Cuthberts Way, Roman and Reivers Route and Cross Borders Drove Road.
- A number of Foresty and Land Scotland (FLS) sites within the Study Area which provide outdoor recreational activities including Innerleithen, Yair, Craik Forest, Wauchope, Newcastleton and Castle O'er.
- A range of notable visitor attractions (a number of which are also designated for cultural heritage interests) including Traquair House, Abbotsford, Floors Castle and Hermitage Castle as well as Melrose Abbey.

Carbon-rich Soils and Peatland

The Carbon and Peatland 2016 Map identifies where areas of carbon-rich soils and peatlands are likely to occur. It shows the distribution of carbon and peatland classes (class 1 which is representative of nationally important carbon rich soils and deep peat to class 5 which is representative of peat soils). This is an important consideration in the identification of route options taking account of NPF4 which aims to guide development away from carbon-rich soils and peatland.

Class 1, 3 and 5 soils are present throughout the Study Area with particularly extensive areas on the western and eastern margins of the Study Area as well as south of the proposed Teviot Wind Farm. Small areas of Class 1 soils are present on the western margins of the Study Area with larger areas of Class 3 soils and in particular Class 5 soils present moving eastward across Craik Forest and towards the A7. Slightly larger areas of Class 1 soils are present to the east of the Study Area, firstly south of the proposed Teviot Wind Farm and coinciding with the Langholm-Newcastleton SPA and SSSI and on the eastern margins of the Study Area coinciding with Kielderhead Moors: Carter Fell to Peel Fell SSSI. Class 3 and 5 soils are present on much of the eastern part of the Study Area extending southwards from the A6088 to Kershope Foot.

Other Land Use Considerations

Forestry

There are large areas of forestry present throughout the Study Area. These include Traquair Forest, Craik Forest, Eskdalemuir Forest and Castle O'er Forest all of which lie to the west of the Study Area as well as Wauchope and Newcastleton Forests which are located to the southeast of the Study Area. The extent of forestry present within the Study Area means that it is an important consideration in the identification of route options taking account of NPF4 and the Scottish Government's Control of Woodland Removal Policy. These only support woodland removal where it would achieve significant and clearly defined public benefits. In most cases, compensatory planting may form part of this balance.

Land Capability for Agriculture

The Land Capability Map for Agriculture provides information on the types of crops that may be grown in different areas dependent on environmental and soil characteristics. Land is classed from 1-7 depending on its capability to support agriculture (with 1 indicating capability to support a wide range of crops and 7 indicating land of limited agricultural value). Much of the land within the Study Area falls within classes 4,5 and 6 and is therefore of lower agricultural capability. Some smaller area of class 3 are present in lower lying river valleys including along the River Tweed and Ettrick Water while a larger area of class 3 with some class 2 land is present to the northeast of the Study Area largely coinciding with lower lying land.

4.5 Landscape Character and Sensitivity

The following sub-sections provide an overview of landscape character within the Study Area and should be read with reference to Appendix D.

Landscape Baseline

The landscape character within the Study Area is defined by the use of Landscape Character Types (LCTs), which are areas of a type of landscape which may be replicated across different parts of the country and are not geographically defined as a unique area.

There are 26 LCTs within the Study Area, largely based on land use and topographical characteristics and defined by Nature Scot. No single LCT is prevalent but in general terms most are uplands/upland plateau or upland fringe/foothills with lowland areas and valley landscapes being less common. The LCTs are identified below in Table 9.

Table 9 Landscape Character Types within the Study Area

Landscape Character Types within the Study Area	
115: Upland Valley with Mixed Farmland	172: Upland Fringe- Dumfries and Galloway
103: Undulating Upland Fringe	171: Flow Plateau
91: Plateau Grassland-Borders	175: Foothills- Dumfries and Galloway,

Landscape Character Types within the Study Area	
114: Pastoral Upland Valley	90: Dissected Plateau Moorland,
116: Upland Valley with Woodland	119: Wooded Upland Fringe Valley
93: Southern Uplands with Scattered Forest- Borders	160: Narrow Wooded River Valley- Dumfries and Galloway
113: Upland Valley with Pastoral Floor	117: Pastoral Upland Fringe Valley
96: Southern Uplands with Forest- Border	177: Southern Uplands- Dumfries and Galloway
178: Southern Uplands with Forest- Dumfries and Galloway	176: Foothills with Forest- Dumfries and Galloway
94: Rolling Moorland	120: Lowland Valley with Farmland
101: Rocky Upland Fringe.	98: Rolling Foothills
99: Rolling Farmland – Borders	109: Lowland Margin with Hills
158: Coastal Flats- Dumfries and Galloway	102: Upland Fringe with Prominent Hills

A summary of the key characteristics of each LCT is provided in Appendix D of this report with the LCTs shown on Figure C.2. A summary of the landscape context across the study area is provided below.

The northeast portion of the study area largely comprises the Tweed lowlands which are characteristic of a typical Borders landscape of rolling mixed farmland with extensive estate landscapes with rich cultural heritage. Much of this landscape provides the foreground to the view of the Eildon Hills. The upland landscape to the west comprises large tracts of steep rolling landform and open plateau moorland with deep valleys and rounded peaks. Locally prominent areas of forestry are present along with pockets of shelterbelt planting within the undulating upland fringe. Between Teviot and the Tweed lowlands to the north, there are a varied mix of landscape elements with forestry, woodland, open hillsides and pastoral farmland which contrast with the well settled valleys.

From Teviot south the landscape is largely characterised by the southern uplands, a larger scale, rolling, upland landscape with large areas of forestry, open moorland and wind farms. This landscape transitions to the south to a generally undulating landscape with semi-improved pasture and many scattered farmsteads and small settlement. The southern most part of the study area is characterised by the flow plateau, an area of largely flat and gently rolling topography with an incline towards the Solway with large fields and pockets of riparian woodland.

Landscape Sensitivity

Landscape sensitivity studies can identify areas of relative sensitivity to particular development scenarios (An approach to landscape sensitivity assessment – to inform spatial planning and land management, Natural England, June 2019).

Landscape sensitivity can be defined as a measure of the resilience, or robustness, of a landscape to withstand specified change arising from development types or landscape management practices, without undue negative effects on the landscape and visual baseline and their value.

When considering the ability of the landscape of the study area to accommodate high voltage OHLs or substation infrastructure, factors which influence the sensitivity of a landscape to overhead lines needs to be considered. Factors which increase or reduce landscape elements' susceptibility to an OHL within the Study Area are set out in Appendix D.

Initial assessment of the sensitivity of the landscape baseline has been undertaken based on desktop analysis and focused site survey of landscape designations and their special qualities within the Study Area and the LCTs and their key characteristics. In determining landscape sensitivity professional judgement has been applied along with an understanding of how a high voltage OHL or substation would affect or fit in with the landscape. These findings are set out in Appendix D.

4.6 Other Routeing Considerations

Physical Environment

Physical environmental considerations, in particular altitude and slope angle influence the identification of route options. At higher altitudes OHLs would be exposed to higher wind and ice loading which would influence OHL design, for example potentially requiring tower steelwork to be strengthened, as well as potentially affecting the lifetime of OHL assets through increased risk of damage. Similarly steeper slopes can adversely affect the identification of OHL routes requiring more extensive groundworks to enable construction.

The majority of the Study Area is located between 200 and 500 metres Above Ordnance Datum (mAOD). Localised high points in excess of 500mAOD are locate on the western margins of the Study Area associated with the Tweedsmuir and Moffat Hills, south of the proposed Teviot Wind Farm where a number of hills are in excess of 500mAOD. Areas of lower altitudes, less than 200mAOD, are confined to the northeast and south of the Study Area as well as along river valleys including the River Tweed, Ettrick Water, Yarrow Water, River Teviot and Ale Water.

Steep slopes (greater than 22%) are present throughout the Study Area, however, they are most prevalent to the west of the Study Area on hillslopes on Tweedsmuir and Moffat Hills as well as along the A7 from Castleweary to south of Langholm. More localised steep slopes are present along some of the river valleys within the Study Area.

Other Electricity Transmission Infrastructure

There is a limited amount of existing electricity transmission infrastructure within the Study Area. Existing and proposed infrastructure which may influence the development of route options includes:

- Existing ZA Route: To the north of the Study Area, located to the north and east of the proposed Gala North Substation is an existing 400kV OHL route (referred to as the 'ZA route'). It is routed from Smeaton Substation outside of Edinburgh to Eccles Substation in the east of the Scottish Borders. The ZA route will also be turned into (i.e. connected to) the proposed Gala North Substation.
- Proposed Gala North Substation: the 'start' point for the SP Energy Networks Project, a proposed 400/132kV Substation located approximately 3-4km southwest of Lauder.
- Existing U and AT Routes: To the north of the Study Area to the north of Galashiels are two existing 132kV OHL routes referred (referred to as 'U' and 'AT' routes). These are routed from Galashiels to Eccles. It should be noted that these routes are to be consolidated and replaced by a new 132kV OHL from Galashiels to Eccles.
- Existing V Route: extending south through the centre of the Study is an existing 132kV route from Galashiels to Hawick and onwards across the Scotland-England border towards the Harker area (referred to as V route). For a large part of its length from just south of Hawick to just south of Langholm, the V route largely parallels the A7.
- Planned Dun Law Wind Farm Grid Connection: a new 132kV OHL from the existing Dun Law Wind Farm north of the Study Area to the proposed Gala North Substation and then southwards terminating to the north of Langlee, Galashiels where the existing U and AT routes converge.

Wind Farms

There is extensive wind farm development particularly within the south of the Study Area coinciding with higher elevations and more sparsely populated areas. Wind turbines create a physical obstacle to the routeing of OHLs and subject to proximity to them, their downwind wake effect may impact on conductors ('wires') causing increased levels of movement, or in more extreme cases causing conductor clashing where the conductors come into contact with each other. These effects could shorten the lifetime of OHL assets through increased risk of damage.

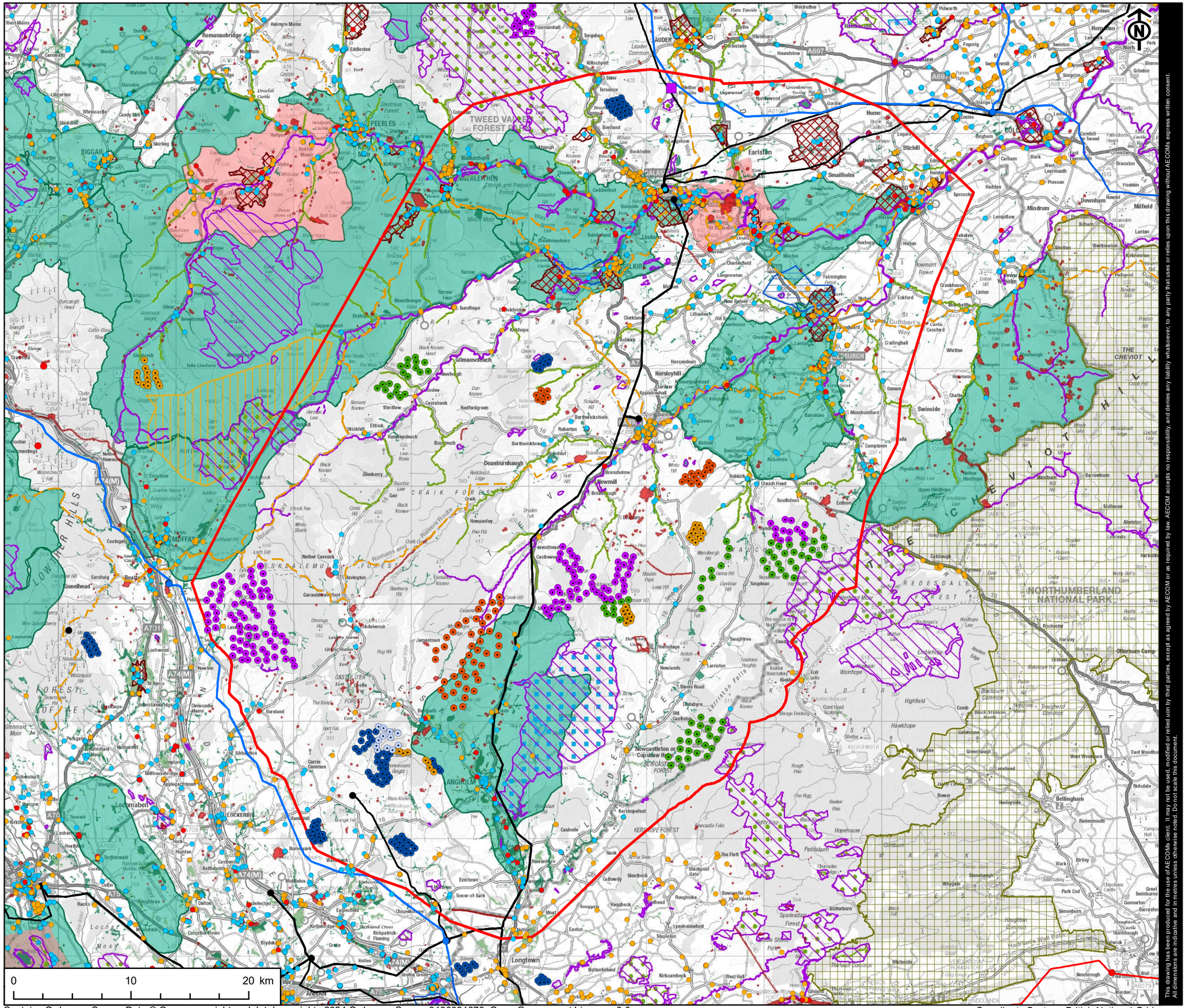
Existing and proposed wind farms have been identified from publicly available information held by Scottish Borders Council, Dumfries and Galloway Council and the Scottish Government Energy and Consents Unit (ECU) at the time of the routeing and siting study. Wind farms have been categorised according to their current status; for example operational, in construction or in planning. Wind farms are considered to be a significant engineering constraint which should be avoided taking account of good practice developed by the Electricity Networks Association (ENA).

Military Activity

Much of the Study Area coincides with a Ministry of Defence (MOD) Tactical Training Area (TTA). Area 20T extends west to east across the Study Area and southwards from Selkirk

across the Scotland-England border. The TTA is used to practice low-flying to 100 feet above ground level (i.e. approximately 30m above ground level).

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Proposed Gala North Substation Location
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Consented
- Appeal/Public Inquiry
- Application Submitted
- Design/Scoping; Scoping
- Refused

Existing Transmission System

- 132 kV Substation
- 275 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

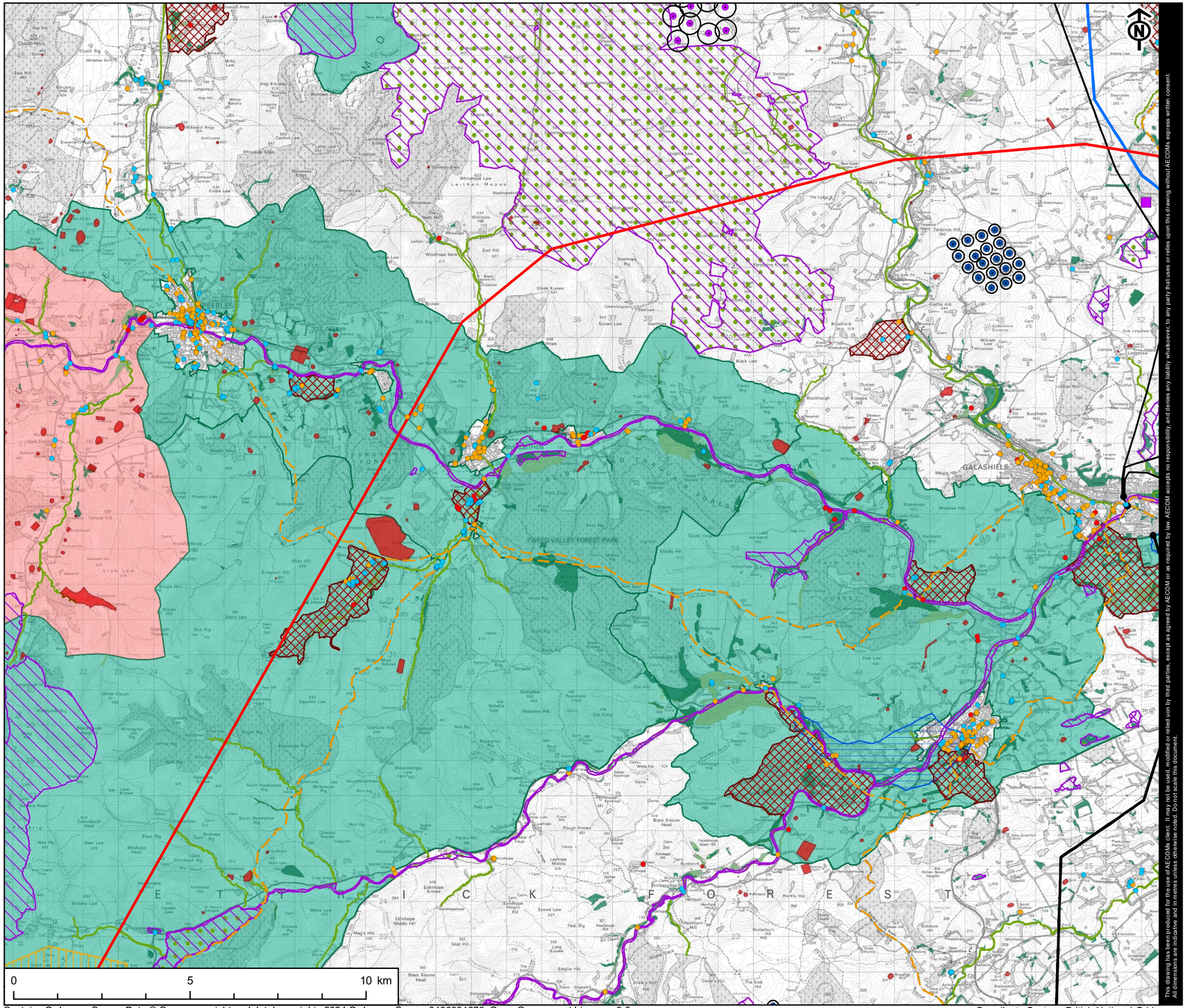
REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
1 of 7

DATE
27/08/24

Coordinate System: British National Grid

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

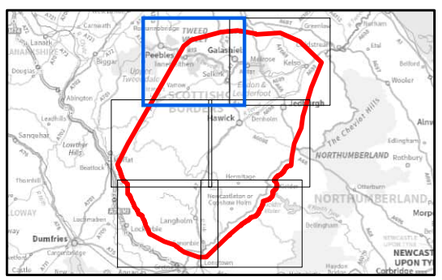
- Study Area
- Proposed Gala North Substation Location
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Application Submitted
- Design/Scoping; Scoping
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 132kV OHL
- 400kV OHL



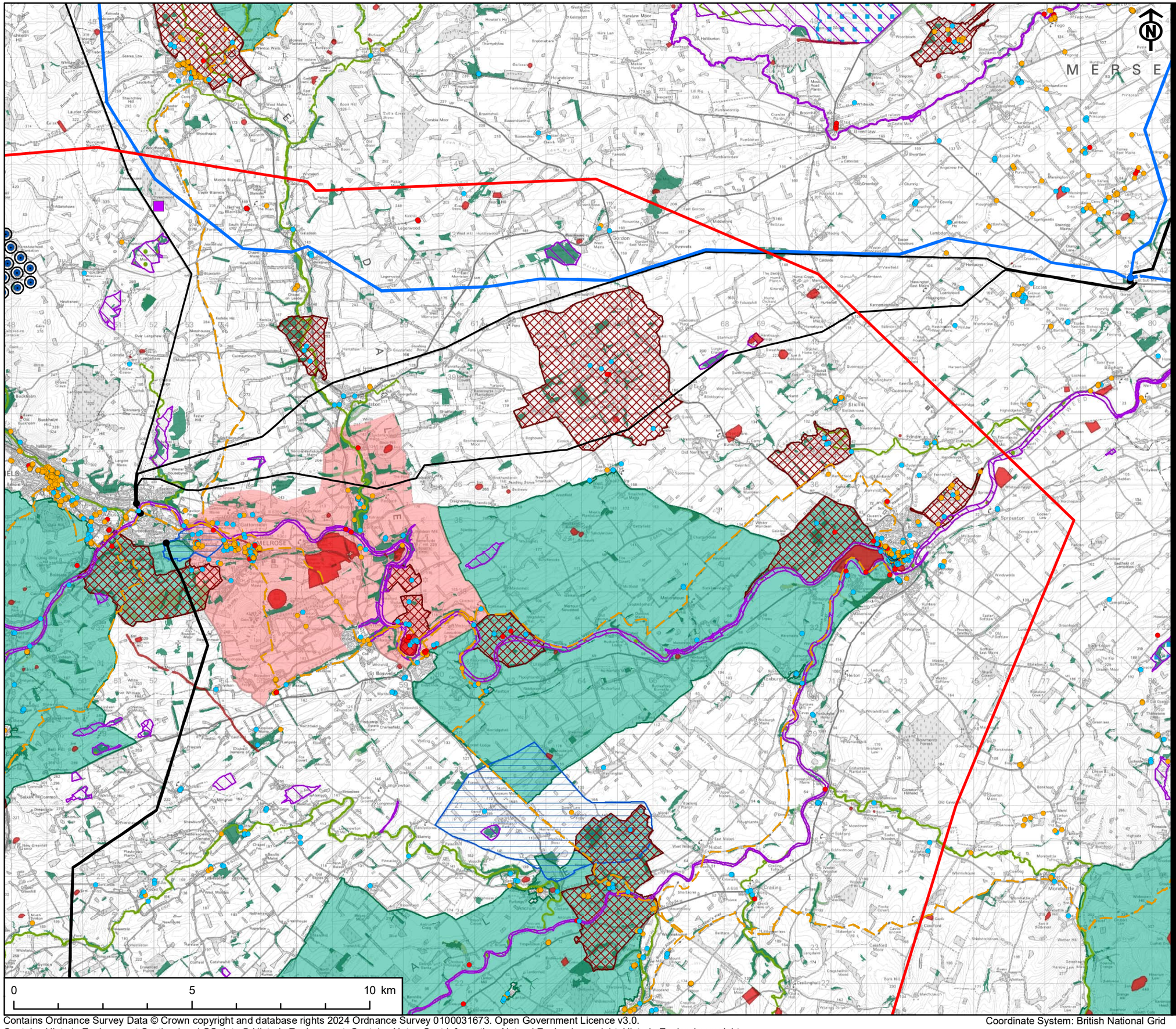
TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
2 of 7

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:2,000,000

0 5 10 km

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
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- Category A / Grade I Listed Building
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- Category C / Grade II Listed Building
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Wind Turbine Location (Status)

- Operational
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

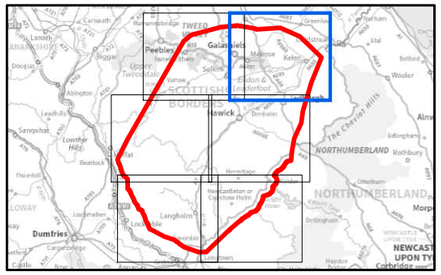

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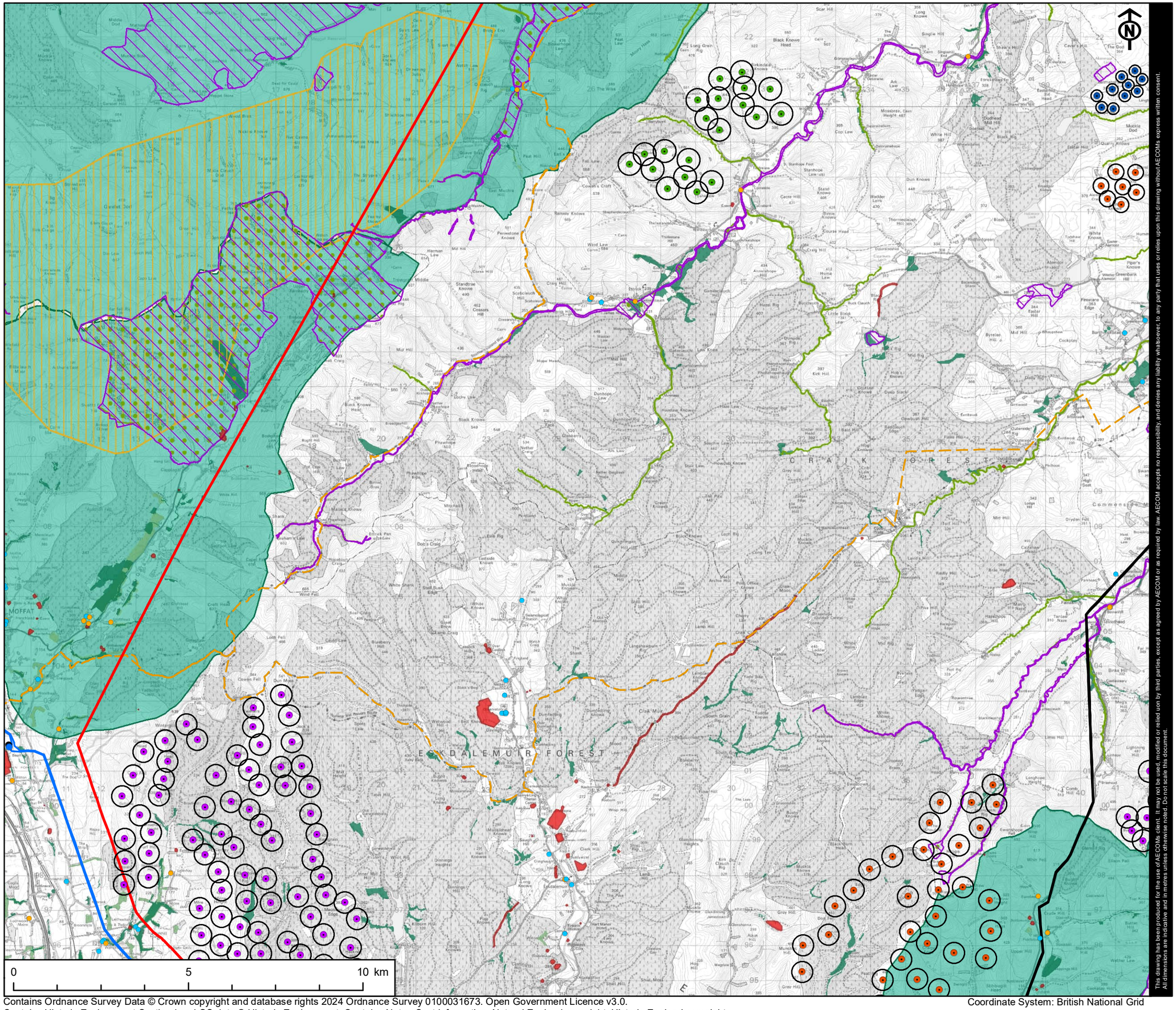
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
3 of 7

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:2,000,000

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
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- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
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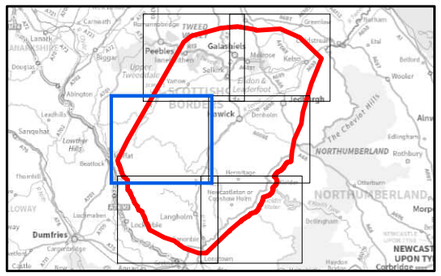
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL



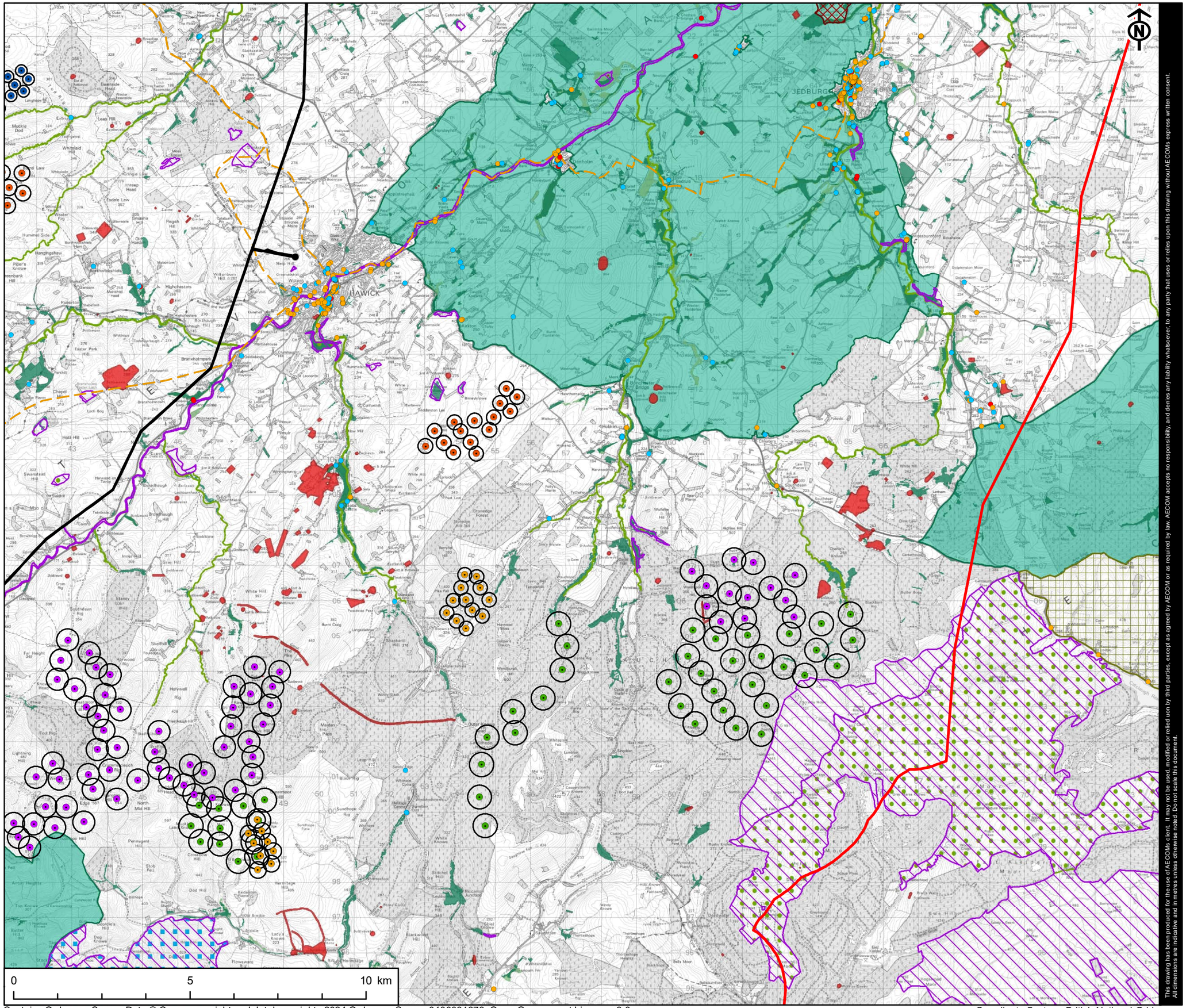
TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
4 of 7

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

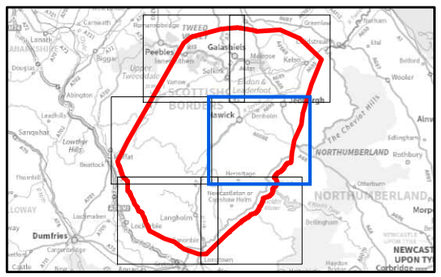
- Study Area
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- Locally Designated Landscape
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Consented
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 132kV OHL



TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
5 of 7

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

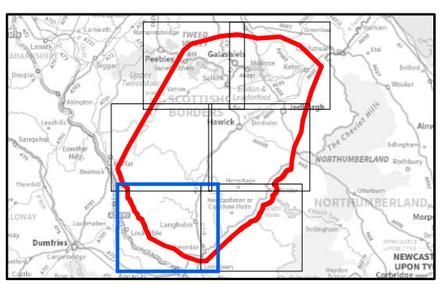
- Study Area
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape

Wind Turbine Location (Status)

- Operational
- Consented
- Appeal/Public Inquiry
- Application Submitted
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL



TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
6 of 7

DATE
27/08/24

Scale @ A3 1:2,000,000

0 5 10 km

Coordinate System: British National Grid

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

Scale @ A3 1:2,000,000

0 5 10 km

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

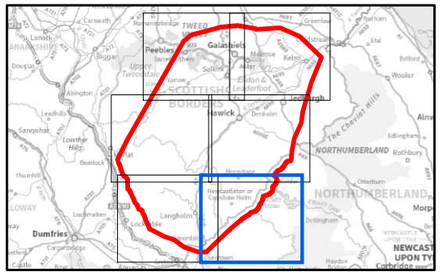
CLIENT
SP Energy Networks

KEY

- Study Area
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- Locally Designated Landscape

Wind Turbine Location (Status)

- Operational
- Design/Scoping; Scoping
- Wind Turbine Location - 2x Rotor Diameter
- 132kV OHL



TITLE
Figure 8
Study Area - Key Routeing and Siting Constraints

REFERENCE
GH_20240827_RS_8_v2

SHEET NUMBER
7 of 7

DATE
27/08/24

05.
Routeing Strategy

5. Routeing and Siting Strategy

5.1 Routeing and Siting Considerations

Routeing and siting considerations are set out in detail in Appendix D but are briefly summarised in this section in Table 10. These have been developed specific to the SP Energy Networks Project based on the constraints present within the Study Area while drawing on the guidance contained in the Holford and Horlock Rules.

Table 10 Project Routeing and Siting Considerations

Appraisal Topic	Routeing and Siting Considerations
Landscape	The Eildon and Leaderfoot NSA is the only statutory landscape designation or area of the highest environmental value within the Study Area and therefore must be avoided by route and site options. There are other nationally designated landscapes present in the immediate vicinity of the Study Area including the Upper Tweeddale NSA to the west and the Northumberland National Park to the east. While effects on these areas should be avoided consideration of potential landscape setting effects may be required if route options are located on the margins of the Study Area. There are a number of local landscape designations in the Study Area including multiple SLAs in the Scottish Borders and one RSA in Dumfries and Galloway. These areas are considered to be of moderate environmental value. While it is preferable to avoid these areas as much as possible, the scale and distribution of SLAs within the Scottish Borders means that some routeing within them will be unavoidable. Where routeing through local landscape designations regard should be had for the key features and attributes of the local designations and sensitivity to OHLs.
Visual Amenity	Settlements within the Study Area comprise a number of towns and larger villages which should be avoided as much as possible to prevent or reduce views from residential areas. The rural nature of large parts of the Study Area means that there are scattered individual properties or small clusters of properties present throughout. These should be avoided as much as possible in order to reduce potential adverse effects on views from residential receptors, however, this may require to be balanced against other routeing and siting considerations.
Ecology and Biodiversity	There are a number of internationally and nationally designated sites (i.e. sites of the highest or high environmental value) present within

Appraisal Topic	Routeing and Siting Considerations
	the Study Area as well as locally designated sites (i.e. sites of moderate or low environmental value), however, they vary in terms of the basis of the designation as well as in scale from small discrete sites to larger scale or linear sites. Route and site options should avoid designated sites as much as possible in order to prevent or reduce potential adverse effects on them. Where sites cannot be avoided due to the extent of designation or because of other constraints, consideration should be given to the designations qualifying interests, the location of substation sites or where they are crossed by overhead line routes in order to provide opportunities to develop a detailed design which reduces the potential for adverse effects on them.
Cultural Heritage and Archaeology	There are a number of cultural heritage and archaeological designations which are of the highest or high environmental value. These vary in geographic scale (from small discrete sites to larger areas) and well as in distribution (from individual areas or sites to clusters of sites which are closely located and in some cases may be interrelated). Route and site options should avoid designated sites as much as possible in order to prevent or reduce potential adverse effects on them including effects on their setting. This may include using existing landscape features such as landform or woodland to avoid or reduce effects.
Forestry and Woodland	There are a range of forestry and woodland resources present within the Study Area ranging from Ancient Woodland Inventory sites which are considered to be areas of high environmental value to large-scale commercial forestry which support land use and recreational functions and are of moderate or low environmental value. Route and site options should avoid forestry and woodland as much as possible, in particular Ancient Woodland Inventory sites, in order to prevent tree loss. Where route or site options cannot avoid woodland due to other constraints, effects should be reduced as far as possible with routes or sites identified having regard to forestry design as well as planting/restocking plans.
Water Resources	There are a number of waterbodies and watercourses present within the Study Area, however, in general they are not considered to significantly constrain the development of route or site options. Route options should maintain a minimum separation distance of 50m in order to ensure watercourses could be spanned by OHL routes where they require to be crossed. Site options for the new substation

Appraisal Topic	Routeing and Siting Considerations
	should be sited away from watercourses as much as possible in order to reduce the potential for pollution of watercourses.
Ground Conditions	There are a small number of sites designated only for geological conservation purposes within the Study Area. These are typically small discrete sites which should be avoided by route and site options as much as possible. Where sites cannot be avoided due to the extent of designation or because of other constraints, consideration should be given the location of substation sites or where they are crossed by overhead line routes in order to provide opportunities to develop a detailed design which reduces the potential for adverse effects on them. Priority and other peatland habitats and other carbon rich soils are present throughout the Study Area. Route and site options should avoid peatland habitats as much as possible in order to reduce the loss of peat. Where peatland areas cannot be avoided losses should be minimised as far as possible, for example by routeing across peatland as directly as possible in order to minimise the length of routes within peat.
Tourism and Recreation	There is a range of tourism and recreational interests present within the Study Area. Route and site options should avoid tourism and recreational interests as much as possible in order to reduce potential adverse effects on the amenity of users of or visitors to routes, trails or other visitor attractions. Where routeing or siting cannot avoid tourism or recreational interests, regard should be had for the landscape setting of the attraction and visual amenity of visitors/users for example using existing landscape features such as landform or woodland to avoid or reduce effects.
Land Use	The majority of the land within the Study Area is not suitable for arable farming based on the National Land Capability Map for Agriculture. Route and site options should avoid or reduce impacts on agricultural land as much as possible. Large areas of commercial forestry are present throughout the Study Area. Route and site options should avoid commercial forestry as much as possible but where it cannot be avoided, effects should be reduced as far as possible with routes or sites for example having regard to forestry design and felling/restocking plans.
Engineering Constraints	Route options between the proposed Gala North Substation and new Teviot Substation as well as new Teviot Substation and the Scotland-England border should be as direct as possible subject to other routeing constraints considerations in order to reduce overall OHL

Appraisal Topic	Routeing and Siting Considerations
	route lengths. Consideration should be given to the impact of siting Teviot Substation on the overall directness and length of route options. Altitudes and slope angle have been derived from digital terrain data and reviewed as part of technical reviews of route options. Altitudes within the Study Area are highly variable from less 100mAOD in some river valleys to more than 500mAOD in upland areas. Subject to other routeing constraints and considerations, route options should take account of altitudes in order to reduce potential exposure to increased ice and wind loads as much as possible (<200mAOD/low risk, 200-500mAOD/medium risk and >500mAOD/high risk). While routeing at higher altitudes is feasible it can require tower strengthening works as well as shorter spans (i.e. more towers) in order to mitigate exposure to wind and ice loads. The variable altitudes also influence the steepness of slopes within the Study Area with steep slopes often present within narrow V-shaped river valleys. Route options should take account of slopes which require to be routed over and/or along avoiding steep slopes where possible in order to reduce construction access risks. Sites for the new Teviot Substation should also take account of slopes seeking to avoid areas where significant earthworks may be required to establish a level platform for the substation where possible. There is a range of existing and proposed energy infrastructure within the Study Area including transmission assets as well as wind farms at various stages of development (pre-application, application, construction, operation). Existing infrastructure has been identified and should be taken account of in the identification of route and site options. This includes consideration of proximity to and/or requirements to cross other transmission infrastructure such as the existing 132kV OHL route (V route) which is routed north to south through the Study Area as well as application of appropriate separation distances to wind farms in line with industry guidance.

5.2 The Routeing and Siting Strategy

The Routeing and Siting Strategy has been developed taking into account the routeing and siting objective identified in section 3 and the routeing considerations outlined above and detailed in Appendix E. The purpose of the Routeing and Siting Strategy is to ensure a consistent approach to identifying and assessing route and site options leading to the identification of a preferred option which best meets the objective while also balancing routeing and siting considerations. Addressing this balance often requires careful professional judgement taking account of different constraints as well as seeking to integrate an OHL into the landscape.

The Routeing and Siting Strategy developed for the SP Energy Networks Project is as follows:

"Route options for continuous overhead line routes will avoid areas of the highest or high environmental value and settlement where possible while responding to and making best use of landscape character and features including topography and woodland to screen or backcloth routes. Where conflicting environmental and technical considerations are identified, these will be carefully balanced using professional judgement when assessing route options."

"Site options for a new substation will avoid areas of the highest or high environmental value and settlement where possible while taking account of landscape character and making best use of existing landform and woodland to integrate the substation into its surroundings. Where conflicting environmental and technical considerations are identified, these will be carefully balanced using professional judgement when assessing site options."

06.
Substation Siting

6. Substation Siting

6.1 Substation Siting Study Area

For the purposes of identifying a site for the new Teviot Substation, a sub-Study Area was identified around the proposed Teviot Wind Farm. This allows for consideration of potential substation sites to the north, east, south and west of the proposed wind farm. The Study Area as well as key constraints influencing site selection are illustrated in Figure 9.

The sub-Study Area extends from the A7 in the west to the B6399 in the east. It is bounded to the south by a minor local road which connects the A7 at Fiddleton to the B60399 at Hermitage Schoolhouse. There are a small number of constraints of the highest or high amenity value present. These include watercourses which are part of the River Tweed SAC and SSSI including the Northhouse Burn and the Allan Water as well as a number of scheduled monuments clustered to the northeast of the sub-Study Area. The sub-Study Area is sparsely settled with scattered individual properties present. Landform is a key constraint with the sub-Study Area formed by a series of steeply sloping hills with elevations ranging from 300 to more than 500mAOD.

6.2 Identification of Substation Siting Options

Six potential substation sites have been identified based on the substation parameters and are illustrated in Figure 10. Existing topography and landform have been key considerations when identifying potential sites seeking to reduce the potential earthworks required to establish a substation platform.

Table 11 Overview of Potential Substation Sites

Option	Description
TEV-01	An approximate 10ha site located on the west side of the proposed Teviot Wind Farm. The site is located on the south side of a valley. There is a minor road which provides local access into the valley including Phaup Cottage and plantation forestry.
TEV-02	An approximate 8ha site located on the west side of the proposed Teviot Wind Farm. The site is located to the immediate east of the A7 with residential properties at Linhope to the north and Braehead to the south. The Linhope Burn is located to the north of the site draining in a western direction where it meets the River Tweed SAC.
TEV-03	An approximate 20ha site located to the north/northwest of the proposed Teviot Wind Farm. The site is located on lower lying north facing slopes of Southdean Rig. The A7 is located approximately 600m to the northwest of the site. It is bounded to the north and east by Northhouse Burn, which is also part of the River Tweed SAC.

Option	Description
TEV-04	An approximate 20ha site located to the south of the proposed Teviot Wind Farm on the minor local road running from Fiddleton to the Hermitage House. The site lies on the north facing slope of Geordie's Hill within a relatively narrow valley. The Langholm-Newcastleton SPA and SSSI and lies to the south of the site.
TEV-05	An approximate 70ha site located to the east of the proposed Teviot wind Farm. The site lies approximately 1.5km west of the B6399 on the edge of commercial forestry. Access to the site would via existing access tracks within the commercial forestry.
TEV-06	An approximate 30ha to the north/northeast of the proposed Teviot Wind Farm. The site is located on the north/northwest facing slopes of White Hill. Access is via an existing track which runs north to south from Stob Station house to commercial forestry.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

Scale @ A3 1:60,000

0 2.5 5 km

Coordinate System: British National Grid

AECOM

PROJECT
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CLIENT
SP Energy Networks

KEY

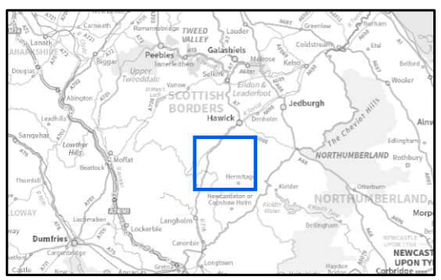
- Substation Siting sub-Study Area
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape
- Long Distance Trail

Wind Turbine Location (Status)

- Consented
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132kV OHL



TITLE
Figure 9
Substation Siting sub-Study Area

REFERENCE
GH_20240827_RS_9_v2

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1 of 1

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27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

TEV01
TEV02
TEV03
TEV04
TEV05
TEV06

Scale @ A3 1:60,000

0 2.5 5 km

Coordinate System: British National Grid

AECOM

PROJECT
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CLIENT
SP Energy Networks

KEY

- Potential Substation Site
- Substation Siting sub-Study Area
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
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- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
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- Woodland identified in the Native Woodland Survey of Scotland
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- Long Distance Trail

Wind Turbine Location (Status)

- Consented
- Application Submitted
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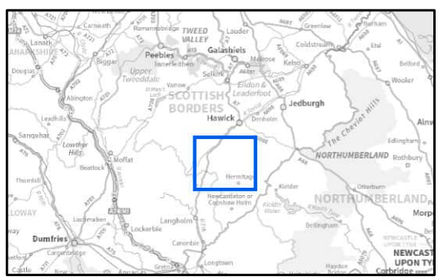
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132kV OHL



TITLE
Figure 10
Substation Siting Options

REFERENCE
GH_20240827_RS_10_v2

SHEET NUMBER
1 of 2

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

TEV01

TEV02

TEV03

TEV04

TEV05

TEV06

Scale @ A3 1:20,000

0 1,000 2,000 m

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Potential Substation Site
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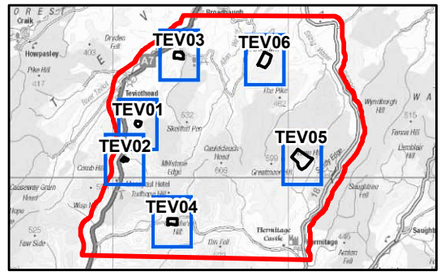
- Scheduled Monument
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape

Wind Turbine Location (Status)

- Application Submitted
- Wind Turbine Location - 2x Rotor Diameter



TITLE
Figure 10
Substation Siting Options

REFERENCE
GH_20240827_RS_10_v2

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2 of 2

DATE
27/08/24

6.3 Appraisal of Siting Options

The following sections summarise the appraisal of alternative substation siting options. A more detailed appraisal of the sites taking account of the routeing and siting objectives and considerations is contained in Appendix F.

TEV-01

TEV-01 lies to the west of the sub-Study Area and would only be suited to potential OHL routes within the west of the overall Study Area. It is located within a valley formed by Binks Hill to the north and Meg's Hill to the south. The site lies on the north facing slopes of Meg's Hill.

While there are no sites or areas of the highest or high environmental value present within the immediate proximity of the site, Frostley Burn lies to the west of the site and is part of the River Tweed SAC. The requirement to establish a new access crossing the Phaup Burn which drains into the Frostley Burn increases the potential to impact on the River Tweed SAC.

There are two residential properties in the vicinity of the site, Frostley Burn to the west and Phaup Cottage to the east. The proximity of the properties to the site, in particular Phaup Cottage increases the potential for amenity impacts (noise and/or visual).

The access to the valley is well established with a wide junction connecting to the A7. The access runs broadly west to east up the valley into the commercial forestry located to the east of valley. Owing to topography the site is located on the southern side of the valley and would require a new road crossing of the Phaup Burn to provide into TEV-01.

TEV-02

TEV-01 lies to the west of the sub-Study Area and would only be suited to potential OHL routes within the west of the overall Study Area. It is located on a relatively lower lying and less steeply sloping area to the south of Linhope, adjacent to the A7.

There are no sites or areas of the highest or high environmental value present within the immediate proximity of the site. It is bounded to the west and east by watercourses (Combe Sike and Linhope Burn) which drain into Frostley Burn which is part of the River Tweed SAC. An unnamed watercourse drains the hill into Combe Sike and would require to be diverted or culverted in order to accommodate a substation on the site. As a result TEV-02 has increased potential to impact on the River Tweed SAC.

While the site is remote from larger settlement, there is a cluster of buildings including residential property (referred to as Linhope) to the north as well as a property (Braehead) to the south. Existing woodland would provide some screening, however, due to their proximity to the site some amenity impacts (noise and/or visual) would occur.

While the site is adjacent to the A7 it is constrained in terms of access. The existing access to the properties at Linhope is narrow and includes a bridge over the Frostley Burn. This would require significant upgrading in order to facilitate access. Alternatively, a new access could be established off of the A7 but would require a new crossing of the Combe Sike.

TEV-03

TEV-03 lies to the northwest of the sub-Study Area. It would be suitable for potential OHL routes within the west of the overall Study Area as well as for potential routes crossing over the Study Area to the north of the proposed Teviot Wind Farm.

There are a number of sites or areas of the highest or high environmental value within the vicinity of the site including Northhouse Burn to the north/northeast which is part of the River Tweed SAC as well as a number of scheduled monuments to the west. The proximity to Northhouse Burn as well as the potentially the requirement for a new access crossing it increases the potential to impact on the River Tweed SAC. There is also some potential to impact on the setting of the scheduled monuments, however, this may be reduced due to landform and limits on intervisibility.

TEV-03 is located in a relatively prominent position on the north-facing slope of Southdean Rig. It is likely that it will be partly visible from the A7 to the north, particularly for those travelling southbound. There is a cluster of properties to the west of the site as well as to the north. While landform may help to screen some views of a substation at TEV-03 some amenity related impacts (noise and/or visual) would occur.

Access to the site is via an established local road which is routed east/southeast following the landform. The majority of the road is single carriageway with passing places. An access track including a crossing of the Northhouse Burn could provide access into the site but would require upgrading.

TEV-04

TEV-04 is located to the south of the sub-Study Area. In relation to potential OHL routes it is considered more constrained than alternatives. This is because it is located to the south of the proposed Teviot Wind Farm within a valley formed by a series of hills to the north and south. The nature of the landform and topography constrains the development of OHL route options towards TEV-04 compared to other options on the western or eastern margins of the proposed wind farm.

TEV-04 is located away from sites or areas of the highest or high amenity value. The Langholm-Newcastle SPA and SSSI lies to the south, less than 1km at its nearest point. Cultural heritage designations are sufficiently far enough away that they should not be affected. However, TEV-04 lies within the northern part of an area of moderate environmental value; the Langholm RSA designated by Dumfries and Galloway Council. A substation within the RSA has the potential for greater landscape impacts.

The valley in which the site is located is sparsely settled largely owing to the steep hillslopes to the north and south. There are some individual properties present where the landform widens and flattens including Carrett Rig to the west and Billhope to the east. While these are relatively distant to the site, the rural nature of the valley means some amenity impacts (noise and/or visual) are likely to occur.

Access to the site is via an existing local road which runs from west to east between Fiddleton and Hermitage. This is formed of a single track with passing places. Significant upgrades would be required to provide access to the site.

TEV-05

TEV-05 lies to the east of the sub-Study Area. It would be suitable for potential OHL routes crossing over the overall Study Area from west to east to the north of proposed Teviot Wind Farm as well those located entirely within the east of the Study.

There are no sites of the highest or high environmental value in the immediate vicinity of the site. There are no landscape or ecological designations, however, there are a small number of cultural heritage designations present including the Catrail, a linear earthwork broadly running eastwards through commercial forestry to the north of the site as well as some smaller sites to the north/northwest. The distribution of these designations as well as intervening commercial forestry and/or landform is such that setting impacts from a substation should be avoided.

TEV-05 is located away from settlement. There are some individual properties present along the B6399, however, these are typically well-screened from TEV-05 by a combination of landform and/or commercial forestry. A result the potential for amenity related impacts (noise and/or visual) is considered to be lower to TEV-05 relative to the other sites.

A large area has been identified for TEV-05 which includes an area on the margins of commercial forestry as well as open moorland. Subject to the precise siting of the substation there is the potential for some commercial forestry to be lost. Part of the site is underlain by class 1 and class 5 peatlands. The precise siting of the substation within TEV-05 should seek to reduce potential impacts on peat and carbon rich soils as much as possible.

Access to the site is via existing tracks within the commercial forestry which in turn are accessed from the B6399. While existing forestry tracks would require to be upgraded and extended in order to provide access to the site.

TEV-06

TEV-06 is located to the north of the proposed Teviot Wind Farm. It would only be suitable for potential OHL routes coming from the west and crossing the overall Study Area and continuing to the east.

There are a number of scheduled monuments present within the immediate vicinity of the site. These include hillforts and earthworks thought to date from the Iron Age as well as a number of sites related with Stobs Camp which was used for military training before and during the First World War. The location and distribution of these sites means that some setting impacts would be unavoidable and make this site less preferable to alternatives.

The site is located within a generally remote area and distant from settlement, however, some individual properties which could experience amenity impacts (noise and/or visual) are present including Penchrise Farm to the east of the site on the northeast of White Hill as well as properties on the local road to the west including Dodburn and Shankfoot.

The site is considered to be significantly constrained in terms of access. An existing single carriageway track is routed southwards from the B6399 at Stobs to Penchrise Farm. This would require significant upgrading to enable access for construction of a substation in this location.

6.4 Substation Siting Conclusions

The preferred site for the substation is dependent on the route options and vice versa, however, based on the appraisal of substation siting options some emerging conclusions can be drawn which also help to inform the identification of route options. Table 12 provides an overview of the emerging conclusions from the assessment of substation sites.

Table 12 Appraisal of Substation Sites

Option	Key Findings	Conclusion
TEV-01	There are no environmental or technical constraints which would prevent the development of a substation in this location. There are a number of constraints which would influence its design including access arrangements and its location further up a valley, however, these are not considered sufficient to discount the site at this stage.	Potential site
TEV-02	There are no environmental or technical constraints which would prevent the development of a substation in this location. The site is immediately adjacent to the A7 and would therefore be a prominent feature, however, there would be opportunities to reduce potential adverse effects through design and mitigation.	Potential site
TEV-03	The site is located in a prominent location on the A7 in close proximity to a number of environmental constraints, however, there would be opportunities to reduce potential adverse effects through design and mitigation.	Potential site
TEV-04	The site is located within a Regional Scenic Area and is therefore of higher landscape sensitivity compared to others. In addition, the location of the site is considered significantly more constrained than alternatives in terms of potential new OHL routes and it is therefore discounted.	Discount
TEV-05	While the site is located within an area of peatland on the margins of commercial forestry it otherwise avoids or reduces potential impacts on environmental or settlement related considerations. It provides scope for potential new OHL routes to connect to it from the west or east. It is considered to provide a feasible siting option. It is also located between the proposed Teviot Wind Farm (to the west) and the proposed Liddesdale (or Borders) Wind Farm (to the east) and provides some benefits with respect to connecting to it.	Potential site

Option	Key Findings	Conclusion
TEV-06	The site offers no environmental or technical advantages. It is located close to and has high potential to impact on cultural heritage sites of the highest or high environmental value and is considered to be highly constrained in relation to accessibility compared to others.	Discount* (consideration was given to route options to TEV-06

07.

Strategic Routeing – Route Corridors

7. Strategic Routeing – Route Corridors

7.1 Introduction

Due to the scale of the Study Area a two-step approach has been taken to the identification of alternative OHL routes: firstly, the consideration of strategic route corridors and secondly the consideration of route options. This section describes the first step, the identification and assessment of strategic route corridors.

7.2 Identification of Strategic Route Corridors

Strategic route corridors have been identified in response to larger areas of the highest or high environmental value, larger settlement and settlement pattern as well as landscape character and sensitivity. These factors are considered to significantly influence potential OHL routes and help to focus the development of OHL route options within the Study Area. As a result, Strategic route corridors are often wider and incorporate routeing considerations that would otherwise be avoided more tightly defined route options or detailed route alignments.

In developing strategic route corridors, the objective has been to identify corridors which are considered capable of accommodating a continuous OHL route between proposed Gala North Substation and emerging Teviot Substation options described in section 4 and then onwards to the Scotland-England border. The Study Area was divided into four 'quadrants', as illustrated in Figure 11, in which to develop route corridors as well as consider route corridor links between them.

- Strategic route corridors: these are large and typically wide corridors located on the east or west of the Study Area and typically orientated north to south.
- Strategic route corridor links: these are link route corridors and would enable OHL routes to switch from east to west or vice versa.

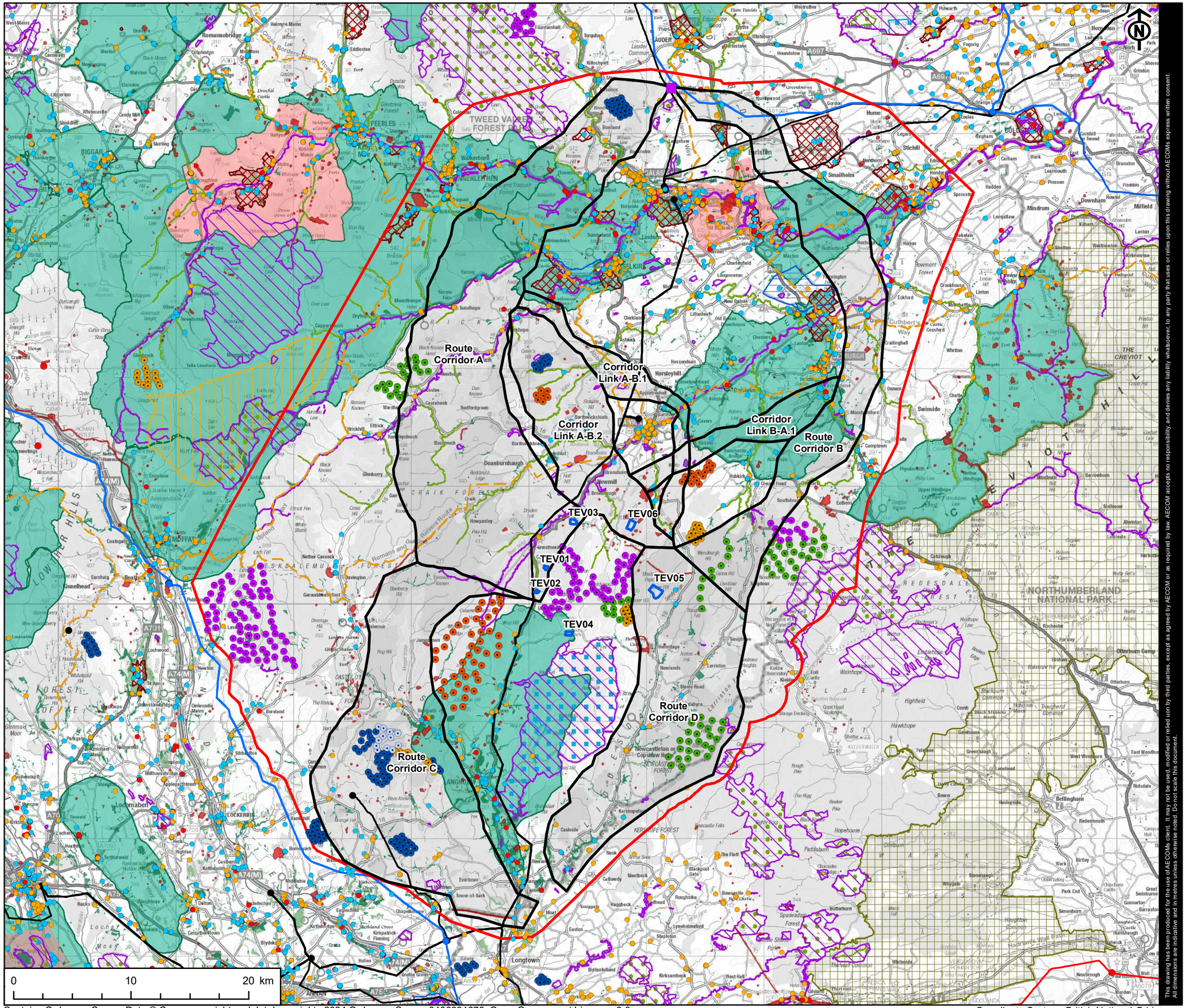
Four strategic route corridors and three corridor links have been identified and are illustrated in Figure 11 and briefly described in Table 13.

Table 13 Overview of Strategic Route Corridors and Links

Corridor	Description of Corridor
Route Corridor A (NW Quadrant) – Gala North to west of Teviot	This corridor is located on the northwest and west of the Study Area. It is routed southwest from the proposed Gala North Substation towards the River Tweed and then is largely routed southwards across the Tweedsmuir Hills gradually turning southeast to enable direct connections to TEV-01, TEV-02 and TEV-03 as well as connections via corridor links to TEV-05 and TEV-06.

Corridor	Description of Corridor
Route Corridor B (NE Quadrant) – Gala North to east of Teviot	This corridor is located on the northeast and east of the Study Area. It is routed southeast from the proposed Gala North Substation towards the A699 and then is routed southwards to the west of the Cheviot Hills gradually turning southwest to enable a direct connection to TEV-05 or connections via corridor links to TEV-06, TEV-01, TEV-02 and TEV-03.
Route Corridor C (SW Quadrant) west of Teviot to the Border	This corridor is located on the west and southwest of the Study Area. It is routed west and south across the Moffat Hills through parts of Eskdale Muir and Castle O'er Forests towards the Scotland-England border.
Route Corridor D (SE Quadrant) east of Teviot to the Border	This corridor is located on east and southeast of the Study Area. It is largely orientated southwards extending across the Liddesdale Valley. The corridor is wide where it reaches the Scotland-England border enabling crossings from Kielder Forest in the north as far south/southeast as Canonbie.
Corridor Link A-B.1 (NW to NE Quadrants)	This is a corridor link between Route Corridor A and Route Corridor B. It is a narrower corridor and extends from north of Ettrick Bridge to the northeast of the proposed Teviot Wind Farm. It is routed in southeastern direction to the north of Hawick turning south as it crosses the River Teviot. It enables an alternative connection to TEV-05 and TEV-06 from the west of the Study Area.
Corridor Link A-B.2 (NW to NE Quadrants)	This is a corridor link between Route Corridor A and Route Corridor B. It is a wider corridor and extends from Ettrick Bridge to the north of the proposed Teviot Wind Farm. It is routed in southeastern direction to the south of Hawick. It enables an alternative connection to TEV-05 and TEV-06 from the west of the Study Area.
Corridor Link B-A.1 (NE to NW Quadrants)	This is a corridor link between Route Corridor B and Route Corridor A. It is a narrower corridor routed in a southwestern direction from south of Jedburgh to the north of the proposed Teviot Wind Farm. It enables an alternative connection to TEV-01, TEV-02 and TEV-03 from the east of the Study Area.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Potential Substation Site
- Strategic Route Corridor
- Proposed Gala North Substation Location
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)
- Operational
- Consented
- Appeal/Public Inquiry
- Application Submitted
- Design/Scoping; Scoping
- Refused

Existing Transmission System
- 132 kV Substation
- 275 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 11
Strategic Route Corridors

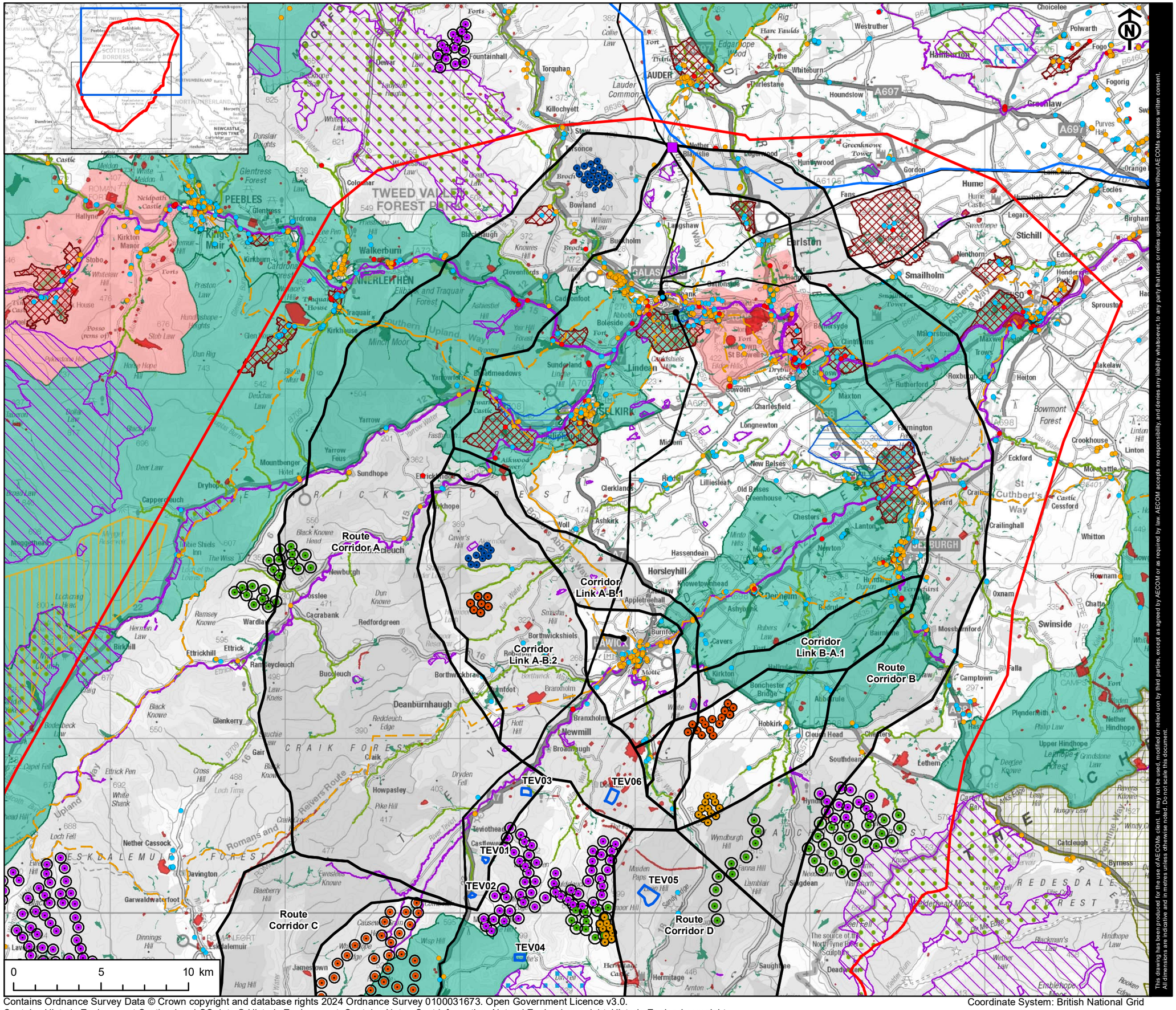
REFERENCE
GH_20240827_RS_11_v2

SHEET NUMBER
1 of 3

DATE
27/08/24

Coordinate System: British National Grid

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Potential Substation Site
- Strategic Route Corridor
- Proposed Gala North Substation Location
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Consented
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

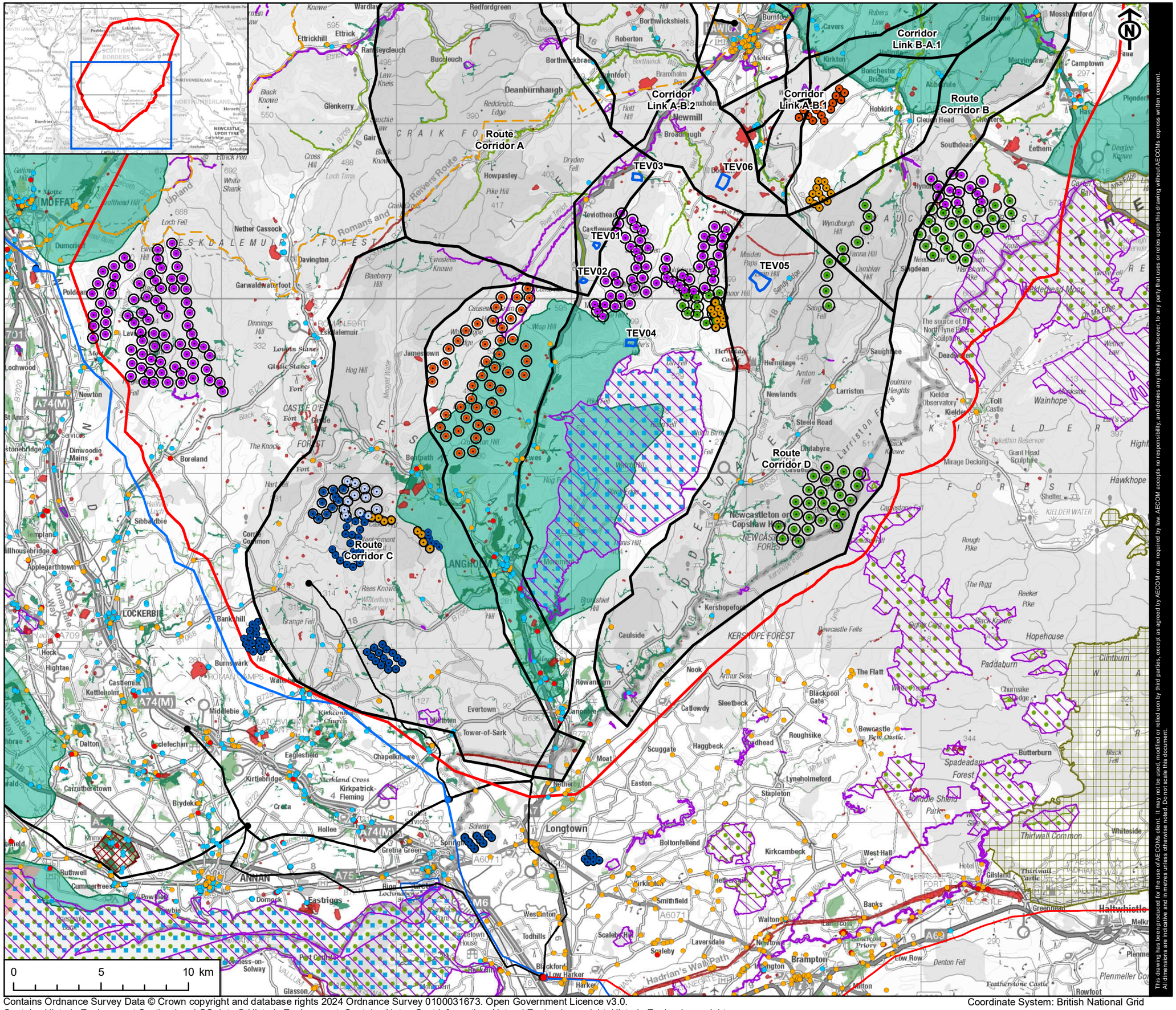
TITLE
Figure 11
Strategic Route Corridors

REFERENCE
GH_20240827_RS_11_v2

SHEET NUMBER
2 of 3

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Potential Substation Site
- Strategic Route Corridor
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Park
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Consented
- Appeal/Public Inquiry
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Existing Transmission System

- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

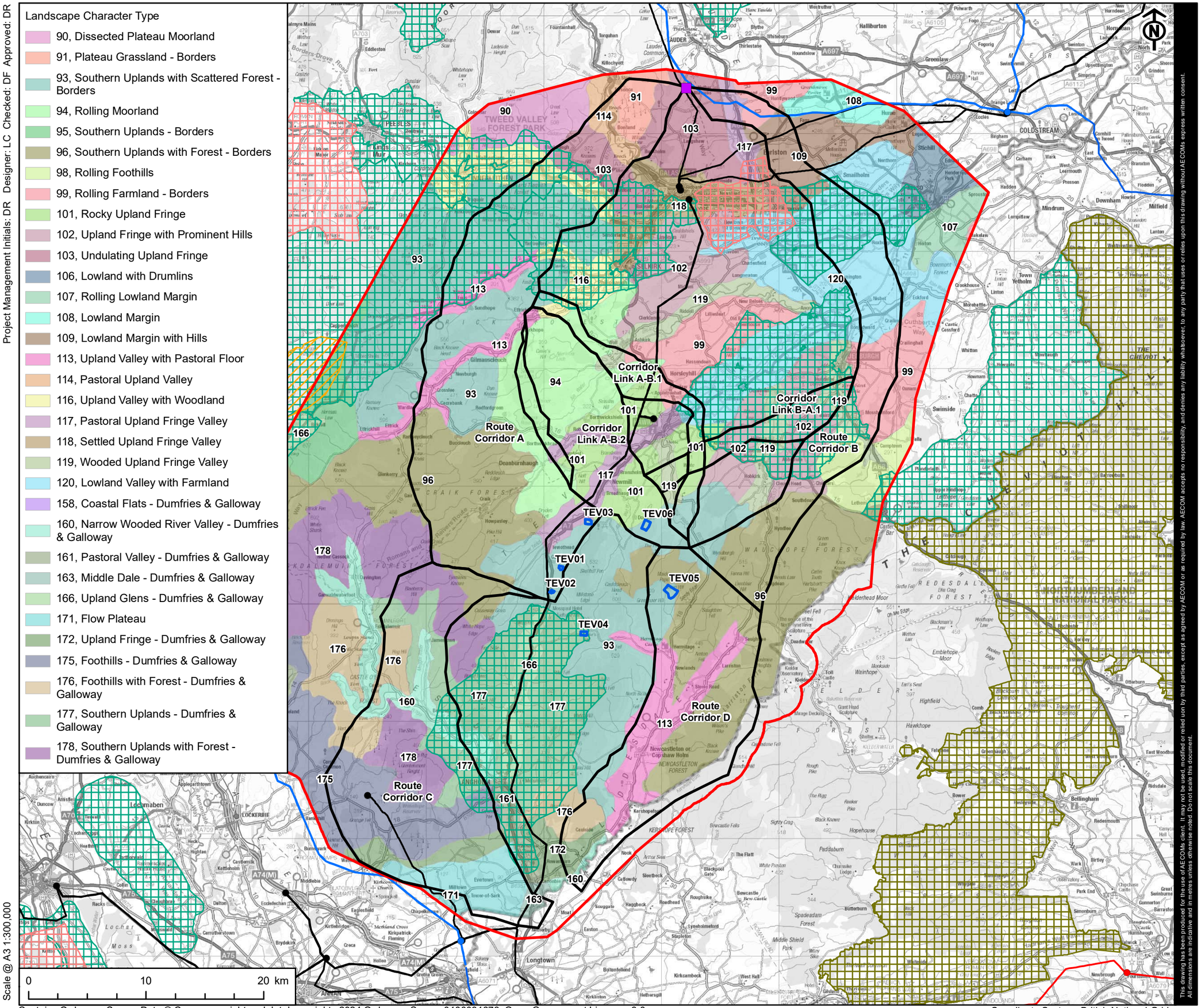
TITLE
Figure 11
Strategic Route Corridors

REFERENCE
GH_20240827_RS_11_v2

SHEET NUMBER
3 of 3

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Landscape Character Type

- 90, Dissected Plateau Moorland
- 91, Plateau Grassland - Borders
- 93, Southern Uplands with Scattered Forest - Borders
- 94, Rolling Moorland
- 95, Southern Uplands - Borders
- 96, Southern Uplands with Forest - Borders
- 98, Rolling Foothills
- 99, Rolling Farmland - Borders
- 101, Rocky Upland Fringe
- 102, Upland Fringe with Prominent Hills
- 103, Undulating Upland Fringe
- 106, Lowland with Drumlins
- 107, Rolling Lowland Margin
- 108, Lowland Margin
- 109, Lowland Margin with Hills
- 113, Upland Valley with Pastoral Floor
- 114, Pastoral Upland Valley
- 116, Upland Valley with Woodland
- 117, Pastoral Upland Fringe Valley
- 118, Settled Upland Fringe Valley
- 119, Wooded Upland Fringe Valley
- 120, Lowland Valley with Farmland
- 158, Coastal Flats - Dumfries & Galloway
- 160, Narrow Wooded River Valley - Dumfries & Galloway
- 161, Pastoral Valley - Dumfries & Galloway
- 163, Middle Dale - Dumfries & Galloway
- 166, Upland Glens - Dumfries & Galloway
- 171, Flow Plateau
- 172, Upland Fringe - Dumfries & Galloway
- 175, Foothills - Dumfries & Galloway
- 176, Foothills with Forest - Dumfries & Galloway
- 177, Southern Uplands - Dumfries & Galloway
- 178, Southern Uplands with Forest - Dumfries & Galloway

Scale @ A3 1:300,000

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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Potential Substation Site
- Strategic Route Corridor
- Proposed Gala North Substation Location
- National Scenic Area (NSA)
- Wild Land Area (WLA)
- National Park
- Locally Designated Landscapes

Existing Transmission System

- ● 132 kV Substation
- ● 275 kV Substation
- ● 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 12
Strategic Route Corridors - Landscape Character and Designations

REFERENCE
GH_20240822_RS_12_v1

SHEET NUMBER	DATE
1 of 1	22/08/24

7.3 Appraisal of Strategic Route Corridors

The following sections summarise the appraisal of strategic route corridors and corridor links. A more detailed appraisal is contained in Appendix G.

Route Corridor A (NW Quadrant) – Proposed Gala North Substation to west of proposed Teviot Wind Farm

Route Corridor A is located within northwest of the Study Area and is routed southwest from the proposed Gala North Substation towards the River Tweed avoiding the Moorfoot Hills SAC and SSSI. From the crossing it is routed in a southern direction over the Tweedsmuir Hills. The Corridor gradually turns southwest crossing the River Teviot and the A7 providing opportunities to directly connect route options to potential substations TEV-01, TEV-02 or TEV-03 on the western side of the proposed Teviot Wind Farm.

An appraisal of Route Corridor A (including a comparative assessment against Route Corridor B) is set out in Table G.1 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of Route Corridor A.

Route Corridor A contains a number of areas of highest or high amenity value which are unavoidable as they form continuous linear sections extending east to west across the Corridor. The River Tweed SAC and SSSI includes the River Tweed and flows broadly west to east through the Corridor as it crosses the Tweed Valley as well as the tributaries which include a number of watercourses including the Yarrow Water and Ettrick Water draining the hill slopes within the Corridor in a northeastern direction. Extending across a similar part of the Corridor are the locally designated SLAs of the Tweedsmuir Uplands, Tweed Valley and Tweed, Ettrick and Yarrow Confluences which reflect landscapes of increased sensitivity to OHLs. Additional sites of highest or high amenity value exist within the Corridor including Bowland GARDEN AND DESIGNED LANDSCAPE and various SSSIs and scheduled monuments. The Corridor is generally wide enough that it provides opportunities to develop route options which avoid these smaller sites.

In the northern part of the corridor to the north of the River Tweed the landscape comprises an area of relatively open, undulating, upland with forestry and woodland typically more present on the steeper slopes of valley sides, such as along the Gala Water and River Tweed. South of the River Tweed the Corridor remains in the locally designated landscapes until the Yarrow Water. The Corridor then enters an open and elevated upland landscape with the heavily forested Craik Forest in the west and rolling moorland and upland fringe to the east. In the west, the Corridor encompasses large scale and expansive landscapes which are sparsely populated and more able to accommodate OHL infrastructure. In the east, there is increased proximity to settled, partially enclosed farmland west of Hawick in which the Borders Abbey Way is located, with greater settlement, recreational use and increased sensitivity. The southern section of the Corridor terminating at the A7 encompasses expansive, upland landscapes with forestry which contain large scale elements of landform and land use exhibiting a decreased sensitivity to OHLs.

A large part of the Corridor is sparsely settled, coinciding with the extensive tracts of upland moorland or forestry. Smaller settlements or individual properties are typically confined to the lower lying valleys which run across the Corridor including the River Tweed, Yarrow Water,

Ettrick Water and the Teviot Water. A number of long-distance trails cross the corridor including the Southern Upland Way, Borders Abbeys Way and the Romans and Reivers Route which will locally increase visual sensitivity.

Route Corridor B (NE Quadrant) – Proposed Gala North Substation to east of proposed Teviot Wind Farm

Route Corridor B is located in the northeast of the Study Area. It is routed east and southeast from the proposed Gala North Substation routeing through a relatively narrow gap between the Eildon and Leaderfoot NSA to the west and Mellerstain Garden and Designed Landscape to the east. The Corridor crosses the River Tweed in a more open section of the Tweed Valley between Newton St Boswells and Kelso. From here it continues southwards to the east of Jedburgh before gradually turning southwest and crossing parts of Wauchope Forest providing opportunities to directly connect route options to potential substation TEV-05.

An appraisal of Route Corridor B (including a comparative assessment against Route Corridor A) is set out in Table G.1 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of Route Corridor B.

Route Corridor B contains some areas of highest or high amenity value which are unavoidable as they form continuous linear sections extending across the Corridor. This includes the River Tweed SAC and SSSI which flows through the Corridor west to east along with some if its tributaries including the River Teviot and the Jed Water. Whilst the Eildon and Leaderfoot NSA is avoided by this Corridor it lies to the immediate west with the locally designated Tweed Lowlands SLA extending entirely across the Corridor from the NSA boundary in the west to Kelso in the east. Several GARDEN AND DESIGNED LANDSCAPEs lie adjacent to but not within the Corridor including Carolside and Leadervale, Mellerstain, Mertoun, Floors Castle, and Monteviot GARDEN AND DESIGNED LANDSCAPEs.

As with Corridor A there are additional smaller sites of highest or high amenity value within the Corridor including Borders Woods SAC, several SSSIs and a number of scheduled monuments. The Corridor is generally wide enough that it provides opportunities to develop route options which avoid these smaller sites although there are some localised pinch points which increase the potential for adverse effects.

The landscape character varies across the Corridor from north to south. The upland fringe landscape in the far north of the Corridor quickly gives way to lowland farmland which extends for a large section of the Corridor to the second locally designated landscape within the Corridor of the Teviot Valleys. The lowland farmland has a strong intact field pattern, with woodland and landform forming an attractive combination, reflected in the SLA designation but also in the wider landscape, increasing sensitivity. Much of this area of rolling mixed farmland forms the foreground to views of the Eildon Hills and is an important aspect of the setting of the NSA. To the south of the Teviot Valleys the Corridor is characterised by the larger scale upland landscape of the Southern Uplands with large areas of forestry present. This change in scale of landscape and presence of more simple landscape elements exhibits a decreased sensitivity to OHLs compared with the more sensitive central and northern parts of the corridor.

Whilst the Corridor has been developed to avoid larger settlements as much as possible the low-lying river valley includes scattered individual and clusters of residential properties. The

Borders Abbeys Way and St Cuthberts Way long-distance recreational routes cross the Corridor along with the A68 which is a notable tourist route of scenic value.

Route Corridor C (SW Quadrant) west of proposed Teviot Wind Farm to the Border

Route Corridor C is located in the southwest of the Study Area. It is routed in a western direction crossing over the A7 and River Teviot then turns southwards routeing over the Moffat Hills and parts of Eskdale Muir and Castle O'er Forests. The Corridor widens as it crosses the River Esk. Moving south and eastwards elevations begin to reduce towards the Scotland-England border. The Corridor follows the border extending south from Canonbie and over the River Esk and paralleling Scot's Dike (a scheduled monument) to the south.

An appraisal of Route Corridor C (including a comparative assessment against Route Corridor D) is set out in Table G.2 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of Route Corridor C.

Route Corridor C avoids larger sites of the highest or high amenity value with the exception of a small number of watercourses which are part of the River Tweed SAC and SSSI. Whilst these tributaries can't be avoided potential impacts on them can be addressed through detailed route alignment and siting of towers. Additional sites of the highest or high amenity value are present within the Corridor and are predominantly scheduled monuments which are dispersed throughout and two smaller SSSIs; Bigholms Burn and Bells Flow towards the southeast of the corridor. There are localised pinch points notably along the River Esk valley where there is high potential for setting effects on some of the scheduled monuments.

A large part of the northern part of the Corridor encompasses upland moorland and forestry which is sparsely settled and offers a reduced sensitivity to OHLs. The locally designated Langholm Hills RSA extends towards the eastern margins of the Corridor, however, detailed route options could avoid directly affecting it and the intervening landform and forested nature of the landscape is likely to limit inter-visibility. The narrow largely wooded river valley of the Esk crosses the Corridor with settlement concentrated along the valley floor creating a band of more sensitive landscape. The southern section of the Corridor becomes progressively more open, accessible with more gently undulating hills with semi-improved pasture with an increasing presence of scattered farmsteads and small settlements. The southern extent of the Corridor terminates in the mostly flat more open settled landscape of the flow plateau.

Route Corridor D (SE Quadrant) east of proposed Teviot Wind Farm to the Border

Route Corridor D is routed in a southern direction broadly following the Liddesdale valley towards the Scotland-England border. It extends west to east over the valley into more elevated upland areas comprising moorland to the west and forestry to the east. The Corridor has been narrowed to avoid the Langholm-Newcastleton SPA and SSSI which is located to its west. The Corridor parallels the border in a southwestern direction from Kielder southwest towards Canonbie which may reduce the length of route options subject to where the border is crossed.

An appraisal of Route Corridor D (including a comparative assessment against Route Corridor C) is set out in Table G.2 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of Route Corridor D.

Route Corridor D entirely avoids larger sites of highest or high amenity value with only three discrete geological SSSIs and a small number of scheduled monuments present within the Corridor, all of which could be avoided through the development of route options. The majority of this Corridor is characterised by a large-scale upland landscape with large tracts of forestry predominantly in the Newcastleton and Kershope Forest areas. This simple landscape of large-scale landform and land uses is of reduced sensitivity to OHLs. Within this the Liddel Valley broadly following a north to south direction within the Corridor and creates a more intimate character in the landscape with narrow incised valleys, wooded slopes and enclosed pasture floors all of which creates an increased sensitivity to OHL. Within the valley, scattered properties are present along with the larger settlement of Newcastleton increasing the potential for visual impact.

Corridor Link A-B.1 (NW to NE Quadrants)

Corridor link A-B.1 connects Route Corridor A and Route Corridor B. It is a narrow corridor and extends from north of Ettrick Bridge to the northeast of the proposed Teviot Wind Farm. It is routed in southeastern direction to the north of Hawick turning south as it crosses the River Teviot. It enables an alternative connection to TEV-05 and TEV-06 from the west of the Study Area.

An appraisal of Corridor Link A-B.1 is set out in Table G.3 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of the Corridor Link.

This Corridor Link requires at least two crossings of the River Tweed SAC and SSSI due to tributaries flowing through the Corridor, although potential impacts can be addressed through the more detailed route alignment stage and consideration of tower positions and standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including number of SSSIs as well as scheduled monuments. These are largely avoidable but the corridor link is relatively narrow which provides less scope for the development of route options within it and increases the potential for effects due to increased proximity.

The Corridor Link abuts the southern end of the locally designated SLA of the Tweed, Ettrick and Yarrow Confluences and passes through the edge of the Teviot Valleys SLA to the north of Hawick. It is largely a landscape of partially forested rolling moorland which is sparsely settled although in proximity to Hawick the landscape changes to a more enclosed field pattern of managed grassland and rolling farmland with increased sensitivity to OHLs. The Corridor Link avoids larger settlement but some smaller settlements and individual properties are present in particular to the east and south of Hawick increasing potential for visual effects.

Corridor Link A-B.2 (NW to NE Quadrants)

Corridor link A-B.2 connects Route Corridor A and Route Corridor B. It is a wider corridor and extends from Ettrick Bridge to the north of the proposed Teviot Wind Farm. It is routed in a southeastern direction to the south of Hawick. It enables an alternative connection to TEV-05 and TEV-06 from the west of the Study Area.

An appraisal of Corridor Link A-B.2 is set out in Table G.3 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of the Corridor Link.

This Corridor Link requires at least four crossings of the River Tweed SAC and SSSI due to tributaries flowing through the Corridor, although potential impacts can be addressed through the more detailed route alignment stage and consideration of tower positions and standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including a number of SSSIs as well as scheduled monuments. These are largely avoidable particularly where the Corridor Link is wider to the west, however, as it narrows to the east it provides less scope for the development of route options and the number of scheduled monuments increases along with the associated risk of setting effects to occur.

The landscape character is mainly comprised of rolling moorland and partially forested landscape which is sparsely settled. The central part of the Corridor Link is dissected by pastoral upland fringe valleys associated with the Ale Water, Borthwick Water and the River Teviot and the associated clusters of properties and settlement along them. The Romans and Reivers long-distance trail crosses the corridor broadly following sections of the Borthwick Water. The southern section of the Corridor Link crosses the A7 corridor beyond which the landscape becomes more forested with the scale of forestry and potential to screen OHLs within it reducing the overall sensitivity of the landscape.

Corridor Link B-A.1 (NE to NW Quadrants)

Corridor link B-A.1 connects Route Corridor B to Route Corridor A. It is a narrower corridor routed in a southwestern direction from south of Jedburgh to the north of the proposed Teviot Wind Farm. It enables an alternative connection to TEV-01, TEV-02 and TEV-03 from the east of the Study Area.

An appraisal of Corridor Link B-A.1 is set out in Table G.3 in Appendix G. The following provides a summary of the key constraints and opportunities influencing the appraisal of the Corridor Link.

This Corridor Link requires at least three crossings of the River Tweed SAC and SSSI due to tributaries flowing through the Corridor, although potential impacts can be addressed through the more detailed route alignment stage and consideration of tower positions and standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including a number of SSSIs as well as scheduled monuments. These are largely avoidable but the Corridor Link is relatively narrow which provides less scope for the development of route options within it and increases the potential for effects due to increased proximity.

The majority of this Corridor Link lies within the locally designated Teviot Valleys SLA which increases the relative sensitivity of the landscape to accommodate an OHL. To the southwest of the Corridor Link outside the SLA the landscape comprises a more undulating, rocky upland area with scattered small woodlands and permanent pasture. It is more open and exposed in character on higher ground with some distant and panoramic views prevalent resulting in increased sensitivity to OHLs. Whilst the Corridor Link avoids larger settlements,

smaller settlements and individual properties are typically present within valleys resulting in the potential for increased proximity of routes and potential impacts to occur more likely.

7.4 Strategic Route Corridor Appraisal Conclusions

The purpose of identifying strategic route corridors was to help refine the Study Area and identify corridors in which to focus the development of route options while also taking account of the emerging results of substation siting. Table 14 provides an overview of the conclusions of the appraisal. These are also illustrated in Figure 13.

Table 14 Summary of Appraisal of Strategic Route Corridors and Links

Option	Key Findings	Conclusion
Route Corridor A	• With the exception of the River Tweed SAC and SSSI, Route Corridor A largely avoids sites of the highest or high amenity value. Where sites are located within the Corridor there is scope to develop route options which avoid them or increase the separation distances from them. • Whilst three locally designated landscapes (SLAs) are contained within the Corridor they are concentrated between the River Tweed and the Yarrow Water. The Corridor is sufficiently wide in these locations that route options can be developed which limit effects on the more valuable aspects of these locally designated landscapes. Beyond these areas the Corridor encompasses sufficient areas of landscape which are upland and of larger scale in character which are generally less sensitive to the introduction of OHL infrastructure. • The Corridor avoids large settlement and traverses land which is generally sparsely settled other than along the A and B roads which cut across the Corridor in the valleys where clusters of properties and small settlement exist. There is scope to avoid these in the identification of Route Options, however the distribution of individual or small clusters of properties within the open countryside will mean that they may be in closer proximity to or within potential route options and require further consideration in the detailed route alignment stage.	Take forward
Route Corridor B	• Similar to Route Corridor A, with the exception of the River Tweed SAC and SSSI, the Corridor largely avoids sites of the highest or high amenity value. Comparatively there are likely to be fewer potential crossings of these designated watercourses compared with Route Corridor	Discount

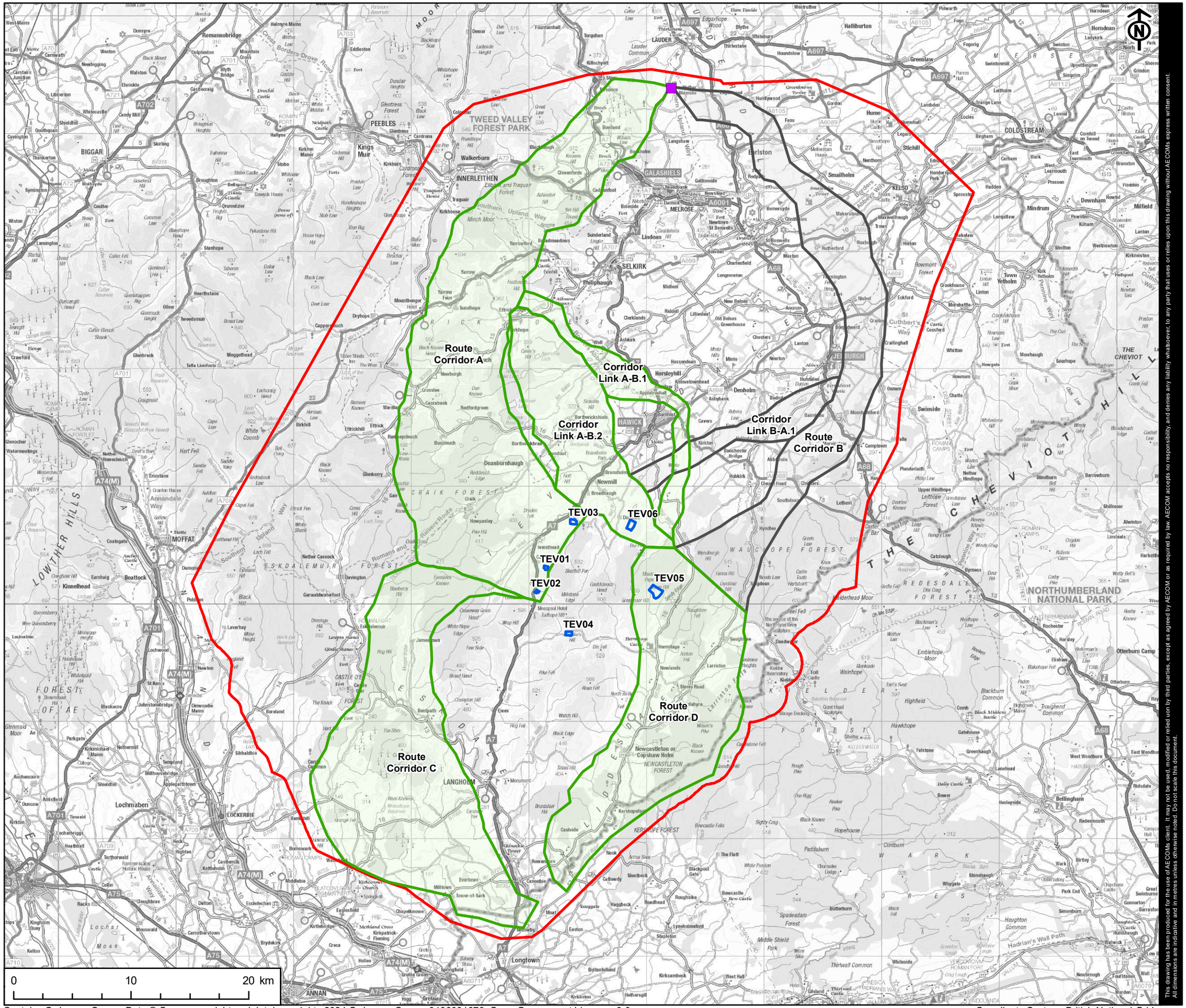
Option	Key Findings	Conclusion
	A and similarly potential effects can be mitigated through the detailed route alignment. • Route Corridor B passes through the locally designated Tweed Lowlands SLA and in relative proximity to the east of Eildon and Leaderfoot NSA as well as up to 5 GARDEN AND DESIGNED LANDSCAPEs. There is therefore greater potential for impacts on the setting of the NSA and the designated landscapes. • A large proportion of this Corridor comprises settled and enclosed lowland farmland where strong intact field patterns with woodland create an inherently more sensitive landscape to OHLs. Much of this landscape also forms the foreground to views of the Eildon Hills and is an important aspect of the setting of the NSA. • The southern part of the Corridor encompasses a large part of the locally designated Teviot Valleys SLA where the combination of enclosed arable and pasture field patterns with woodland and landform increase the sensitivity of the landscape and its scenic value. • Whilst the southern most part of the Corridor encompasses upland large scale forested and sparsely settled landscapes which are less sensitive to OHLs, the majority of this Corridor comprises landscapes of higher sensitivity which contribute to the setting of nationally designated landscapes including the NSA and a number of GARDEN AND DESIGNED LANDSCAPEs. As a result, Route Corridor B has not been taken forward to the detailed Route Option stage.	
Route Corridor C	• With the exception of the River Tweed SAC and SSSI, Route Corridor C largely avoids sites of the highest or high amenity value. Where sites are located within the Corridor there is scope to develop route options which avoid them or increase the separation distances from them. • The River Esk valley is a notable constrained area within the Corridor where scheduled monuments are present along the valley with high potential for setting impacts. It is also where settlement coalesces along the B709 increasing the likelihood of route options being in closer proximity to them. • A large part of the Corridor encompasses sparsely settled upland moorland and forestry which provides	Take forward

Option	Key Findings	Conclusion
	opportunities to develop route options within less sensitive landscapes. • The southern part of this corridor comprises more open and accessible landscapes of lower lying areas of moorland and upland pasture with an increased pattern of scattered settlement. Whilst this part of the landscape is more sensitive the Corridor is sufficiently wide to develop route options which avoid settlement and limit effects on the landscape.	
Route Corridor D	• Route Corridor D avoids larger sites of the highest or high amenity value and whilst the Langholm-Newcastleton SPA and SSSI lies to the west of the Corridor, impacts can be avoided. Similarly smaller sites of highest or high amenity value including three discrete geological SSSIs and a small number of scheduled monuments can be similarly avoided through the route options stage as the Corridor is sufficiently wide. • This Corridor contains the Liddel Valley in which settlement is generally concentrated along the valley floor with Newcastleton comprising the largest settlement. The Corridor is sufficiently wide that it provides opportunities to develop route options avoiding more densely settled areas by routeing to the west or east of the Liddel Water valley. • The majority of this Corridor comprises a simple landscape of large-scale landform and land uses. The upland landscape with large tracts of forestry is of reduced sensitivity to OHLs due to the scale and potential to accommodate the infrastructure. Whilst parts of the Corridor, particularly to the south contain narrow wooded river valleys which present a more intimate landscape character, these can be largely avoided other than where route options cross the border.	Take forward
Corridor Link A-B.1	• This Corridor Link requires at least two crossings of the River Tweed SAC and SSSI due to tributaries flowing through the Corridor although potential impacts on them can be addressed through more detailed route alignments and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including SSSIs and scheduled monuments which are largely avoidable. The Corridor Link is relatively narrow however, which will limit the scope for development of route	Take forward

Option	Key Findings	Conclusion
	options within it, increasing the potential for effects due to increased proximity. • The Corridor Link is routed to the north of Hawick avoiding larger settlement but smaller settlements and properties are present in particular to the east and south of Hawick. • The Corridor Link clips and passes through two locally designated landscapes (SLA 3 and 5). Most of the Corridor north of Hawick lies within a less sensitive landscape of partially forested rolling moorland. Closer to Hawick the landscape changes becoming more sensitive with a more enclosed field pattern of managed grassland and rolling farmland with less scope to avoid landscape and visual effects.	
Corridor Link A-B.2	• This Corridor Link requires at least four crossings of the River Tweed SAC and SSSI due to tributaries flowing through the Corridor although potential impacts on them can be addressed through more detailed route alignments and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including SSSIs and scheduled monuments which are largely avoidable particularly to the west where it is wider. The Corridor Link narrows to the east and provides less scope for the development of route options within it, increasing the potential for effects due to increased proximity. • There are a number of smaller settlements present within the various valleys that cross the Corridor Link with scope to develop route options which avoid them. Some scattered individual properties are present throughout which may be more difficult to avoid proximity to. • The Corridor Link broadly passes through the same landscapes as Corridor Link A-B.1 but also includes sections of upland valley landscapes along the Ale Water, Borthwick Water and Teviot River. South of the A7 the Corridor is more forested with the scale of forestry and potential to screen OHLs within it reducing the overall sensitivity of the landscape.	Take forward
Corridor Link B-A.1	• This Corridor Link requires at least three crossings of the River Tweed SAC and SSSI due to tributaries flowing	Discount

Option	Key Findings	Conclusion
	through the Corridor although potential impacts on them can be addressed through more detailed route alignments and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including SSSIs and scheduled monuments which are largely avoidable. The Corridor Link is relatively narrow however, which will limit the scope for development of route options within it, increasing the potential for effects due to increased proximity. • The Corridor avoids larger settlements, although smaller settlements and individual properties are present within valleys which require to be crossed by the Corridor Link. • The majority of this Corridor Link falls within the locally designated Teviot Valleys SLA which increases the sensitivity with limited scope to avoid landscape effects. The landscape outside of the SLA is similarly sensitive with open and exposed character on higher ground. • As this Corridor Link enables an alternative and more direct route from the NE quadrant of the Study Area towards TEV-01, TEV-02 and TEV-03 it has been discounted as the eastern route Corridor B has been discounted based on landscape and visual grounds as explained above.	

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Coordinate System: British National Grid

AECOM

PROJECT
Gala-Harker Reinforcement

CLIENT
SP Energy Networks

KEY
- Study Area
- Potential Substation Site
- Proposed Gala North Substation

Strategic Route Corridor
- Preferred
- Discounted

TITLE
Figure 13
Strategic Route Corridors Appraisal Outcomes

REFERENCE
GH_20240822_RS_13_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

08.

Detailed Routeing – Route Options

8. Detailed Routeing – Route Options

8.1 Identification of Route Options

Route options have been developed taking account of the appraisal of Strategic Route Corridors as well as the potential substation sites. The identification of route options has focused on those route corridor and site options identified in Table 15 and illustrated in Figure 14.

Table 15 Options taken forward from Strategic Routeing and Substation Siting

Substations sites taken forward	Route Corridors and Links taken forward
• Substation site TEV-01	• Route Corridor A
• Substation site TEV-02	• Route Corridor C
• Substation site TEV-03	• Route Corridor D
• Substation site TEV-05	• Corridor Link A-B.1
• Substation site TEV-06	• Corridor Link A-B.2

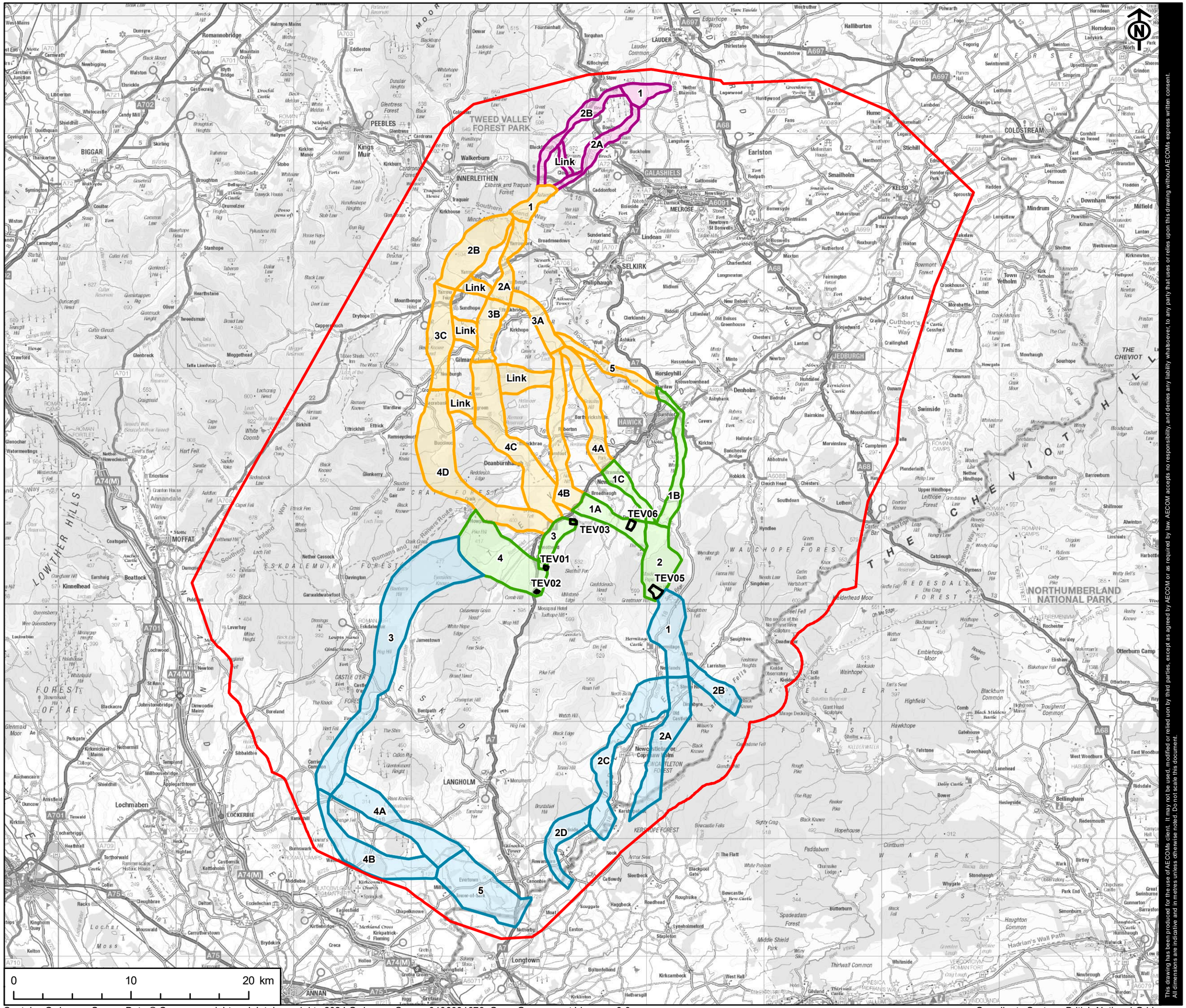
Route options are narrower corridors within the Strategic Route Corridors which are considered to provide opportunities to develop a continuous OHL route. The route options have been identified having regard to the routeing objectives and considerations described in section 5 and Appendix F. Given the potential length of route options, for ease of identification and appraisal they have been split into four sections illustrated on Figure 14 and outlined below:

- Section A Proposed Gala North Substation to River Tweed
- Section B River Tweed to the A7
- Section C A7 to new Teviot Substation
- Section D New Teviot Substation to Scotland-England border

The identification and appraisal of route options considers:

- Route options: these are relatively narrow corridors routed wholly or partly through a section and within which a detailed OHL could be developed.
- Route links: these are relatively narrow corridors which connect route options and provide some flexibility for how routeing considerations are addressed within a section.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study
- Potential Substation Site

Route Option Section
- A
- B
- C
- D

TITLE
Figure 14
Route Options and Substation Sites

REFERENCE
GH_20240827_RS_14_v1

SHEET NUMBER
1 of 1

DATE
27/08/24

8.2 Appraisal of Route Options (Section A)

Overview of Section A - Proposed Gala North Substation to the River Tweed

Section A extends from the proposed Gala North Substation to the River Tweed. The proposed substation is located adjacent to C77 Lauder-Galashiels Road approximately 4km southwest of Lauder. From here Section A extends southwards over undulating uplands to the River Tweed valley.

The following sections summarise the appraisal of route options and route links within Section A. These are illustrated in Figure 15. A more detailed appraisal of the route options and links taking account of the routeing and siting objectives and considerations is contained in Appendix H (Table H.1).

Section A -Route Option 1

Route Option 1 is required for any route west out of the proposed Gala North Substation to the River Tweed. It is routed west/southwest from the proposed substation towards the existing Long Park Wind Farm. The option gradually widens as it heads west allowing for onwards options passing to the north and west or east and south of the wind farm. This section crosses open agricultural land which is rising in a western direction up to around 380mAOD. It crosses the Allan Water which is flowing in southern direction towards the River Tweed. There are some scattered woodland blocks within the option largely coinciding with field boundaries.

Route Option 1 extends west from the proposed Gala North Substation over an undulating upland and plateau landscape. This avoids ecological designations of the highest or high environmental value to the south including Threepwood Moss SAC and SSSI and Colmsliehill Junipers SSSI as well as avoids larger settlements including Galashiels to the south as well as Stow to the northwest. With the exception of some scattered individual properties there are no areas of highest or high environmental value within or immediately adjacent to Route Option 1. Landform and woodland blocks within Route Option 1 provide some opportunities to integrate an OHL into the landscape including screening and/or backclothing of an OHL route within Route Option 1.

Section A - Route Option 2

Route Option 2 comprises two sub-options, Route Option 2a and Route Option 2b from Long Park Wind Farm to the River Tweed as well as route link from 2b to 2a.

<u>Section A - Route Option 2a</u>

Route Option 2a is routed to the south and east of Long Park Wind Farm along the slopes of William Law towards the Gala Water and A7/River Tweed. It crosses to the south of Bowland Garden and Designed Landscape and follows the B710 along the slopes of Mains Hill toward Caddon Mill, west of Clovenfords. From here it enters SLA 3 - Tweed, Ettrick and Yarrow Confluences and crosses the Caddon Water and River Tweed SAC and SSSI ending on the lower slopes of Ashiestiel Hill.

Route Option 2a avoids Bowland Garden and Designed Landscape, however, there is the potential to impact on views from within it towards and along the Gala Water as well as its

affect its setting. Similarly direct physical impacts on scheduled monuments and listed buildings are or can be avoided, however, there is the potential for some setting effects. While there is a requirement for multiple crossings of watercourses which are part of the River Tweed SAC and/or SSSI impacts on these can be avoided through careful positioning of towers. Key routeing constraints affecting Route Option 2a relate to the potential impact on Clovenfords to the south of the route options as well as from the removal of woodland including the potential loss of an area of Ancient Woodland where the route crosses the River Tweed.

Section A - Route Option 2b

Route Option 2b is routed to the north and west of Long Park Wind Farm over Sell Moor and Torsonce Hill and crossing a valley through which the Gala Water and A7 pass. From here it continues in a southwestern direction crossing Crumshank Hill and Bowshank Hill through a gap between the Moorfoothills SAC and SSSI to the west and Bowland Garden and Designed Landscape to the east. It is routed to the west of Stantling Craig Reservoir and crosses over a number of undulating hills until it crosses the A72 and River Tweed SAC and SSSI to the east of Traquair Forest ending on the lower slopes of Ashiestiel Hill. The southern part of Route Option 2b from Darny Burn is within SLA 2 – Tweed Valley.

With the exception of crossings of the River Tweed SAC and SSSI and some scattered residential properties, Route Option 2a largely avoids areas or sites of the highest or high environmental value. While this option is routed between the Moorfoot Hills SAC and SSSI and Bowland Garden and Designed Landscape neither site is likely to be affected. It is sufficiently set back from the SAC/SSSI so as not to affect its designated features and is routed to the north and west of Bowland where substantial woodland surrounds the site and views from within it are orientated to the south. A small part of Route Option 2a crosses through SLA 2 – Tweed Valley, however, there is considered to be some scope to mitigate effects on the site.

Section A - Route Link 2b to 2a

The Route Link is a short option which provides the opportunity to switch from Route Option 2a to Route Option 2b. It begins to the west of Stantling Craig Reservoir and is routed in a southeastern direction over the Caddon Water (twice) and Blackhaugh before connecting to Route Option 2b to the southwest of Caddon Water before it crosses the River Tweed. A short part of the Route Link is within SLA 3 - Tweed, Ettrick and Yarrow Confluences.

The route link largely requires the use of Route Option 2b switching to 2a to the west of Knowes Hill. As result if avoids the impacts on Bowland Garden and Designed Landscape that would occur if only routeing within Route Option 2a, however, it would introduce additional crossings of the Caddon Water (which is part of the River Tweed SAC) and crosses River Tweed SAC and SSSI at the same location as Route Option 2a where impacts on Clovenfords could occur while woodland removal would also be required.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

Option 1

Option 2B

Option 2A

Link 2B to 2A

GALASHIELS

SCOTTISH BORDERS

NORTHUMBERLAND

Scale @ A3 1:50,000

0 2.5 5 km

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Route Option Section A
- Route Option Section - Other
- Proposed Gala North Substation Location
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Scenic Area
- Locally Designated Landscape
- Long Distance Trail

Wind Turbine Location (Status)

- Operational
- Wind Turbine Location - 2x Rotor Diameter

Carbon and Peatland 2016

- Class 1
- Class 3
- Class 4
- Class 5

Existing Transmission System

- 132 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 15
Section A Route Options

REFERENCE
GH_20240827_RS_15_v1

SHEET NUMBER
1 of 1

DATE
27/08/24

8.3 Appraisal of Route Options (Section B)

Overview of Section B - River Tweed to the A7

Section B extends from the River Tweed valley and over the Tweedsmuir Hills and a mix of upland moorland and forestry towards the Yarrow Water. From here it comprises the Ettrick Hills extending in a southeastern direction towards the River Teviot and the A7 to the west of the proposed Teviot Wind Farm.

The following sections summarise the appraisal of route options and route links within Section B. These are illustrated in Figure 16. A more detailed appraisal of the route options and links taking account of the routeing and siting objectives and considerations is contained in Appendix H (Tables H.2, H.3 and H.4).

Section B - Route Option 1

Route Option 1 is located entirely within SLA 3 - Tweed, Ettrick and Yarrow Confluences and is common for any route south of the River Tweed. It is routed up Ashiestiel Hill with Traquair Forest to the north and Williamhope SSSI to the south. It is routed toward the peak of Brown Knowe around 520mAOD and widens out over the peak where the Route Option meets the Southern Upland Way and would connect to Route Options 2a or 2b.

The route option has been developed to avoid most areas of highest or high environmental value, however, it crosses relatively steep slopes ascending land to the south of the River Teviot which also coincides with SLA 3 Tweed, Ettrick and Yarrow Confluences. The SLA cannot be avoided, however, there is some scope to reduce effects on it by utilising the existing forestry plantation to the north as well as landform. The Southern Upland Way and Cross Borders Drove Road lie to the south where Route Option 1 meets Options 2a and 2b and extend across the route option. As result there is the potential to impact on users of the long-distance trails.

Section B - Route Option 2

Route Option 2 comprises two sub-options, Route Option 2a and Route Option 2b from Brown Knowe to the Yarrow Water as well as route link from 2b to 2a.

<u>Section B - Route Option 2a</u>

Route Option 2a heads south from the Southern Upland Way and crosses a series of hills from Brown Knowe to Old Hill some of which form relatively steep-sided valleys through which a number of small watercourses flow. This section of Route Option 2a crosses two SLAs, firstly SLA 3 - Tweed, Ettrick and Yarrow Confluences between the Southern Upland Way and Old Hill, and secondly through part of SLA 1 - Tweedsmuir Uplands from Old Hill to A708. From Old Hill the route option crosses the A708 and the Yarrow Water and crosses an upland area until it reaches Black Knowe Head.

With the exception of the Yarrow Water which is part of the River Tweed SAC and SSSI, Route Option 2a largely avoids sites of the highest or high environmental value. Due to a combination of their size and/or orientation, it cannot avoid routeing across two SLAs (SLA 3 Tweed, Ettrick and Yarrow Confluences and SLA 1 Tweedsmuir Uplands) as well as the Southern Upland Way and Cross Borders Drove Road. The landscape is generally considered

capable of accommodating an OHL route but there are areas of increased sensitivity associated with the long-distance trails and crossing the Yarrow Water.

Section B - Route Option 2b

Route Option 2b heads west/southwest from the Southern Upland Way crossing part of the Tweed Valley Forest Park. Coming out of the commercial forestry the route option crosses a series of hills some of which form steep-sided valleys through which watercourses drain southeast towards the Yarrow Water. It finishes just north of the Yarrow Water on Snouthead and Peat Law. A small part of Route Option 2b is located with SLA 3 - Tweed, Ettrick and Yarrow Confluences, however, the remainder is located entirely within SLA 1 - Tweedsmuir Uplands.

Route Option 2b avoids areas of the highest or high environmental value but as with Option 2a is routed entirely within locally designated landscapes crossing SLA 3 Tweed, Ettrick and Yarrow Confluences and SLA 1 Tweedsmuir Uplands. This is the most westerly route considered with the potential to increase overall route length and crosses very elevated upland areas which are typically between 450 and 500mAOD and requires to route across a number of steep slopes.

Section B - Route Link 2b to 2a

Route Link 2b to 2a provides an opportunity to connect Route Option 2b to Route Option 2a and onwards to Route Options 3a or 3b, as alternative to continuing south from Route Option 2b to Route Option 3c. The Route Link is a short section from Whitefield to Wester Kershope crossing the A708 and the Yarrow Water where it is a part of the River Tweed SAC and SSSI. With the exception of the River Tweed SAC and SSSI the route link does not have the potential affect sites or areas of the highest or high environmental value. A short section of the route link crosses SLA 1 – Tweedsmuir Uplands and is routed across the Yarrow valley. This short section of the link has the potential to result in landscape effects on the enclosed valley.

Section B - Route Option 3

Route Option 3 comprises three sub-options, Route Options 3a, 3b and 3c which provide alternative routes across the Ettrick Hills and the Ettrick Water as well as a route link from 3c to 3b.

Section B - Route Option 3a

Route Option 3a starts to the north of Ettrickbridge on Black Knowe Head and is routed in a southeastern direction just cutting across the southern margins of SLA 3 - Tweed, Ettrick and Yarrow Confluences. It crosses the Ettrick Water, part of the River Tweed SAC and SSSI, and the B7009 continuing in a southeastern direction. It ascends Hutlerburn Hill and finishes to the east of the Dod, north/northeast of Langhope Rig Wind Farm from where it would connect to Route Options 4a, 4b or 5.

There are a number of areas or sites of highest or high environmental value which influence Route Option 3a including a crossing of the Ettrick Water which is part of the River Tweed SAC and SSSI, scheduled monuments within and near to the route option as well as Ancient Woodland Inventory sites which extend across the option making some tree removal unavoidable. Route Option 3a crosses the Ettrick Water to the east of Ettrickbridge in a more

sensitive location in landscape and visual terms on the margins of SLA 3 with limited opportunities to mitigate effects.

Section B - Route Option 3b

Route Option 3b starts to the southwest of Black Knowe Head and is routed in a southern direction crossing over a series of hills including Nether Hill, Peat Rig, Newhouse Kip and Singlie Hill. From Singlie Hill it descends towards Hyndhope. It crosses the B7009 and Ettrick Water, part of the River Tweed SAC and SSSI at Hyndhope finishing on the lower slopes of White Hill.

Route Option 3b crosses a remote upland landscape within which settlement is sparse and the large-scale rolling landform with simple land use increases the ability of the landscape to accommodate an OHL option. There are a small number of areas or sites of the highest or high environmental value including the River Tweed SAC and SSSI and a scheduled monument and listed building at Kirkhope. Potential effects on these can be avoided or reduced, however, there is some potential for setting effects.

Section B - Route Option 3c

Route Option 3c starts on Snouthead and Peat Law descending the hills in a southern direction and crossing over Feuars Hill towards the Yarrow Water, part of the River Tweed SAC and SSSI. The route option crosses the Yarrow Water at Sundhope continuing south on the east facing slopes of Eldinhope Knowe. It crosses over a series of hills including Scar Hill as it continues south towards the B7009 and the Ettrick Water, also part of the River Tweed SAC and SSSI. Route Option 3c crosses over the Ettrick Water between the proposed Brown Rig Wind Farm to the west and Gilmanscleuch to the east. From here it begins to rise up crossing over Cop Law and finishing at Stanhope Law.

Route Option 3c is comparable to the 3b crossing a sparsely settled upland landscape with the exception of where it crosses the Yarrow valley and the Ettrick valley where some isolated or scattered properties are present. This option crosses the River Tweed SAC and SSSI in two locations (Yarrow Water and Ettrick Water), however, these are unavoidable and would not prevent an OHL route. Peatland is present within Route Option 3c with the extent and distribution meaning that it cannot be avoided.

Section B Route Link 3c to 3b

The route link connects Route Option 3c to 3b from approximately from Scar Hill within 3c to Singlie Hill within 3b. It is a relatively short link with topography generally falling in an eastern or southeastern direction crossing over Sundhope Height to Long Knowe.

The route link requires the use of Route Option 3c switching to 3b part way through it. This would enable some areas of class 3 peatland within Route Option 3c to be avoided otherwise it does not offer any significant environmental benefits with the exception of potentially reducing route length as part of an overall OHL.

Section B -Route Option 4

Route Option 4 comprises four sub-options, Route Options 4a, 4b, 4c and 4d which provide alternative routes to the River Teviot and A7 as well as two alternative route links from Route Option 4d to 4c and from Route Option 4c to 4b.

Section B - Route Option 4a

Route Option 4a begins at Wester Essenside and is routed in a southern direction crossing Todrig Road and Todrig Burn, the latter of which is part of the River Tweed SAC. From here it extends over Leap Hill and continues to ascend rising landform towards and over Cringie Law. From Cringie Law land begins to slope towards the Borthwick Water. The Borthwick Water is also part of the River Tweed SAC. Route Option 4a crosses the B711 and Borthwick Water in a southern direction at Highchesters/Todshawhaugh. It extends over Todshaw Hill and Branxholmpark Hill crossing the Roman and Reivers Way as well as the River Teviot, part of the River Tweed SAC and SSSI at Branxholme where the Route Option finishes.

Route Option 4a requires multiple crossings of watercourses which are part of the River Tweed SAC and/or SSSI. These are unavoidable and potential adverse effects can be avoided or reduced through the design of a detailed route alignment. There are also a number of scheduled monuments and listed buildings present within or close to Route Option 4a and while direct physical impacts can be avoided some setting impacts may occur. This route option is considered to be constrained in landscape and visual terms routeing across an area which is considered to be more sensitive to an OHL as well as closer to larger settlements including Hawick. Other notable routeing constraints include a crossing of the Roman and Reivers Road long distance trail.

Section B - Route Option 4b

Route Option 4b starts to the east of Langhope Rig Wind Farm and is routed in southern direction. It is routed over a series of undulating hills including Whitslaid Hill, Barrel Law, Wester Rig and Hangingshaw Hill as it approaches the Borthwick Water. It crosses the watercourse, part of the River Tweed SAC to the west of Roberton and continues southwards ascending Parkhill and Chapel Hill (where it crosses Roman and Reivers Way) and continuing over Hott Hill. From here it descends in a southeastern direction towards Teindside crossing the A7 and the River Teviot (part of the River Tweed SAC and SSSI) finishing at Northhouse.

In landscape and visual terms Route Option 4b is comparable to 4a although located slightly further west and therefore further away from Hawick. Nevertheless, it passes smaller settlements including Roberton and Burnfoot with the potential for visual effects. With regard to areas or sites of highest or high environmental value, Route Option 4b requires multiple crossings of watercourses which are part of the River Tweed SAC and/or SSSI and also encompasses Slaidhills Moss SSSI. There are no scheduled monuments or listed buildings directly within Route Option 4b but some are present on the margins of the option with the potential for setting effects. Other notable routeing constraints include a crossing of the Roman and Reivers Road long distance trail.

Section B - Route Option 4c

Route Option 4c starts at White Hill south of the Ettrick Water. It is routed in a southern direction crossing over a series of undulating hills some of which are contain forestry. From the B711 Route Option 4c is routed in a southeastern direction crossing the Ale Water and over Byrelee Hill and Mid Hill descending the hillslopes towards the Borthwick Water which is part of the River Tweed SAC. It crosses the Roman and Reivers Way and then Route Option widens out over Commonside Moor. From there is scope to connect onto Route Option 4b at

Slaidhill or continue over Commonside Moor crossing the River Teviot, part of the River Tweed SAC and SSSI and the A7 finishing on the lower slopes of Crom Rig.

Route Option 4c crosses a large scale, simple landscape which is relatively remote and with characteristics which are indicative of lower sensitivity to an OHL route. There are some areas of increased sensitivity largely coinciding with narrow valleys which require to be crossed and in which an OHL would be more prominent. As with other options, Route Option 4c requires multiple crossings of watercourses which are part of the River Tweed SAC and/or SSSI. There are no scheduled monuments or listed buildings directly within Route Option 4c but some are present on the margins of the option with the potential for setting effects. Larger areas of forestry and peatland are present within Route Option 4c with the potential for impacts on both. Similar to other sub-options it also requires a crossing the Roman and Reivers Way with the potential to impact on users of the trail.

Section B - Route Option 4d

Route Option 4d starts at Stanhope Law and is routed southwards over a series of undulating hills including Cacra Hill, Stand Knowe, Craig Hill, Annelshope Hill and Home Law till it reaches the B711. From here Route Option 4d is routed across Craik Forest crossing a series of hills including Kirk Hill, Under Hill Head and Bald Hill. It crosses the Borthwick water, part of the River Tweed SAC, to the northeast of Craik and continues in an eastern direction over Calfshaw Head towards the River Teviot, part of the River Tweed SAC and SSSI. Route Option 4d connects to Route Option 4c at Commonside and continues over Colterscleuch crossing the River Teviot and A7 finishing to the southwest of Crom Rig.

Route Option 4d is similar in landscape terms to 4c but is located further west on more elevated land. There are greater amounts of forestry present with a large part of the option routeing through Craik Forest which provides some opportunities to avoid or reduce potential impacts. As with other options, Route Option 4d requires multiple crossings of watercourses which are part of the River Tweed SAC and/or SSSI. There are no scheduled monuments or listed buildings directly within Route Option 4d but some are present on the margins of the option with the potential for setting effects. Much of the upland area would require routeing through peatland so potential impacts would be unavoidable.

Section B - Route Link 4d to 4c

This route link connects Route Option 4d to 4c crossing west to east from Stand Knowe to Thorniecleuch Hill.

The route link requires the use of a very short section of Route Option 4d then switches to 4c. In practice it would connect OHL routes from Route Option 3c onto 4c largely avoiding 4d. Overall, it does not offer any significant environmental benefits. While it could potentially reduce the length an overall OHL route, the route link crosses an area of identified peatland which could be avoided by continuing south through Route Option 4d.

Section B - Route Linke 4c to 4b

This route link connects Route Option 4c to 4d. It starts at Dodhead southeast of Hyndhope and extends eastwards through forestry, within which there are two small lochs, towards Muckle Dod south of the existing Langhope Rig wind Farm.

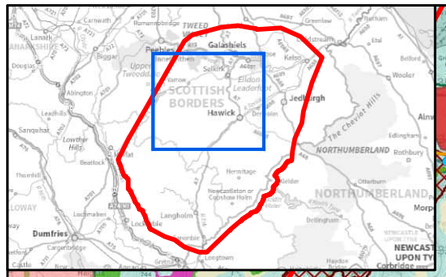
This route link requires the use of a very short section of Route Option 4c then switches to 4d. While it would enable OHL routes to avoid peatland within Route Option 4c, peatland would require to be crossed within the route link. Overall, there may be a slightly lower impact on peatland as the area within the route link is less than that in Route Option 4c, however, any onwards route would have to address other routeing considerations within Route Option 4b as outlined above.

Section B - Route Option 5

Route Option 5 starts to the southeast of Hutlerburn Hill where Route Option 3a finishes and is routed in a southeastern direction over undulating hills which gradually slope down to the Ale Water. It crosses the Ale Water into Salenside Plantation, forestry which covers much of Ashkirk Hill. It continues southeast from the forestry into more open farmland finishing at the A7 north of Hawick.

Route Option 5 provides an alternative route from uplands to the Teviot Valley crossing to the north of Hawick (compared to Route Options 4a-d which cross to the south of Hawick). Route Option 5 stops at the A7 just short of the River Teviot, however, it still requires a crossing of the Ale Water which is part of the River Tweed SAC. Key factors which make Route Option 5 less preferable are largely landscape and visual considerations. Landscape character is considered to be more sensitive to OHL routes due to its openness and the proximity to settlements and transport routes.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Option 1
Option 2B
Option 2A
Link 2B to 2A
Option 3B
Option 3A
Link 3C to 3B
Option 3C
Option 4C
Link 4C to 4B
Link 4D to 4C
Option 5
Option 4A
Option 4B
Option 4D
TEV03
TEV06
TWEED VALLEY FOREST PARK
GALASHIELS
MELROSE
HAWICK

Scale @ A3 1:110,000

0 5 10 km

Coordinate System: British National Grid

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PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Potential Substation Site
- Route Option Section B
- Route Option Section - Other
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Garden and Designed Landscape
- Inventory Battlefield
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- National Scenic Area
- Locally Designated Landscape
- Wild Land Area
- Long Distance Trail

Wind Turbine Location (Status)
- Operational
- Consented
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Carbon and Peatland 2016
- Class 1
- Class 3
- Class 4
- Class 5

Existing Transmission System
- 132 kV Substation
- 132kV OHL

TITLE
Figure 16
Section B Route Options

REFERENCE
GH_20240827_RS_16_v1

SHEET NUMBER
1 of 1

DATE
27/08/24

8.4 Appraisal of Route Options (Section C)

Overview of Section C - A7 to new Teviot Substation

Section C comprises Route Options from the Teviot Valley where the A7 and Teviot Water are present and extends south/southeast to potential substation sites to the west, north and east of the proposed Teviot Wind Farm.

The following sections summarise the appraisal of route options and route links within Section C. These are illustrated in Figure 17. A more detailed appraisal of the route options and links taking account of the routeing and siting objectives and considerations is contained in Appendix H (Tables H.5 and H.6).

Section C - Route Option 1

Route Option 1 comprises three sub-options which provide alternative routes from the Teviot Valley to potential substation sites to the north (TEV-06) and onwards to the east (TEV-05) of the proposed Teviot Wind Farm. Note that a connection to TEV-05 would require Route Option 2.

Section C - Route Option 1a

Route Option 1a starts in the Teviot Valley and extends in an eastern/southeastern direction towards TEV-06 and Route Option 2. It rises from the River Teviot quite steeply over the slopes of Broadhaugh Hill and Inner Hill and from there crosses relatively gently undulating until it reaches White Hill which coincides with TEV-06. It crosses White Hill and finishes within a valley formed by Penchrise Burn where it meets Route Option 2.

There are a number of cultural heritage and archaeological designations present within or on the margins of Route Option 1a which are the key constraint on this option. While the scheduled monuments can be avoided the number and distribution of them crossing White Hill increases the potential for setting effects. In landscape and visual terms the sensitivity of Route Option 1a tends to reduce moving eastwards through the route. At its western extent the Teviot valley is considered to be more sensitive, but this reduces crossing a more open, elevated landscape to the east.

Section C -Route Option 1b

Route Option 1b starts at the A7 to the north of Hawick and is routed around the settlement to north and east. Land to the north of Hawick forms a much more open valley as altitudes are lower and landform much more gentle compared to elsewhere within the Study Area. As the route option crosses the A698 it turns and heads south towards Route Option 2. The land it traverses begins to increase in altitude with the route option crossing over a series of hills or traversing side slopes.

There a number of sites or areas of highest or high environmental value within or close to Route Option 1b including a crossing of the River Tweed SAC and SSSI at the River Teviot as well as a number of scheduled monuments on the margins of the option. In landscape and visual terms, this option has potential for significant effects. This is partly due to landscape character as well as the number of potentially sensitive receptors to the north and east of

Hawick including properties on the edge of Hawick as well as scattered properties in the wider area.

Section C - Route Option 1c

Route Option 1c starts in the Teviot Valley crossing steep slopes to the east as it rises up from the River Teviot. It continues in a southeastern direction over a series of hills with largely gentle or shallow slopes until reaches Route Option 2.

Route Option 1c is comparable to 1a given their proximity. The key considerations influencing the route option relate to landscape and visual considerations as well as potential setting effects on scheduled monuments within and on the margins of the route option. In landscape terms the western part of the route option coming out of Teviot valley is considered sensitive to OHLs due to the scale of the landscape.

Section C - Route Option 2

Route Option 2 comprises a single route option which connects Route Options 1A, B and C onwards to the potential substation site TEV-05 to the east of the proposed Teviot Wind Farm. Its starts at Penchrise Peel and is routed southwards over Burnt Craig into commercial plantation forestry finishing at TEV-05 at Black Rig just on the southern boundary of the forestry.

While in landscape and visual terms this Route Option is considered to be feasible with opportunities to utilise forestry to mitigate impacts, the key constraints are a requirement to cross the Catrail, a scheduled monument formed by a linear earthwork which extends across the option, as well as areas of peatland. Direct physical impacts on the scheduled monument can be avoided as it could be spanned by an OHL or and OHL could routed through the gap in the earthwork, however, there is potential to impact its setting.

Section C - Route Option 3

Route Option 3 comprises a single route option which connects Section B Route Options 4c and 4d to TEV-01 or TEV-03. It also provides opportunities to connect to TEV-02 via Section C Route Option 4. The Route Option broadly extends north to south to the east of the A7. It is routed across a small number of undulating hills including Crom Rig, Far Height and Bink's Hill. Subject to substation site selection it could also provide opportunities for route options from TEV-01, TEV-02 or TEV-03 onwards to the Scotland-England border.

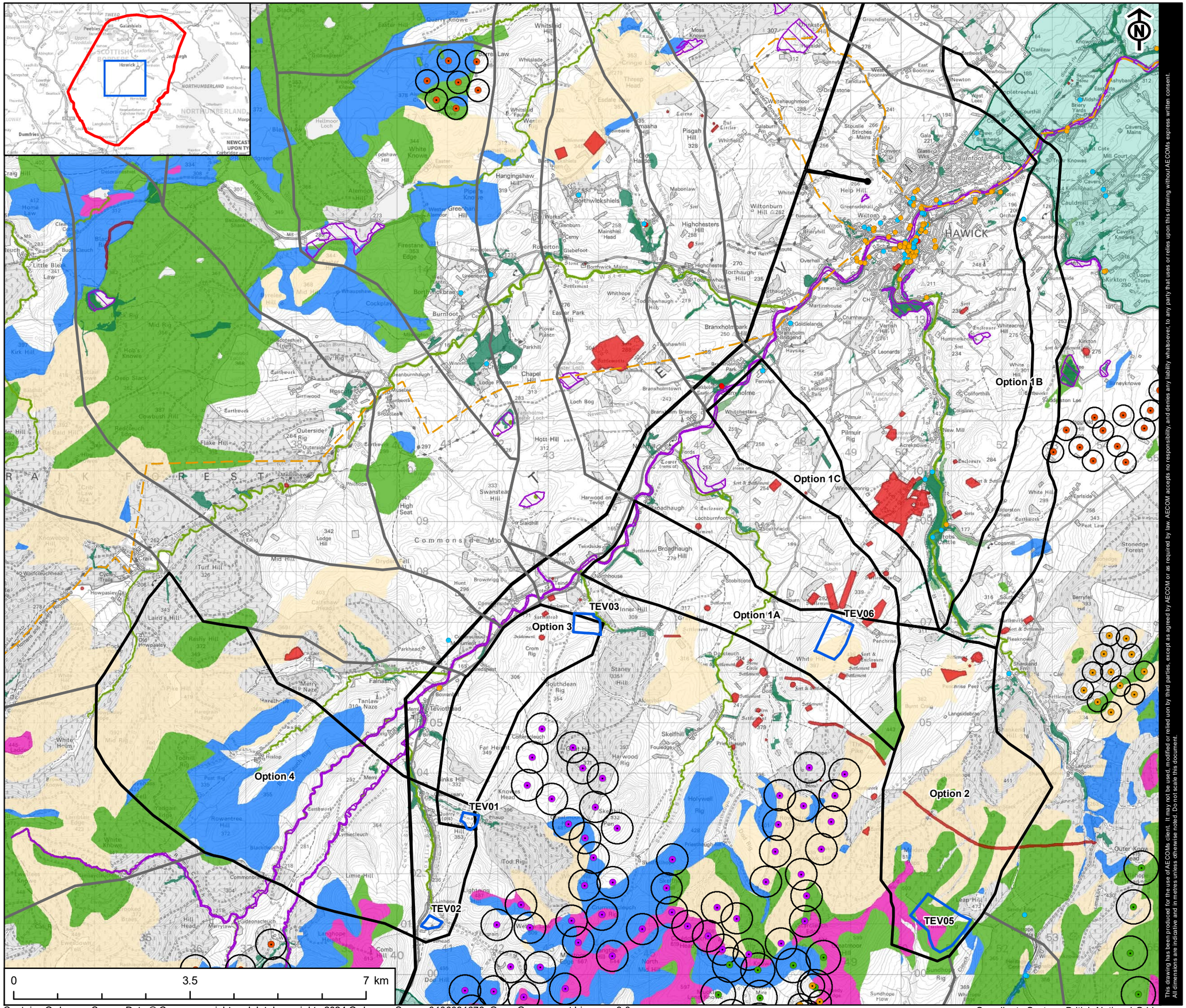
There are a number of routeing considerations within or immediately adjacent to the route options including ecological and archaeological sites of highest or high environmental value. This includes the River Teviot, part of the River Tweed SAC and SSSI which is parallel to the Route Option 3 as well as a small number of scheduled monuments. The River Teviot is not considered to be a significant constraint in the context of this option. Similarly, the scheduled monuments would not prevent the development of an OHL route, however, given their proximity could result in setting effects. In landscape and visual terms Route Option 3 provides a relatively short connection to the substation options within the more open landscape context running parallel to the A7 within which the OHL would run along the plateau on top of the valley ridgeline predominantly impacting the corridor of the A7 and the receptors and settlement within it. This could create a wirescape with the existing 132kV OHL to the west of the A7 and a new OHL to the east.

Section C - Route Option 4

Route Option 4 is routed southeast from within Craik Forest over Blackcleuch Rig and the Teviot Water, part of the River Tweed SAC and SSSI and crossing over Limmie Hill towards the A7 where it finishes. Route Option 4 provides a number of routeing opportunities including connecting Section B Route Option 4d to TEV-02 or TEV-03 or subject to substation site selection route options south towards the Scotland-England border via Section D Route Option 3.

There are a small number of routeing considerations within Route Option 4 including multiple crossings of watercourses which are part of the River Tweed SAC and SSSI as well as routeing across areas of peatland. While these do not necessarily prevent an OHL route they could make it less favourable when evaluating an overall route. Route Option 4 lies predominantly within a landscape containing large tracts of forestry which could accommodate an OHL although the eastern section would require crossing of steep slopes where towers would appear as prominent elements within the landscape crossing the narrow A7 corridor.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:70,000

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

- Study Area
- Potential Substation Site
- Route Option Section C
- Route Option Section - Other
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape
- Long Distance Trail

Wind Turbine Location (Status)

- Consented
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Carbon and Peatland 2016

- Class 1
- Class 3
- Class 4
- Class 5

Existing Transmission System

- 132 kV Substation
- 132kV OHL

TITLE
Figure 17
Section C Route Options

REFERENCE
GH_20240827_RS_17_v1

SHEET NUMBER
1 of 1

DATE
27/08/24

8.5 Appraisal of Route Options (Section D)

Overview of Section D - New Teviot Substation to Scotland-England Border)

Section D comprises route options from potential substation sites at the proposed Teviot Wind Farm to the Scotland-England border. This includes route options to the west of the Study Area crossing over part of the Moffat Hills in Dumfries and Galloway as well as to the east of the Study Area following the Liddel Valley in the Scottish Borders.

The following sections summarise the appraisal of route options and route links within Section D. These are illustrated in Figure 18. A more detailed appraisal of the route options and links taking account of the routeing and siting objectives and considerations is contained in Appendix H (Tables H.7 and H.8).

Section D - Route Option 1

Route Option 1 is required for any route south from TEV-05 to the Scotland-England border. It is routed south from Sundhope Rig crossing over the B6399 and routeing south through commercial forestry until Blackwood Hill. From here it continues over Anton Fell finishing between the B6399 to the west and the B6357 to the east.

Route Option 1 is in close proximity to Hermitage Castle, a scheduled monument and regionally important visitor attraction. Subject to detailed OHL routeing has the potential for setting impacts, however there are opportunities to avoid or reduce these by routeing to the east of the option and using landform to reduce potential intervisibility. Other notable environmental routeing considerations including crossing an area of peatland between TEV-05 and Roughley at the head of the Liddel Valley.

Section D - Route Option 2

Section D - Route Option 2a

Route Option 2a is a continuation of Route Option 1 extending south from Cleuch Head crossing the B357 and Liddel Water into commercial forestry at Newcastleton Forest. It continues south through the forestry on the east side of the Liddel Valley crossing the Scotland-England border at Kershope into Kershope Forest.

The main routeing considerations influencing Route Option 2a are landscape and visual. With regard to areas or sites of highest or high environmental value, the route option largely avoids or provides opportunities to avoid them including Kershope SSSI at the border as well as some cultural heritage and archaeological interests. In landscape and visual terms there are opportunities to develop an OHL route utilising Newcastleton Forest, however, this increases the potential to affect users of the forest including those utilising the trails which are present. While Route Option 2a has been developed to avoid the proposed Liddesdale Wind Farm consideration would need to be given to potential visual effects of the OHL being viewed against the backdrop of the wind farm.

Section D - Route Option 2b

Route Option 2b is a short direct route from Route Option 1 extending in southeast direction over the lower slopes of Rain's Hill and across the B6357 and over the steep slopes of Larriston Fells to the Scotland-England border at Kielder Forest.

While Route Option 2b provides the shortest and most direct route to the Scotland-England border it is not considered preferable. The route option crosses open upland adjacent to Newcastleton Forest edge, rising perpendicularly up the steep hillside of Larriston Fell, which will accentuate localised impacts on landscape character. While the route option largely avoids areas or sites of the highest or high environmental value it would cross over into a highly constrained area at Kielder in which components of the Border Mires Kielder-Butterburn and Kielder Mires SSSI are present and would be likely to constrain onwards routeing within England.

Section D - Route Option 2C

Route Option 2C starts to the west of Cleuch Head and is routed across the Hermitage Water and B6399 to the lower slopes of North Birney Fell. It continues in a southern or southwestern direction along the west side of the Liddel Valley crossing over a number of undulating hills until it reaches the Scotland-England border on the Liddel Water to the southeast of Greena Hill.

Route Option 2c traverses the western side of the Liddel Valley to the east of the Langholm-Newcastleton SPA and SSSI. While the option is located close to the designation, effects on it are considered unlikely. Other sites of highest or high environmental value include a small number of scheduled monuments on the hillslopes. While these can be avoided there is the potential for some setting effects to occur.

Section D - Route Option 2D

Route Option 2d is a continuation of Route Option 2c which would enable the Scotland-England border to be crossed in a different location. It is routed from Greena Hill in a southwestern direction crossing Tinnisburn Forest. It gradually turns southeast crossing the B6357 and continues to the Scotland-England border on the Liddel Water.

In the context of the SP Energy Networks Project, Route Option 2d only increases route length and introduces some additional routeing considerations including crossing peatland and the loss of woodland including potentially Ancient Woodland. With regards landscape and visual amenity Route Option 2d is not considered to provide any benefit as it directly impacts a more sensitive enclosed, narrow valley landscape as it approaches the border. Routeing along the valley-side following its contours provides opportunities to backcloth the OHL and could assist in limiting wider effects on the more sensitive valley landscape.

Section D - Route Option 3

Route Option 3 starts within Eskdalemuir Forest where it meets Section C Route Option 4. It is routed southwest through the forest from Lamblair Edge to Blaeberry Hill where it turns south. The Route Option follows the forestry but extends to open moorland to the east. It is partly routed through Castle O'er Forest crossing the River Esk and B7079 to the east of Castle O'er. It continues in a southwestern direction crossing a series of hillslopes including

Mid Height, Hart Fell and Whitecastles Fell until it reaches Stridrigg to the west of the existing Ewe Hill Wind Farm.

Route Option 3 is required for any route located to the west of the Study Area. It extends through Eskdalemuir Forest and would potentially require a large amount of tree removal while also potentially affecting areas or sites of the highest or high environmental value. This includes a potential crossing of Worms Cleugh part of the River Tweed SAC, as well as setting impacts on scheduled impacts and listed buildings within and on the margins of the route. Route Option 3 also requires to cross a number of areas of peatland. In landscape terms the forestry provides opportunities for OHL routeing either within or on the forestry edge helping to reduce potential landscape effects. Further south Route Option 3 crosses more open terrain and altitudes begin to reduce with the landscape forming a transitional landform from the upland to lowland.

Section D - Route Option 4

Section D - Route Option 4a

Route Option 4a is routed in a southeastern direction. It extends from Stidrigg across a series of undulating hills heading towards Winterhope reservoir. It narrows slightly as the route option crosses over Gowd Moor to the north of the existing Solway Bank Wind Farm continuing to widen out at crosses over less elevated farmland until it finishes at Outer Hill.

There are a small number of constraints present on and near Route Option 4a including cultural heritage and archaeological sites as well as peatland and Ancient Woodland. Much the route option passes through open, locally undulating landscape with isolated settlements and proximity to the A708. Increased wirescape could occur where it contains a section of existing 132 kV OHL around Crawthat Hill, aligned to the end of woodland/forestry, however, overall the route option is considered to be feasible.

Section D -Route Option 4b

Route Option 4b continues south from Stidrigg over Linnhall to the east of the existing Minsca Wind Farm. It turns southeast and routes over High Muir to the south of the existing Solwaybank Wind Farm and continues east to the River Sark where it finishes.

Route Option 4b is comparable with 4a. While there are environmental constraints present the main routeing consideration relates to visual amenity. This option crosses a comparatively more settled landscape with the potential for an OHL to impact on Waterbeck and multiple isolated properties, adding to existing views of the existing 132 kV OHL and other voltage lines exacerbating the wirescape present in views.

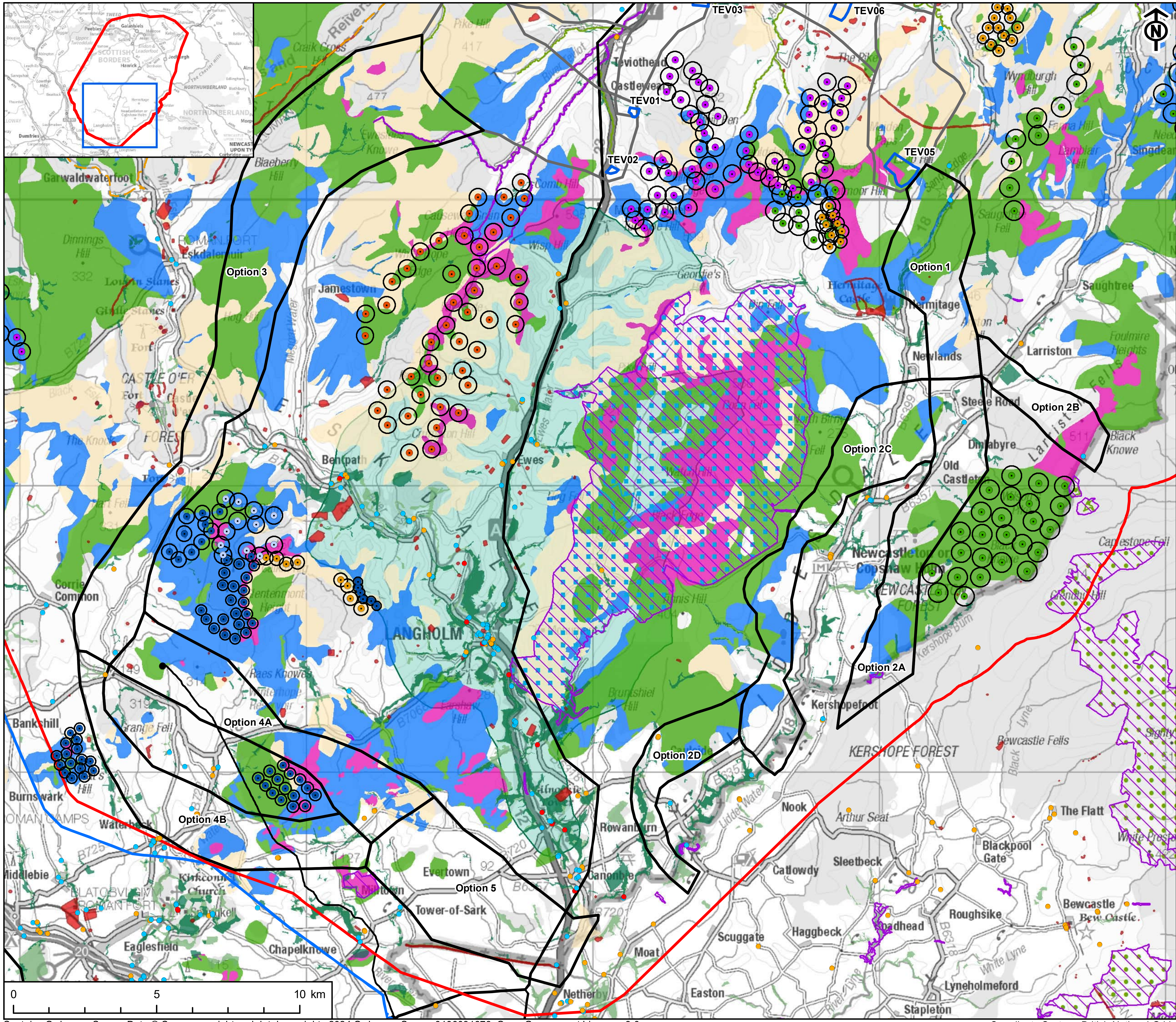
Route Option 5

Route Option 5 continues from Route Options 4a and 4b to the Scotland-England border. It starts at Outer hill and is routed over low-lying farmland in a southeastern direction crossing the B6357 centred on Evertown. It is routed to the north of Scotsdike and extend eastwards crossing the A7 and River Esk at the Scotland-England border.

Route Option 5 is required for any route coming from the west of the Study Area to cross the Scotland-England border. There a small number of environmental routeing considerations present including scheduled monuments, listed buildings, woodland and peatland. There is

some limited woodland in an otherwise open and largely flat landform. The smaller scale landform and pattern increases sensitivity of the landscape to an OHL but would not prevent the development of an OHL through this area.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

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PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Potential Substation Site
- Route Option Section D
- Route Option Section - Other
- Category A / Grade I Listed Building
- Category B / Grade II* Listed Building
- Category C / Grade II Listed Building
- Scheduled Monument
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory Site
- Woodland identified in the Native Woodland Survey of Scotland
- Locally Designated Landscape
- Long Distance Trail

Wind Turbine Location (Status)
- Operational
- Consented
- Appeal/Public Inquiry
- Application Submitted
- Design/Scoping; Scoping
- Refused
- Wind Turbine Location - 2x Rotor Diameter

Carbon and Peatland 2016
- Class 1
- Class 3
- Class 4
- Class 5

Existing Transmission System
- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 18
Section D Route Options

REFERENCE
GH_20240827_RS_18_v1

SHEET NUMBER
1 of 1

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8.6 Route Option Appraisal Conclusions

The Study Area was split into four sections for the purposes of identifying and assessing potential route options between the proposed Gala North Teviot Substation, alternative sites for the new Teviot Substation and the Scotland-England border. Table 16 provides a summary of the key findings of the appraisal including highlighting relevant comparative considerations between route options and links. It should be read with reference to Appendix H which provides a detailed appraisal. Figure 19 illustrates the outcomes of the appraisal.

Table 16 Summary of Appraisal of Route Options and Links

Section	Route Options	Summary of Key Findings
Section A Proposed Gala North Substation to River Tweed	• Route Option 1	Route Option 1 is considered to provide a feasible option in which to develop an OHL route. Landform and woodland provide opportunities to integrate an OHL route into the landscape and reduce its potential effects.
	• Route Option 2a • Route Option 2b • Route Link 2b to 2a	Route Option 2b is considered slightly preferable to Route Option 2a due to the potential effects of 2a on various routeing considerations including Bowland Garden and Designed Landscape and the village of Clovenfords. Route link 2b to 2a is not considered to provide any significant benefits in routeing terms. While it would utilise part of Option 2b avoiding Bowland Garden and Designed Landscape it introduces additional crossings of the River Tweed SAC across the Caddon Water and would utilise part of 2a which impacts Clovenfords and impacts woodland.
Section B River Tweed to the A7	• Route Option 1	Route Option 1 crosses relatively steep slopes to the south of the River Teviot and routes across SLA 3 Tweed, Ettrick and Yarrow Confluences. The SLA cannot be avoided, however, there is some scope to reduce effects on it by utilising the existing forestry plantation to the north as well as landform.

Section	Route Options	Summary of Key Findings
	• Route Option 2a • Route Option 2b • Route Link 2b to 2a	Route Options 2a and 2b are broadly comparable with regard to environmental routeing considerations including crossing of local landscape designations. The main difference is that 2b is further west crossing more elevated land which makes it slightly less preferable to option 2a. Route link 2b to 2a is not considered to provide any significant benefit in routeing terms as it crosses the Yarrow within a steep section where the landscape is considered to be more sensitive to an OHL route.
	• Route Option 3a • Route Option 3b • Route Option 3c • Route Link 3c to 3b	Route Options 3a, 3b and 3c all require crossings of watercourses which are part of the River Tweed SAC and SSSI noting that 3c requires more crossings overall. In comparative terms Route Option 3a is considered to be slightly more constrained as it is narrower than Route Options 3b and 3c with greater potential to affect the setting of the scheduled monuments within it. Route Option 3a is also least preferred in terms of landscape and visual considerations as its crosses the Ettrick valley in a more sensitive location on the edge of a locally designated landscape. While 3b and 3c are comparable with both having traverse areas of peatland, Route Option 3c is slightly less preferable due to the landform crossing steep slopes with localised high points in excess of 500mAOD. The route link requires the use of Route Option 3c switching to 3b part way through it. This would enable some areas of class 3 peatland within Route Option 3c to be avoided otherwise it does not offer any significant environmental benefits with the exception of potentially reducing overall route length.
	• Route Option 4a • Route Option 4b • Route Option 4c • Route Option 4d	Route Options 4a, 4b, 4c and 4d provide alternative routes to the Teviot valley south of Hawick while Route Option 5 provides an alternative route to the north of Hawick. All of the route options involve crossing the more sensitive Teviot Valley landscape in which impacts on landscape character and visual amenity are more difficult to avoid. In broad terms Route Options 4a and 4b and then 4c and 4d are comparable to each other. This is largely due to the relative proximity of the options to each other as well as the nature of

Section	Route Options	Summary of Key Findings
	• Route Option 5 • Route Link 4d to 4c • Route Link 4c to 4b	the landform that they cross. Route options 4a and 4b are located to the east closer towards Hawick while options 4c and 4d cross less sparsely populated upland areas further to the west. Route options 4a and 4b also contain or are closer to cultural heritage or archaeology sites of the highest or high environmental value. While both 4a and 4b can avoid such sites their increased proximity increases the potential for setting effects, particularly compared to options 4c and 4d which do not contain any such sites. Options 4c and 4d provide greater scope to avoid designated sites of the highest or high environmental value but are required to cross areas of peatland. Route Options 4c and 4d are preferable on landscape and visual grounds as they are predominantly located within upland landscapes which are large scale, simple landscapes, relatively remote and with characteristics which indicate lower sensitivity to OHLs. Route Options 4a and 4b cross the Teviot Valley in a comparatively more sensitive location which makes these options less preferable in landscape and visual terms. Route Option 5 was identified to be less preferable due to landscape and visual considerations. It crosses the Teviot valley in a sensitive location due to its open character and proximity to settlements and transport routes. Route link 4c to 4b would enable OHL routes to avoid peatland within Route Option 4c, peatland would require to be crossed within the route link. Overall, there may be a slightly lower impact on peatland as the area within the route link is less than that in Route Option 4c, however, any onwards route would have to address other routeing considerations within Route Option 4b The route link requires the use of a very short section of Route Option 4d then switches to 4c. In practice it would connect OHL routes from Route Option 3c onto 4c largely avoiding 4d. Overall, it does not offer any significant environmental benefits. While it could potentially reduce the length an overall OHL route, the route link crosses an area of identified peatland which could be avoided by continuing south through Route Option 4d.

Section	Route Options	Summary of Key Findings
Section C A7 to new Teviot Substation	• Route Option 1a • Route Option 1b • Route Option 1c	Route Options 1a, 1b and 1c provide alternative routes to TEV-05 and/or TEV06 routeing across the north of the proposed Teviot Wind Farm. Route Options 1a and 1c are located to the south of Hawick while Route Option 1b is routed from the north/northeast of Hawick. While Route Option 1b requires a crossing of the River Teviot where it is part of the River Tweed SAC and SSSI and Route Options 1a and 1c do not this is because of where route options stop and start (i.e. the River Teviot is already crossed by route options within section B which connect onto 1a and 1c). As a result, ecological designations of the highest or high environmental value are not a significant differentiating factor between options. Key environmental routeing considerations relate to cultural heritage and archaeological sites of the highest or high environmental value with a number of sites within or close to Route Options 1a and 1c. While direct impacts on the sites can be avoided there is high likelihood of setting impacts due to their proximity. Route Options 1a and 1c are preferred in landscape and visual terms compared with 1b which lies partly within the locally designated landscape SLA 5 Teviot Valleys as well as adjacent landscapes which are more sensitive to the introduction of an OHL as a result of the varying scale and irregular, undulating landform. Route Options 1a and 1c are comparable with both Options exhibiting landscape characteristics which assist in accommodating OHLs and limited visual receptors other than where the Options rise out of the Teviot valley.
	• Route Option 2	Route Option 2 is required for any route connecting to substation site TEV-05. While in landscape and visual terms this Route Option is considered to be feasible with opportunities to utilise forestry to mitigate impacts, the key constraints are a requirement to cross the Catrail, a scheduled monument formed by a linear earthwork which extends across the option, as well as areas of peatland. Direct physical impacts on the scheduled monument can be avoided as it could be spanned by an OHL or and OHL could routed through the gap in the earthwork, however, there is potential to impact its setting.

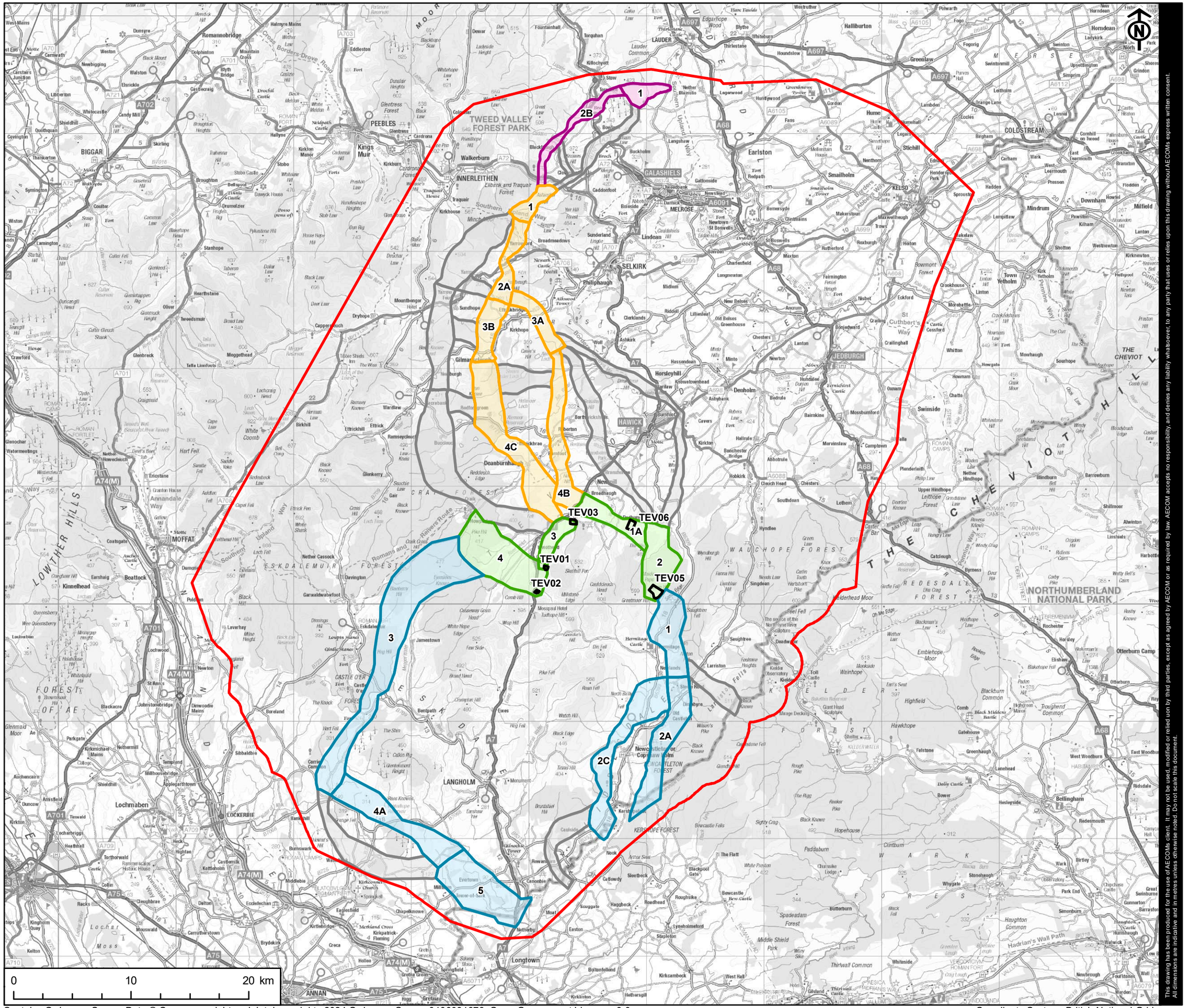
Section	Route Options	Summary of Key Findings
	• Route Option 3	Route Option 3 provides for a connection to the alternative substation sites to the west of the proposed Teviot Wind Farm (TEV-01, 02 or 03). There are a number of routeing considerations within or immediately adjacent to the route options including ecological and archaeological sites of highest or high environmental value. This includes the River Teviot, part of the River Tweed SAC and SSSI which is parallel to the Route Option 3 as well as a small number of scheduled monuments. Effects on the River Teviot are avoidable, however, with regard to the scheduled monuments there is the potential for setting effects. In landscape and visual terms Route Option 3 provides a relatively short connection to the substation options within the more open landscape context running parallel to the A7 within which the OHL would run along the plateau on top of the valley ridgeline predominantly impacting the corridor of the A7 and the receptors and settlement within it. This could create a wirescape with the existing 132kV OHL to the west of the A7 and a new OHL to the east.
	• Route Option 4	Route Option 4 has the potential to serve a number of purposes including providing a connection to and/or from the substation sites on the west of the proposed Teviot Wind Farm (TEV-01, 02 or 03). In particular, parts of Route Option 4 would be required to develop an onward OHL route on the west of the Study Area towards the Scotland-England border. There are a small number of routeing considerations within Route Option 4 including multiple crossings of watercourses which are part of the River Tweed SAC and SSSI as well as routeing across areas of peatland. While these do not necessarily preclude an OHL route they could make it less favourable when evaluating an overall route. Route Option 4 lies predominantly within a landscape containing large tracts of forestry which could accommodate an OHL although the eastern section would require crossing of steep slopes where towers would appear as prominent elements within the landscape crossing the narrow A7 corridor.
Section D New Teviot Substation	• Route Option 1	Route Option 1 is in close proximity to Hermitage Castle scheduled monument and subject to detailed OHL routeing has the potential for setting impacts. It is considered that these can be avoided/reduced by routeing to the east of the option and using landform to reduce potential

Section	Route Options	Summary of Key Findings
to Scotland-England border		intervisibility. Other notable environmental routeing considerations including crossing an area of peatland between TEV-05 and Roughley at the head of the Liddel Valley.
	• Route Option 2a • Route Option 2b • Route Option 2c • Route Option 2d	Route Options 2a, 2b and 2c provide alternative approaches to crossing the Scotland-England border on the eastern side of the Study Area. Route Options 2a and 2c are routed on the east and west side of the Liddel valley respectively with Route Option 2b crossing Larriston Fells to the northeast of the Liddel valley. Route Option2c is closer to the Langholm-Newcastleton Hills SPA and SSSI but is considered to be sufficiently far enough away that the designated site would not be affected by an OHL route. There are a small number of scheduled monuments and listed buildings within and on the margins of both options so this is not considered to be a significant differentiator. Route Option 2a is narrower where it crosses the edge of Newcastleton Forest adjacent to the proposed Liddesdale Wind Farm. In combination, the wind farm as well as the forestry (including its recreational use), are a constraint on an OHL route within Option 2a but would not prevent it. Route Option 2b would enable the shortest, most direct route across the Scotland-England border, however, it crosses into an area where the presence of designated sites including the Border Mires SAC and Kielder Mires SSSI would likely constrain onward route options and it is therefore not considered preferable. In landscape and visual terms Route Option 2b is least preferred on the basis that it crosses the steep hillside of Larriston Fell, appearing prominently within the landscape and increasing visual impact from the surrounding properties. Route Option 2a is slightly more preferable to Route Option 2c on landscape grounds due to the extensive upland forestry and larger scale landscape which is less sensitive to OHLs, however, this is tempered by the visual impact on the recreational users of the Newcastleton Forest trails. Route Option 2c comprises larger tracts of the more sensitive Upland Valley with Pastoral Floor landscape along with potential for increased visual impact from settlement in the valley and valley sides, however careful routeing using contours and landform would assist in reducing these effects.

Section	Route Options	Summary of Key Findings
		Route Option 2d is effectively an extension of 2c enabling an alternative crossing point of the Scotland-England border. In the context of the SP Energy Networks Project this only increases route length and introduces some additional routeing considerations including crossing peatland and the loss of woodland including potentially Ancient Woodland. With regards landscape and visual amenity Route Option 2d is not considered to offer any benefits over the southern extent of Route Option 2c as the former directly impacts the more sensitive enclosed, narrow valley landscape.
	• Route Option 3	Route Option 3 is required for any route located to the west of the Study Area. It extends through Eskdalemuir Forest and would potentially require a large amount of tree removal while also potentially affecting areas or sites of the highest or high environmental value. This includes a potential crossing of Worms Cleugh part of the River Tweed SAC, as well as setting impacts on scheduled impacts and listed buildings within and on the margins of the route. Route Option 3 also requires to cross a number of areas of peatland. In landscape terms the forestry provides opportunities for OHL routeing either within or on the forestry edge helping to reduce potential landscape effects. Further south Route Option 3 crosses more open terrain and altitudes begin to reduce with the landscape forming a transitional landform from the upland to lowland.
	• Route Option 4a • Route Option 4b	Route Options 4a and 4b are similar with regard to the environmental routeing considerations which are present. Both options have the potential for some setting impacts of designated cultural heritage and archaeological sites subject to detailed routeing. Both options are also required to cross peatland as well as require tree removal. Route Option 4a and 4b are also broadly comparable in landscape terms as they lie within similar lowland and transitional landscapes. However, the main difference is with regard to potential visual impacts. Route Option 4b is likely to result in an increased visual impact on a greater number of receptors and therefore on balance is less preferred compared with Option 4a which also follows a more direct alignment

Section	Route Options	Summary of Key Findings
	• Route Option 5	Route Option 5 is required for any route coming from the west of the Study Area to cross the Scotland-England border. There a small number of environmental routeing considerations present including scheduled monuments, listed buildings, woodland and peatland. There is some limited woodland in an otherwise open and largely flat landform. The smaller scale landform and pattern increases sensitivity of the landscape to an OHL but would not prevent the development of an OHL through this area.

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Potential Substation Site

Route Option Section
- A
- B
- C
- D
- Less Preferred Option

TITLE
Figure 19
Route Options Appraisal Outcomes

REFERENCE
GH_20240827_RS_19_v1

SHEET NUMBER
1 of 1

DATE
27/08/24

09.

The Preferred Option

9. The Preferred Option

9.1 Identifying an End-to-End Option

Based on the routeing and siting work in sections 6 and 8, the alternative substation sites and route options have relative advantages and disadvantages, however, in general terms two end-to-end options emerge which would enable a continuous OHL route via a new substation as illustrated in Figure 20:

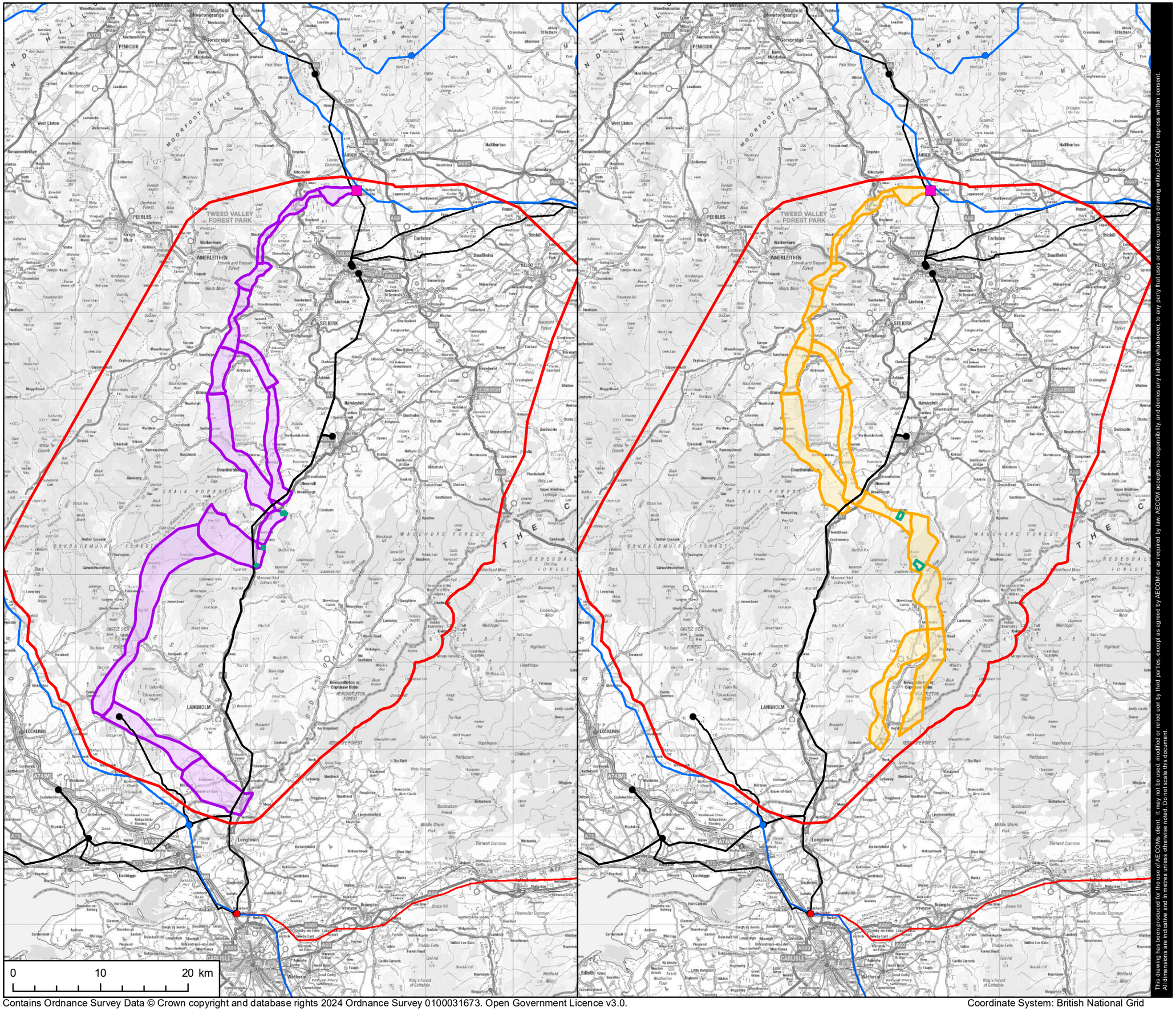
- Purple Option – An end-to-end option located entirely on the west of the Study Area. This is formed of route options on the west of the Study Area connecting to substation sites TEV-01, TEV-02 or TEV-03 to the west of the proposed Teviot Wind Farm and from here continuing to the west of the Study Area before crossing the Scotland-England border to the north of Scots Dike.
- Orange Option – An end-to-end option located partly on the west of the Study Area crossing over to the east. This is formed of route options on the west of the Study Area connecting to substation sites TEV-05 or TEV-06 to the east or north of the proposed Teviot Wind Farm and from here continuing to the east of the Study Area through the Liddel Valley crossing the Scotland-England border south of Newcastleton.

While the individual route and site options which form the Purple and Orange end-to-end options have been assessed in detail in sections 6 and 8 (and associated appendices) taking account of the routeing and siting considerations, this section considers them as a whole as part of an overall option from the proposed Gala North Substation to a new Teviot Substation and onwards to the Scotland-England border. In isolation certain route or site options may be more or less preferable, however, the identification of an overall end-to-end Preferred Option requires routeing and siting considerations to be balanced in reaching an overall preference.

Table 17 End-to-end Options based on Routeing and Siting Appraisals

Section	Purple Option (west/west)	Orange Option (west/east)
A	Route Option 1 Route Option 2b	Route Option 1 Route Option 2b
B	Route Option 1 Route Option 2a Route Option 3a or 3b Route Option 4b or 4c	Route Option 1 Route Option 2a Route Option 3a or 3b Route Option 4b or 4c
C	Route Option 3 Route Option 4	Route Option 1a Route Option 2
-	TEV-01, TEV-02 or TEV-3	TEV-05 or TEV-06
D	Route Option 3	Route Option 1 Route Option 2a or 2c

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:400,000

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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Proposed Gala North Substation Location
- Potential Substation Site
- Purple Route Option
- Orange Route Option

Existing Transmission System
- 132 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 20
Alternative End-to-end Options

REFERENCE
GH_20240821_RS_20_v1

SHEET NUMBER
1 of 1

DATE
21/08/24

9.2 Purple End-to-End Option

The Purple End-to-End Option is illustrated in Figure 20. It located entirely to the west of the Study Area and would include a new Teviot Substation to the west of the proposed Teviot Wind Farm adjacent to the A7. It includes a degree of optionality in the area between the Ettrick valley and the Teviot Valley and with regard to the new Teviot Substation (either TEV-01, TEV-02 or TEV-03 which are broadly similar). Subject to the development of a detailed route alignment it would have an overall length in the order of 100km routeing through the Scottish Borders and Dumfries and Galloway before crossing the Scotland-England border north of Scotsdike.

9.3 Orange End-to-End Option

The Orange End-to-End Option is illustrated in Figure 20. It follows the same route as the Purple Option between the proposed Gala North Substation and the Teviot valley on the west side of the Study Area, however, it routes across the north of the proposed Teviot Wind Farm to the east side of the Study Area. It could comprise a new Teviot Substation at either TEV-06 to the north of the proposed Teviot Wind Farm or at TEV-05 on the edge of commercial forestry between the Teviot and Liddesdale Windfarms before continuing along the Liddel valley to the Scotland-England border. Subject to the development of a detailed route alignment it would have an overall length in the order of 80km routeing entirely within the Scottish Borders before crossing the border at the southern end of the Liddel valley south of Newastleton.

9.4 Appraisal of the End-to End Options

Each of the route options and substation sites which make up the end-to-end options has been appraised in detail in section 8 and Appendix H, so this is not repeated here. This section considers the end-to-end options as a whole having regard to the routeing and siting objective and considerations described in chapter 5.

Given the scale of the SP Energy Networks Project there a number of competing factors which need to be carefully balanced when identifying a Preferred Option. The Purple and Orange End-to-End Options are long distance OHL routes encountering a range of environmental and technical constraints. While some of these are common where the two options follow the same route from the proposed Gala North Substation to the Teviot valley there are significant differences in relation to the potential sites for the new Teviot Substation and onwards OHL routes to the Scotland-England border.

Where the two options follow a common route, the key routeing considerations include multiple crossings of watercourse which are part the River Tweed SAC and/or SSSI, routeing within Special Landscape Areas, routeing over elevated areas with high altitudes and localised steep slopes, routeing in proximity to scheduled monuments and listed buildings with the potential for setting effects as well as crossing over long distance trails including the Southern Upland Way and Roman Reivers Road and crossing the existing 132kV route (V route) within the Teviot valley.

The Purple Option comprises potential substations on the west side of the proposed Teviot Wind Farm to the east of the A7. These sites, in particular TEV-02 and TEV-03 occupy more prominent sites on hillslopes which would be more visible from the A7 and scattered settlement and properties while TEV-01 is located slightly up a valley where effects would be more localised. Each of the substation sites have relative advantages and disadvantages meaning none are significantly preferable over the other. Onwards routeing from these substations is heavily influenced by the landform within the Teviot valley. Moving south the valley narrows with very steep slopes present which are not considered suitable for OHL routeing. This also coincides with the Langholm Regional Scenic Area. As a result, the route passes to the north of the proposed Faw Side Wind Farm (refused on appeal) taking a less direct route through parts of the Eskdalemuir Castle O'er Forests crossing more elevated land as well as areas of peatland. There are a number of scheduled monuments within and on the margins of the Purple Option with the potential for setting effects particularly in the section around the River Esk. From here the Purple Option begins to cross lower lying and comparatively more settled land with higher potential for impacts.

The Orange Option comprises potential substations on the north and east of the proposed Teviot Wind Farm (TEV-06 and TEV-05 respectively). TEV-06 is considered to be a more constrained site with limited access and high potential to affect the setting of a number of scheduled monuments. TEV-05 is considered to be a preferable site avoiding areas of highest or high environmental value on a site on the margins of commercial forestry. It is located between the proposed Teviot Wind Farm (to the west) and proposed Liddesdale Wind Farm (to the east) providing some benefits in terms of connections to the substation when compared to other site options. However, a key siting consideration at TEV-05 that would require to be addressed through more detailed design is the presence of peatland. These substation sites require the route to extend eastwards of the Teviot valley to the north of the proposed wind farm. This requires routeing through an area with a number of scheduled monuments present including the Catrail which could require to be crossed by a route connecting to TEV-05. As result this section of the Orange Option is likely to have some unavoidable setting effects. Routeing south of TEV-05 the Orange Option provides for two alternative options to the border either side of the Liddel valley more closely following landform. Both options are considered technically feasible but on balance there is slight preference in technical terms to route on the western side of the valley to avoid routeing within Newcastleton Forest and crossing the border where steep slopes are present. There is the potential for impacts on settlement and scattered properties along the valley, however, these can be reduced by using the valley side slopes and/or forestry to backcloth an OHL and reduce impacts.

On balance the Orange Option is considered to be preferred overall. It is technically feasible and economically viable and reduces or has opportunities to reduce disturbance to the environment of the Study Area and the people who live, work and enjoy recreation within it. In particular TEV-05 is considered to be a less impacting site for the new Teviot Substation compared to the others which would form part of the Purple Option. It also enables a more direct and shorter route overall (in the order of 80km compared to 100km). While there are constraints on the Orange Route, in particular scheduled monuments to the north of TEV-05 including one which require to be spanned, there are similar constraints present on the

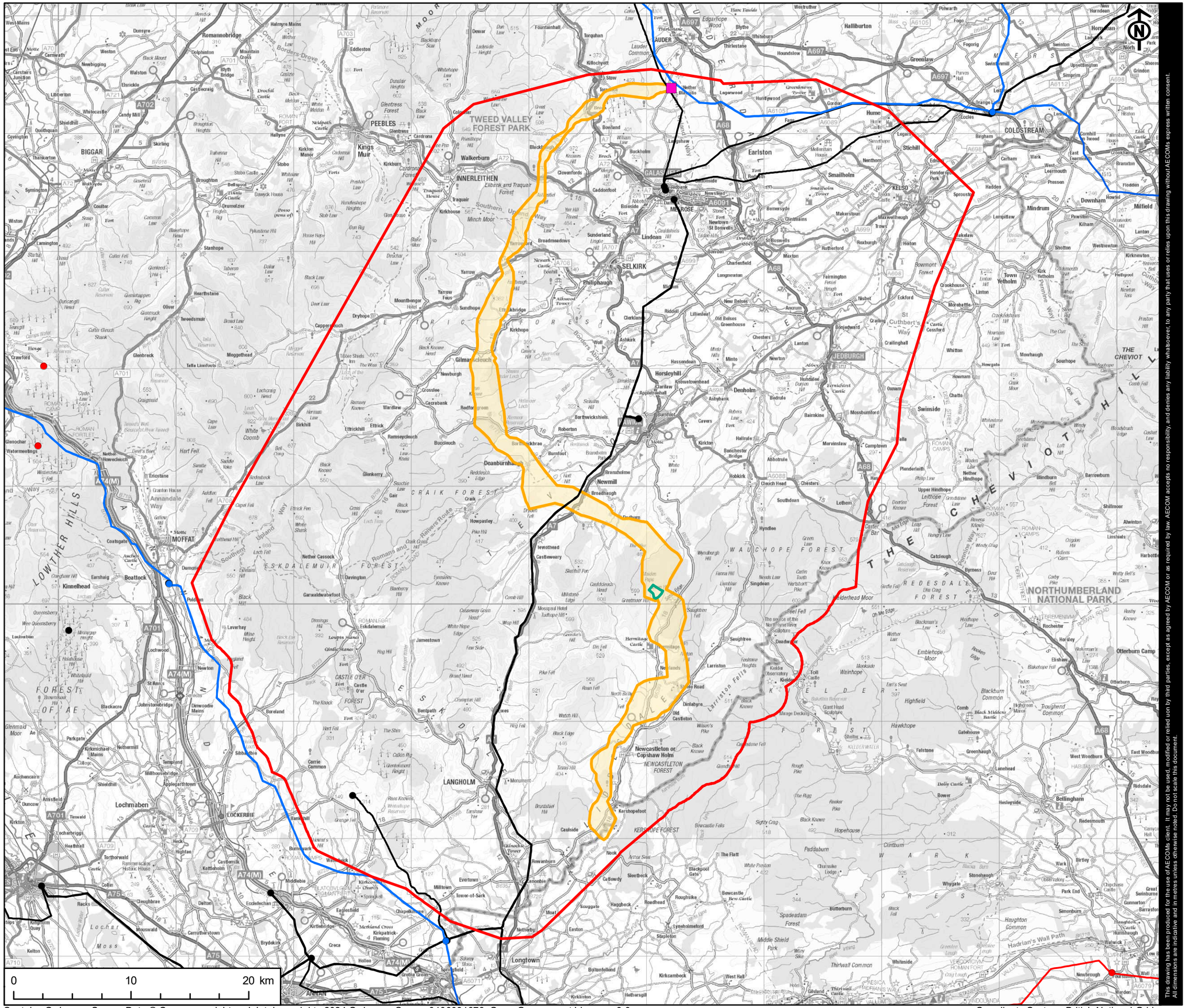
Purple Option including scheduled monuments, settlement and scattered properties which could also be adversely affected.

9.5 The Preferred Option

The Preferred Option is illustrated in Figure 21. It is based on the Orange End-to-End Option and is comprised of the following route options:

- Section A Proposed Gala North Substation to River Tweed
  - Route Option 1
  - Route Option 2b
- Section B River Tweed to the A7
  - Route Option 1
  - Route Option 2a
  - Route Option 3b
  - Route Option 4c
- Section C A7 to new Teviot Substation
  - Route Option 1a
  - Route Option 2
  - TEV-05
- Section D New Teviot Substation to Scotland-England border
  - Route Option 1
  - Route Option 2c

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:300,000

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Proposed Gala North Substation Location
- Preferred Substation Site
- Preferred Route Option

Existing Transmission System
- 132 kV Substation
- 275 kV Substation
- 400 kV Substation
- 132kV OHL
- 400kV OHL

TITLE
Figure 21
Preferred Option

REFERENCE
GH_20240821_RS_21_v1

SHEET NUMBER
1 of 1

DATE
21/08/24

10. Consultation and Next Steps

10. Consultation and Next Steps

10.1 Consultation on the SP Energy Networks Project

As set out in section 1 of this document, SP Energy Networks will be required to apply to Scottish Ministers for consent under section 37 of the Electricity Act 1989 for consent for the components of the SP Energy Networks Project. At the same time, SP Energy Networks will also apply for deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997.

While there are no formal pre-application requirements for consultation in seeking section 37 consent and deemed planning permission, SP Energy Networks is embracing best practice as promoted by Scottish Government Energy Consents Unit (ECU) which encourages applicants to engage with stakeholders and the public in order to develop their proposals in advance of such applications being made. Prior to the submission of the consent application, SP Energy Networks will carry out two rounds of consultation with stakeholders and the public:

- Phase One Consultation: Public consultation on the results of the routeing and siting study, in particular the preferred option, as detailed in section 9 of this document.
- Phase Two Consultation: Public consultation on a more detailed route design including OHL and substation design anticipated to be in 2026.

Note that consultation on the components of the NGET Project (the section of the Cross Border Connection in England) will be undertaken by NGET in due course.

10.2 Approach to and Objective of Phase 1 Consultation

SP Energy Networks attaches great importance to the effect that its works may have on the environment and local communities and is very keen to hear the views of local people to help it inform the development of the SP Energy Networks Project in the most effective way.

The overall objective of the consultation process is to ensure that all parties with an interest in the SP Energy Networks Project have access to accurate and up to date information and are provided with the opportunity to inform SP Energy Networks' proposals during the pre-application stage. In addition, it is intended that the key issues identified through this process can be recorded and presented to decision makers to assist the planning process.

SP Energy Networks has taken steps to identify stakeholders and interested parties prior to this Phase 1 Consultation and is committed to continuing engagement with all stakeholders and communities both during and outside consultation periods.

10.3 Consultees

To ensure that all residents and other stakeholders potentially affected by the SP Energy Networks Project are consulted, SP Energy Networks has defined a consultation zone which includes all residential and business addresses within 5km of the Preferred Option within Scotland. However, any member of the public (whether living within or outside the

includes all residential and business addresses within 5km of the Preferred Option within Scotland. However, any member of the public (whether living within or outside the consultation zone) is welcome to participate in the consultation and comment using one of the channels outlined within this document.

The consultation will include the following broad groups:

- Statutory and non-statutory consultees, including community councils;
- Elected members of whose constituencies are within the consultation zone;
- Homes and businesses within the consultation zone;
- Known local interest and community groups within the consultation zone; and
- The public in general.

10.4 Phase 1 Consultation Launch and Duration

Phase 1 Consultation will run from 23 September 2024 to 28 October 2024. Prior to the consultation, an advert will appear in the local weekly newspaper at least seven days before the first exhibition. The consultation will be posted out to homes, businesses, and known local interest and community groups within the local area, making them aware of the start of the Phase1 Consultation and inviting them to take part.

10.5 Sources of Information about the Consultation

In addition to this document, a project booklet has been prepared which provides a summary of the SP Energy Networks Project and how to participate in Phase 1 Consultation. A project website (www.spenergynetworks.co.uk/pages/cross_border_connection.aspx) has also been set up which provides information about the SP Energy Networks Project and hosts a library of publicly available documents for viewing and/or downloading.

10.6 Providing feedback

There will be several ways for people to make comments:

- By completing a feedback form online at www.spenergynetworks.co.uk/pages/cross_border_connection.aspx
- By completing a feedback form at one of the in-person events
- By email to info@crossborderconnection.co.uk
- By freepost returning the feedback form sent out with the SP Energy Networks Project booklet to homes and businesses in the consultation zone

In-person events

SP Energy Networks will hold twelve in-person drop-in events which will be attended by members of the project team who will be available to answer questions about the SP Energy Networks Project. Feedback can be provided in-person by completing a feedback form at the event:

Table 18 In-person Events

Date	Venue
24 September 2024	Traquair Village Hall (10am-1pm)
24 September 2024	Walkerburn Village Hall (3-7pm)
25 September 2024	Newcastleton Village Hall (3-7pm)
26 September 2024	Hermitage Village Hall (10am-1pm)
30 September 2024	Lauder Public Hall (10am-1pm)
30 September 2024	Stow Town Hall (3-7pm)
1 October 2024	Teviothead Village Hall (10am-1pm)
1 October 2024	Forman Memorial Hall (3-7pm)
3 October 2024	Kirkhope Parish Hall (10am-1pm)
3 October 2024	Yarrow Hall (3-7pm)
7 October 2024	Hawick Town Hall (10am-1pm)
7 October 2024	Caddonfoot Village Hall (3-7pm)

10.7 Responding to Feedback

The responses received to the Phase 1 Consultation will be evaluated by SP Energy Networks and published in the form of a Consultation Feedback Report. Although SP Energy Networks may not be able to respond to all individual comments, people will be able to request to be kept informed by email as and when there are developments in the SP Energy Networks Project, including the availability of the Consultation Feedback Report and confirmation of the Proposed Option.

Appendices

List of Appendices

Appendix	Details
A	The Holford Rules
B	The Horlock Rules
C	Study Area Constraints Plans
D	Landscape Character Analysis
E	Routeing and Siting Considerations
F	New Teviot Substation Siting Appraisal
G	Strategic Route Corridors Appraisal
H	Route Options Appraisal

Appendix A The Holford Rules

Rule 1

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

Note on Rule 1

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

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

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

Special Area of Conservation (SAC)

Special Protection Area (SPA

Ramsar Site

National Scenic Areas (NSA)

National Parks

National Nature Reserves (NNR)

Protected Coastal Zone Designations

Sites of Special Scientific Interest (SSSI)

Schedule of Ancient Monuments

Listed Buildings

Conservation Areas

World Heritage Sites

Historic Gardens and Designed Landscapes

Rule 2

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

Note on Rule 2

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

Impacts on the setting of historic buildings and other cultural heritage features should be minimised.

If there is an existing transmission line through an area of high amenity value and the surrounding land uses.

Rule 3

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

Note on Rule 3

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

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

Rule 4

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

Rule 5

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

Notes on Rules 4 and 5

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

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

Where possible follow open space and run alongside, not through woodland or commercial forestry, and consider opportunities for skirting edges of copses and woods. Where there is no reasonable alternative to cutting through woodland or commercial forestry, the Forestry Commission Guidelines should be followed (Forest Landscape Design Guidelines, second

edition, The Forestry Commission 1994 and Forest Design Planning – A Guide to Good Practice, Simon Bell/The Forest Authority 1998).

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

Rule 6

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

Note on Rule 6

In all locations minimise confusing appearance.

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

Rule 7

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

Note on Rule 7

When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development.

Alignments should be chosen after consideration of impacts on the amenity of existing development and on proposals for new development.

When siting substations take account of the impacts of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation.

Supplementary Notes

a. Residential Areas: Avoid routeing close to residential areas as far as possible on grounds of general amenity.

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

c. Alternative Lattice Steel Tower Designs: In addition to adopting appropriate routeing, evaluate where appropriate the use of alternative lattice steel tower designs available where these would be advantageous visually, and where the extra cost can be justified.

[Note: SHETL have reviewed the visual and landscape arguments for the use of lattice steel towers in Scotland and summarised these in a document entitled Overhead Transmission Line Tower Study 2004].

Further Notes on Clarification to The Holford Rules

Line Routeing and People

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

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

b. In rural areas avoid as far as possible dominating isolated house, farms or other small-scale settlements.

c. Minimise the visual effect perceived by users of roads, and public rights of way, paying particular attention to the effects of recreational, tourist and other well used routes.

Supplementary Notes on the Siting of Substations

a. Respect areas of high amenity value (see Rule 1) and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area.

b. Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas.

c. Use space effectively to limit the area required for development, minimizing the effects on existing land use and rights of way.

d. Alternative designs of substations may also be considered, e.g. ‘enclosed’, rather than ‘open’, where additional cost can be justified.

e. Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints.

f. When siting substations take account of the effects of line connections that will need to be made.

Appendix B The Horlock Rules

Overall System Options and Site Selection

1. In the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum.

Amenity, Cultural or Scientific Value of Sites

2. The siting of new NGC substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.

Notes:

i. Internationally and nationally designated areas of highest amenity, cultural or scientific value are:
   - National Parks
   - Areas of Outstanding Natural Beauty
   - Heritage Coasts
   - World Heritage Sites
   - Ramsar Sites
   - Sites of Special Scientific Interest
   - National Nature Reserves
   - Special Protection Areas
   - Special Areas of Conservation

ii. Care should be taken in relation to all historic sites with statutory protection e.g. Ancient Monuments, Battlefields and Listed Buildings.

iii. Account should be taken of Government Planning Policy Guidance and established codes of practice.

iv. Account should be taken of any development plan policies relevant to the siting or design of substations.

3. Areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable.

Local Context, Land Use and Site Planning

4. The siting of substations, extensions and associated proposals should take advantage of the screening provided by landform and existing features and the potential use of site

layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.

Notes:

i. A preliminary study should be undertaken to identify the extent of land required to meet both operational and environmental needs.
ii. In some instances it may be possible to site a substation partially or fully enclosed by existing woodlands.
iii. Topographical information should be obtained at an early stage. In some cases a geotechnical survey may be required.

5. The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum.

Notes:

i. Allow sufficient space for screening of views by mounding or planting.
ii. Consider appropriate noise attenuation measures where necessary.
iii. Use security measures which minimise visual intrusion from lighting.
iv. Consider appropriate on-site water pollution prevention measures.
v. Consider adjoining uses and the amenity of local inhabitants.

6. The land use effects of the proposal should be considered when planning the siting of substations or extensions.

Notes:

i. Issues for consideration include potential sterilisation of nationally important land, e.g. Grade 1 agricultural land and sites of nationally scarce minerals.
ii. Effects on land drainage.

Design

7. In the design of new substations or line entries, early consideration should be given to the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.

Notes:

i. With outdoor equipment, a preference should be given normally to a low profile design with low height structures and silhouettes appropriate to the background.
ii. Use lightweight narrow section materials for taller structures especially for gantries over about 6 metres in height.
iii. Commission exterior design and colours appropriate to the surroundings.

iv. Materials and colours for buildings, equipment and fencing should be chosen to harmonise with local surroundings.
v. v. Where possible avoid the use of prominent insulators by consideration of available colours appropriate to the background.
vi. Where possible site buildings to act as visual screens for switchgear.
vii. Ensure that the design of high voltage and low voltage substations is co-ordinated by early consultation between NGC and its customers.
viii. Where there are particular technical or environmental constraints, it may be appropriate to consider the use of Gas Insulated Switchgear (GIS) equipment which occupies less space and is usually enclosed within a building.
ix. Early consideration should be given to the routeing of utility service connections.

8. Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.

Notes:

i. Assess the benefit of removing redundant substation equipment from existing sites where this would improve their appearance.

9. The design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings.

Line Entries

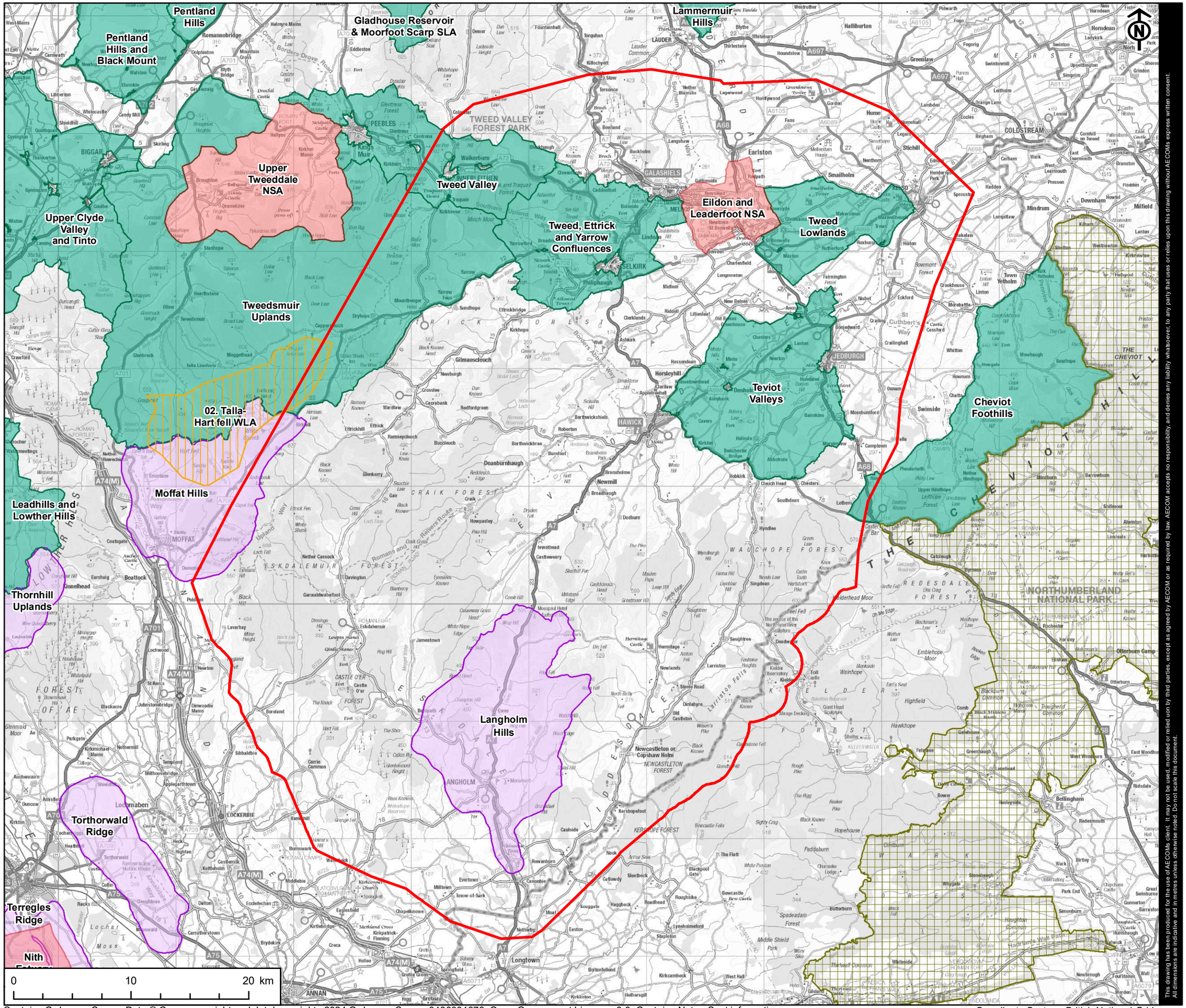
10. In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.

11. The inter-relationship between towers and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.

Appendix C Study Area Constraints Plans

Figure	Title
C.1	Landscape Designations
C.2	Landscape Character Types
C.3	Ecology and Ornithology Designations
C.4	Cultural Heritage and Archaeology Designations
C.5	Settlement and Property
C.6	Woodland and Forestry
C.7	Geological Designations
C.8	Tourism and Recreational Interests
C.9	Carbon-rich soils and Peatlands
C.10	Land capability for Agriculture
C.11	Topography
C.12	Existing Transmission System
C.13	Wind Farms
C.14	Military Interests

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- National Park
- Wild Land Area (WLA)
- National Scenic Area (NSA)
- Special Landscape Area
- Regional Scenic Area

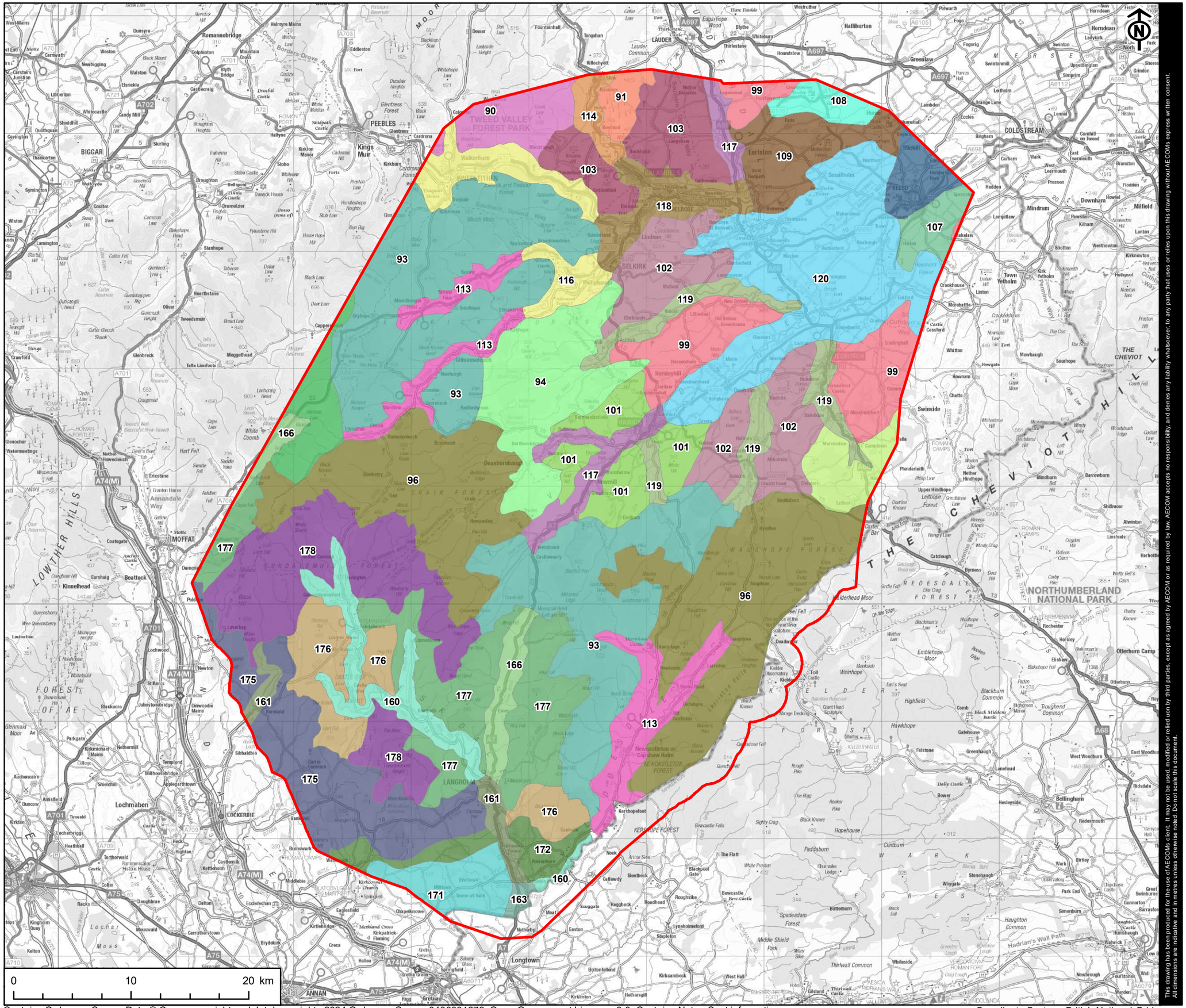
TITLE
Figure C1
Landscape Designations

REFERENCE
GH_20240821_RS_C1_v2

SHEET NUMBER
1 of 1

DATE
21/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Scale @ A3 1:300,000

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

Study Area

Landscape Character Type

- 90, Dissected Plateau Moorland
- 91, Plateau Grassland - Borders
- 93, Southern Uplands with Scattered Forest - Borders
- 94, Rolling Moorland
- 95, Southern Uplands - Borders
- 96, Southern Uplands with Forest - Borders
- 98, Rolling Foothills
- 99, Rolling Farmland - Borders
- 101, Rocky Upland Fringe
- 102, Upland Fringe with Prominent Hills
- 103, Undulating Upland Fringe
- 106, Lowland with Drumlins
- 107, Rolling Lowland Margin
- 108, Lowland Margin
- 109, Lowland Margin with Hills
- 113, Upland Valley with Pastoral Floor
- 114, Pastoral Upland Valley
- 116, Upland Valley with Woodland
- 117, Pastoral Upland Fringe Valley
- 118, Settled Upland Fringe Valley
- 119, Wooded Upland Fringe Valley
- 120, Lowland Valley with Farmland
- 158, Coastal Flats - Dumfries & Galloway
- 160, Narrow Wooded River Valley - Dumfries & Galloway
- 161, Pastoral Valley - Dumfries & Galloway
- 163, Middle Dale - Dumfries & Galloway
- 166, Upland Glens - Dumfries & Galloway
- 171, Flow Plateau
- 172, Upland Fringe - Dumfries & Galloway
- 175, Foothills - Dumfries & Galloway
- 176, Foothills with Forest - Dumfries & Galloway
- 177, Southern Uplands - Dumfries & Galloway
- 178, Southern Uplands with Forest - Dumfries & Galloway

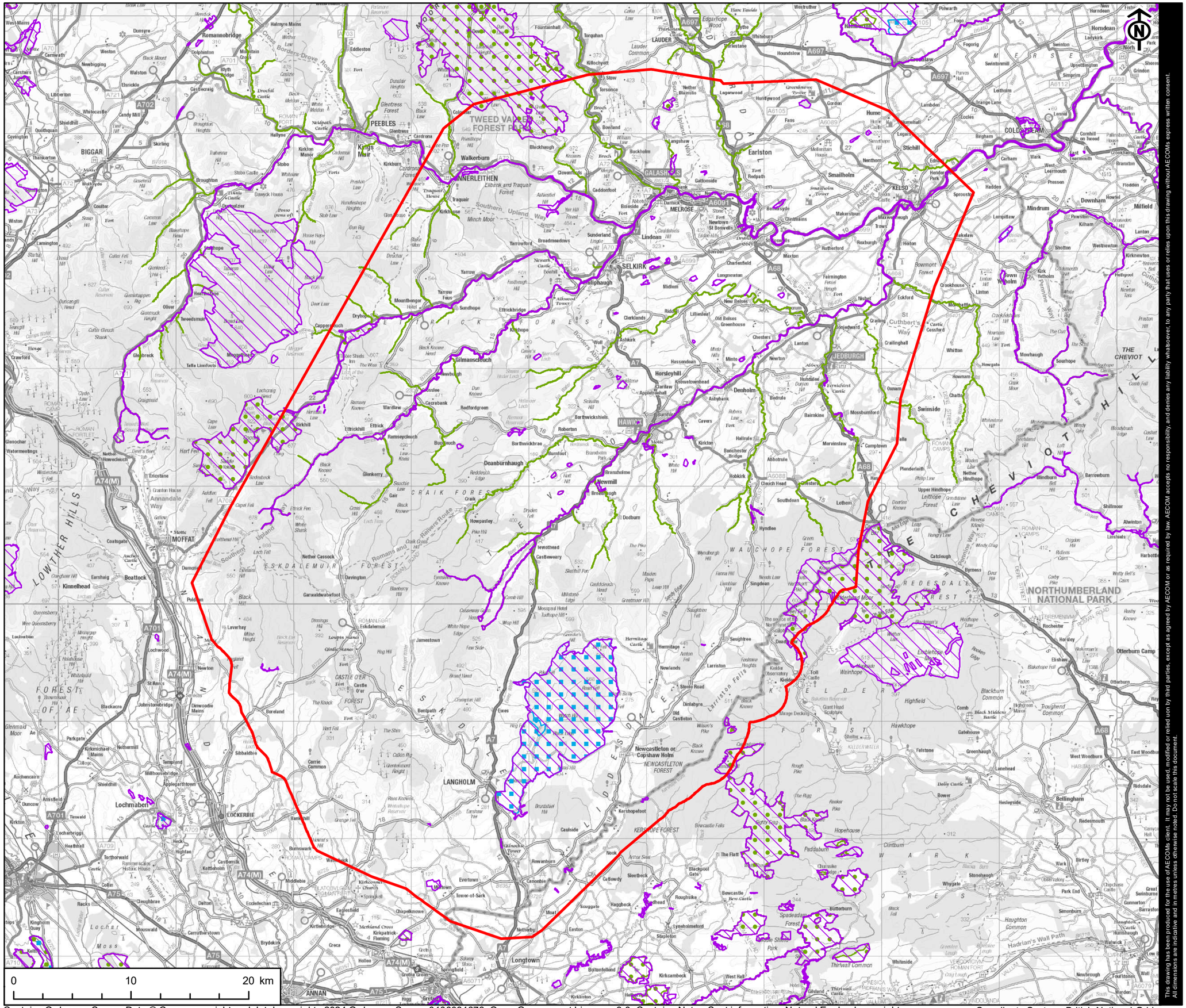
TITLE
Figure C2
Landscape Character Types

REFERENCE
GH_20240821_RS_C3_v1

SHEET NUMBER
1 of 1

DATE
21/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

🟥	Study Area
▨	Special Protection Area (SPA)
●	Special Area of Conservation (SAC)
▨	Site of Special Scientific Interest (SSSI)

TITLE
Figure C3
Ecology and Ornithology Designations

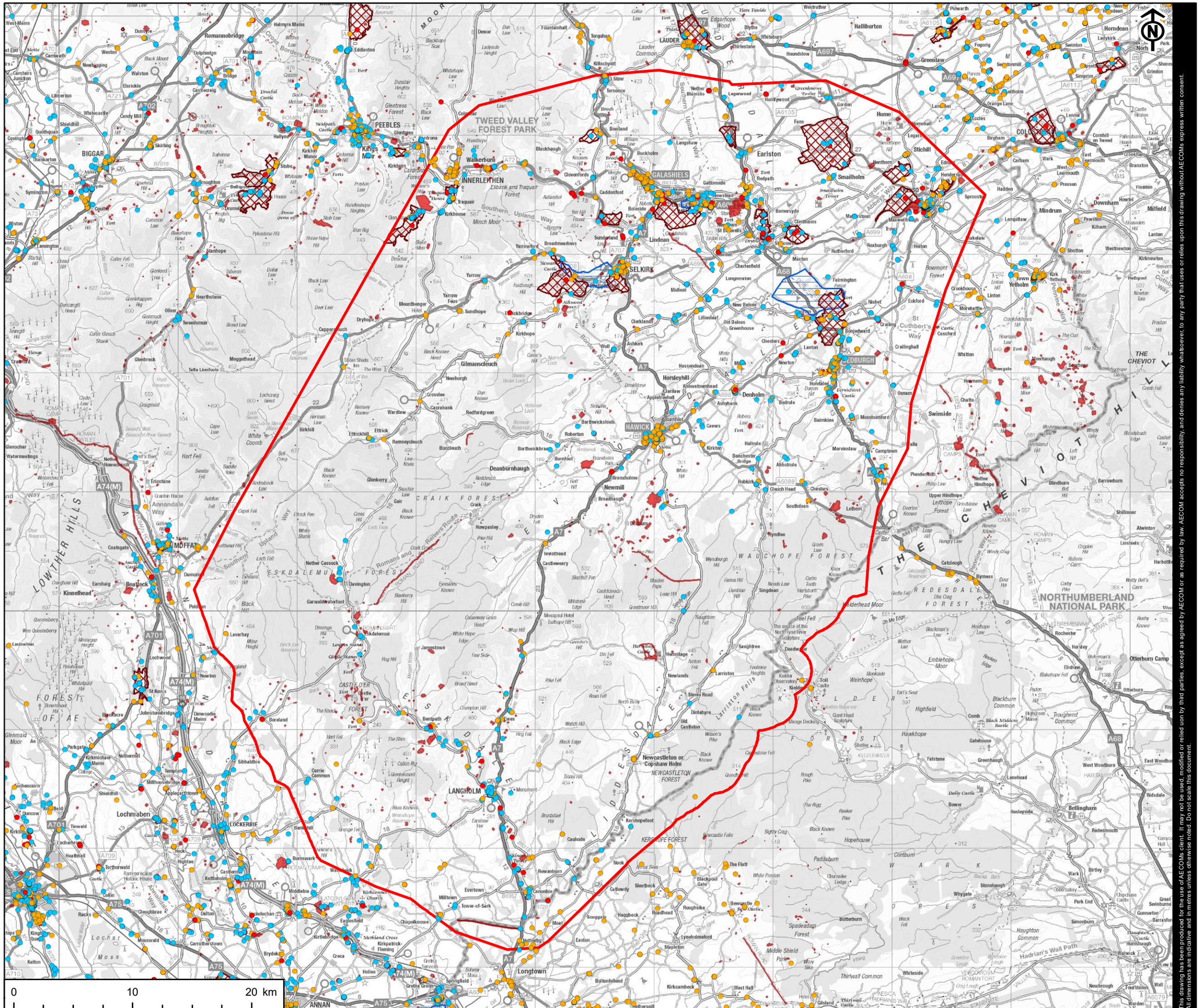
REFERENCE
GH_20240821_RS_C3_v2

SHEET NUMBER
1 of 1

DATE
21/08/24

Coordinate System: British National Grid

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

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PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- ▭ Study Area
- ● Category A / Grade I Listed Building
- ● Category B / Grade II* Listed
- ● Category C / Grade II Listed
- ■ Scheduled Monument
- ▨ Garden and Designed Landscape
- ▭ Inventory Battlefield

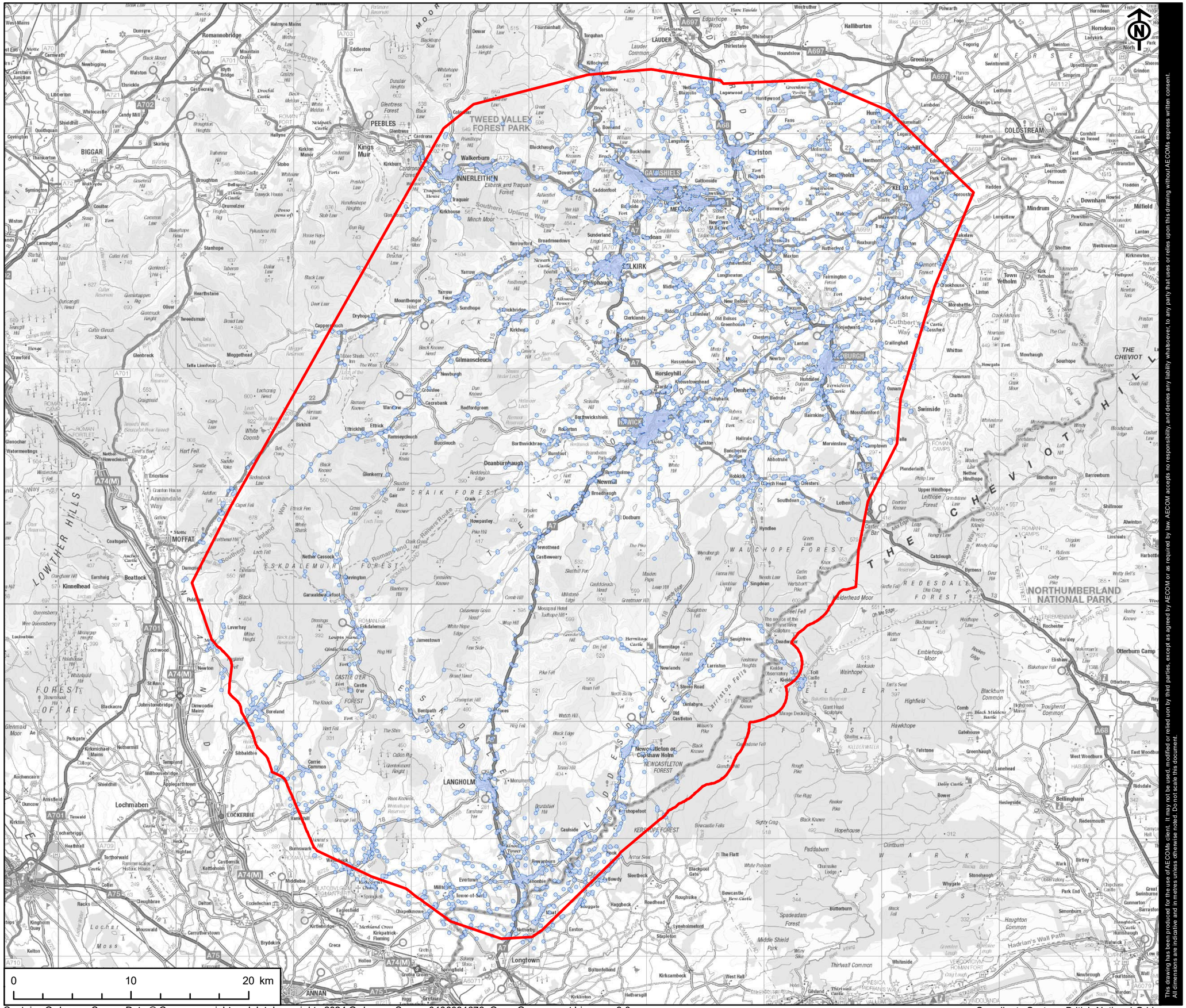
TITLE
Figure C4
Cultural Heritage and Archaeology Designations

REFERENCE
GH_20240821_RS_C4_v2

SHEET NUMBER
1 of 1

DATE
21/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
🟥 Study Area
🟦 Residential Location - 150m Buffer

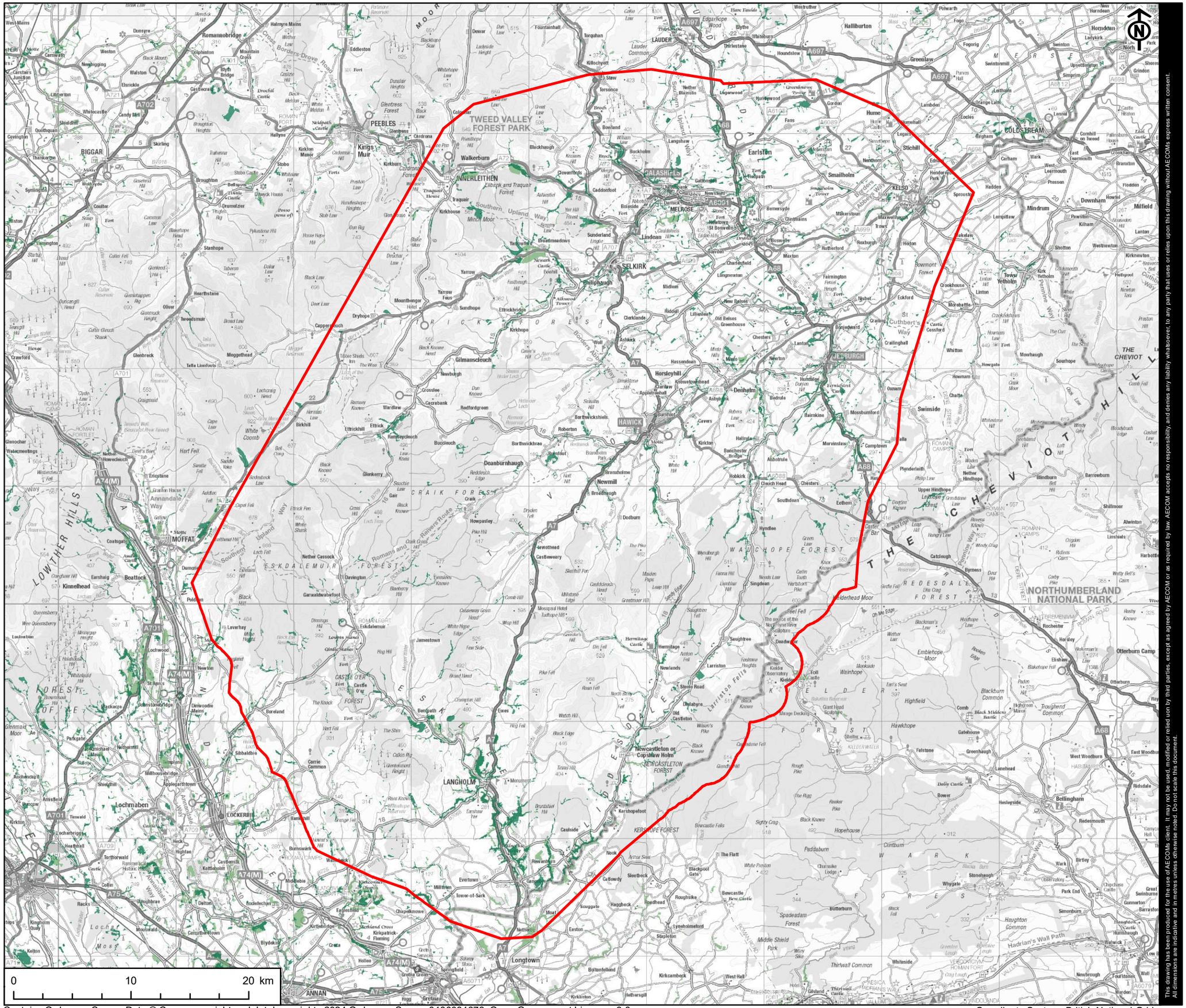
TITLE
Figure C5
Settlement

REFERENCE
GH_20240903_RS_C5_v1

SHEET NUMBER 1 of 1

DATE 03/09/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

🟥	Study Area
🟩	Ancient Woodland Inventory Site
🟩	Woodland identified in the Native Woodland Survey of Scotland

TITLE
Figure C6
Woodland and Forestry

REFERENCE
GH_20240822_RS_C6_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR

Carstairs Kames
River Clyde Meanders
Tinto Hills
Moffat Hills
Greenlaw Moor
Lintmill Railway Cutting
Lennel, Charley's Brae
Hareheugh Craigs
Din Moss - Hoselaw Loch
Grieston Quarry
Thornylee Quarry
Whitlaw Mosses
Palmers Hill Railway Cutting
Langholm - Newcastleton Hills
Kershope Bridge
Newcastleton or Copshaw Holm
Bigholms Burn
River Esk, Glencartholm
Penton Linns
Locharbriggs Quarry
Upper Solway Flats and Marshes

TWEED VALLEY FOREST PARK
NORTHUMBERLAND NATIONAL PARK

Scale @ A3 1:300,000

0 10 20 km

Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Site of Special Scientific Interest (SSSI)
  - Geological
  - Mixed

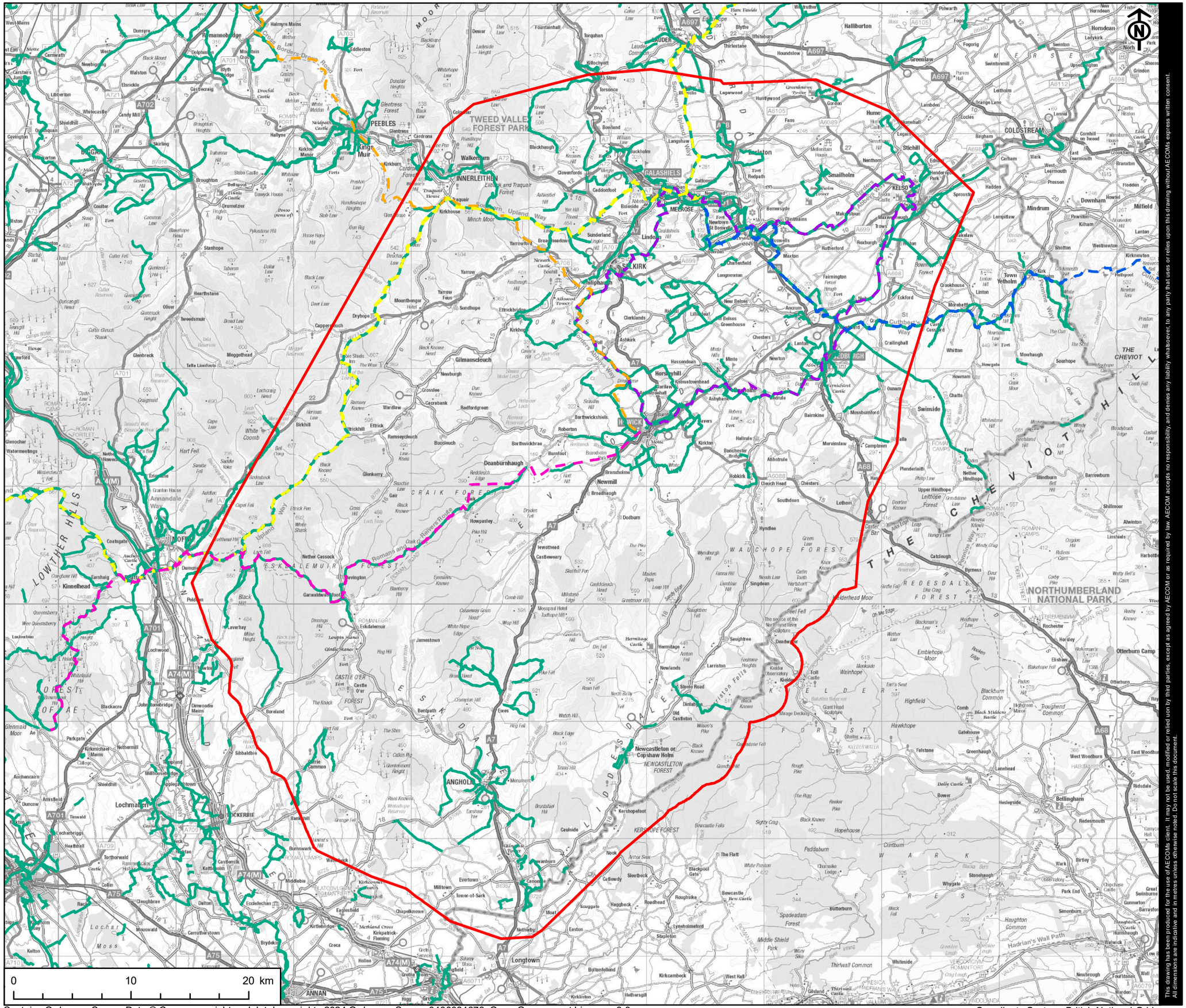
TITLE
Figure C7
Geological Designations

REFERENCE
GH_20240822_RS_C7_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
- Study Area
- Core Path

Long Distance Trail
- Borders Abbey
- Cross Borders Drove Road
- Roman and Reivers Way
- Southern Upland Way
- St Cuthberts Way

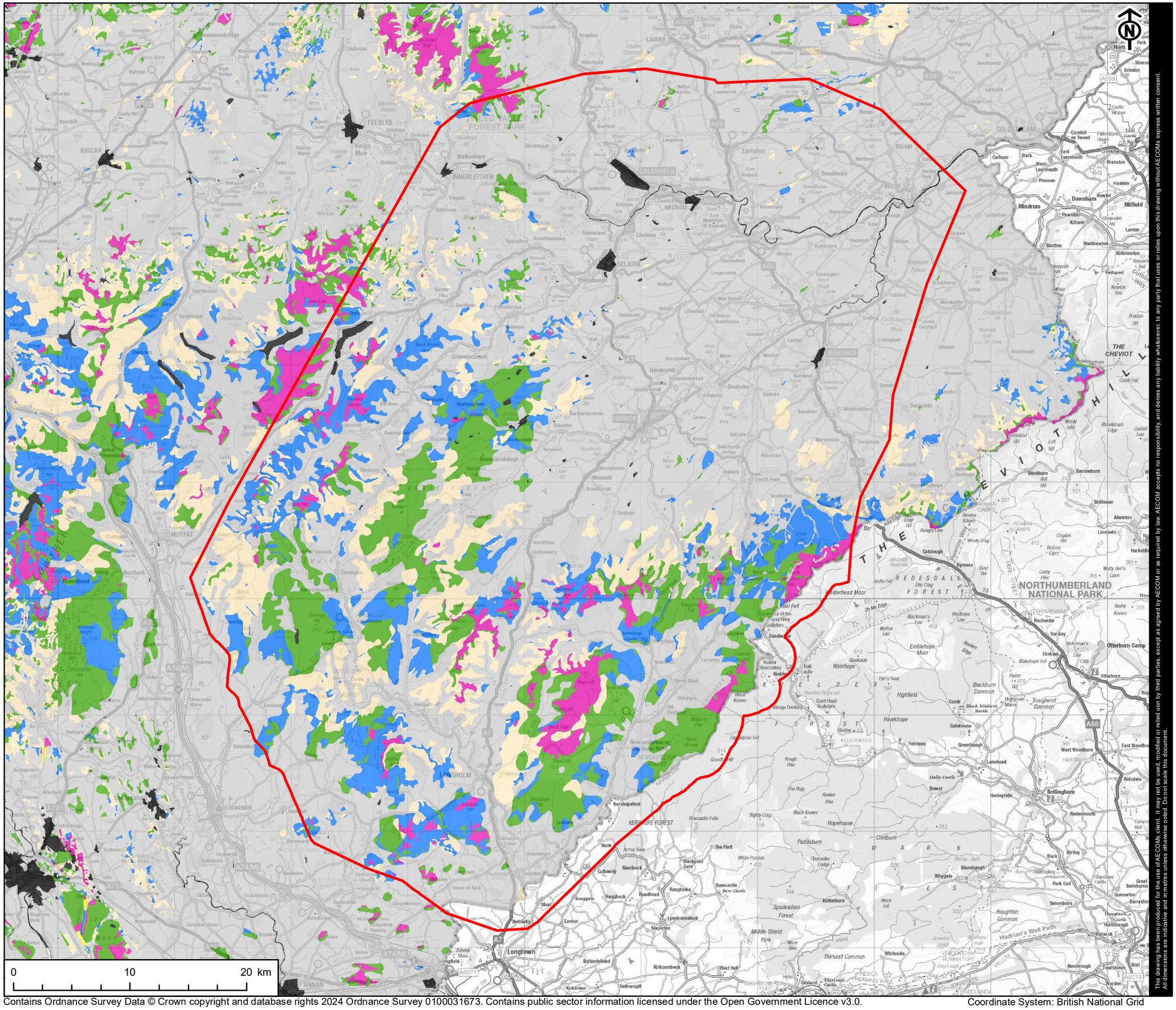
TITLE
Figure C8
Tourism and Recreational Interests

REFERENCE
GH_20240827_RS_C8_v2

SHEET NUMBER
1 of 1

DATE
27/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

Study

Carbon and Peatland 2016

- Non-soil
- Mineral soil
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

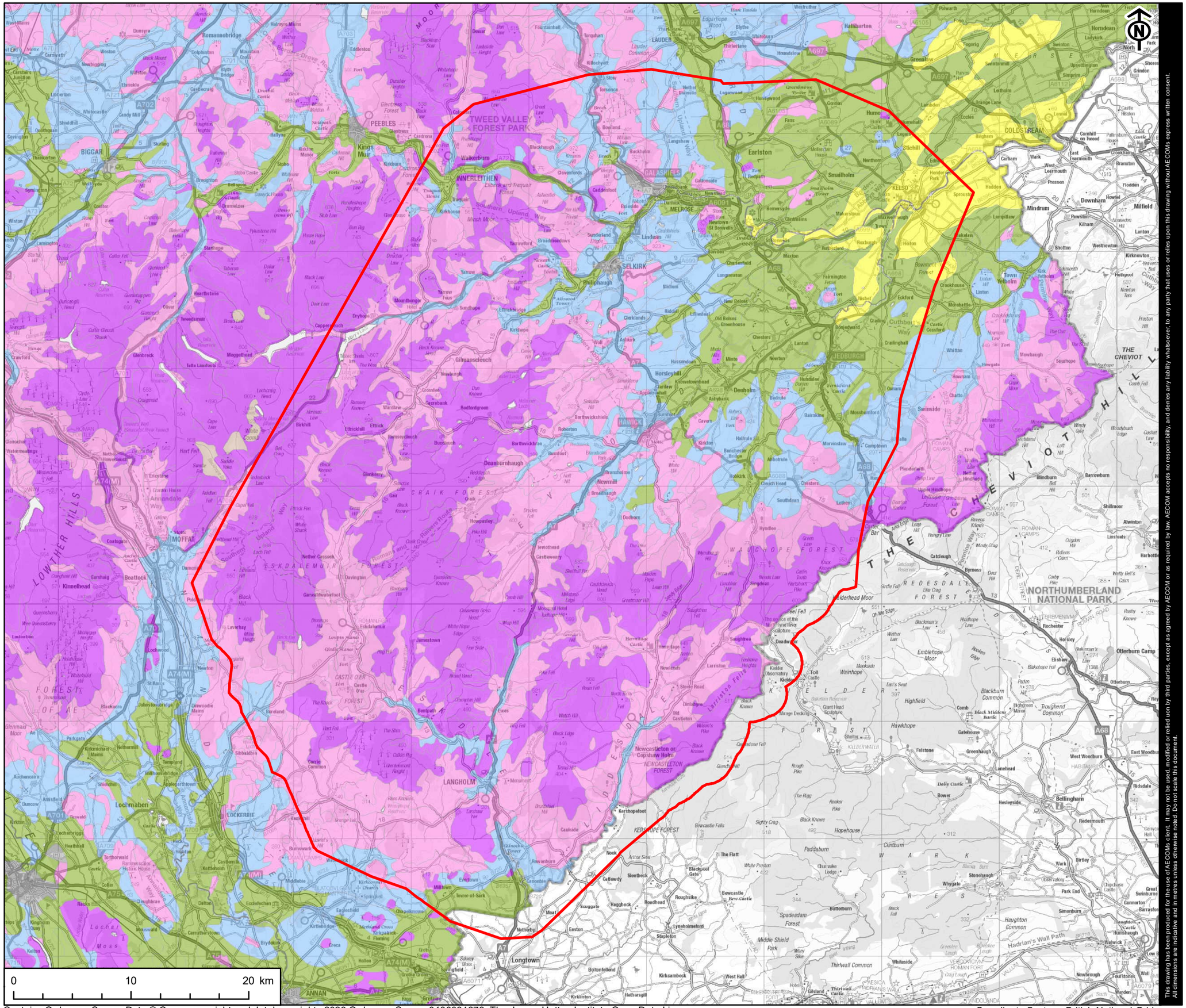
TITLE
Figure C9
Carbon-rich soils and Peatlands

REFERENCE
GH_20240822_RS_C9_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY

Study Area

National Scale Land Capability for Agriculture

- Class 2 - Land capable of producing a wide range of crops with yields less high than Class 1
- Class 3 - Land capable of producing good yields from a moderate range of crops
- Class 4 - Land capable of producing a narrow range of crops
- Class 5 - Land suited only to improved grassland and rough grazing
- Class 6 - Land capable only of use as rough grazing
- Class 7 - Land of very limited agricultural value
- Urban

TITLE
Figure C10
Land Capability for Agriculture

REFERENCE
GH_20240822_RS_C10_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

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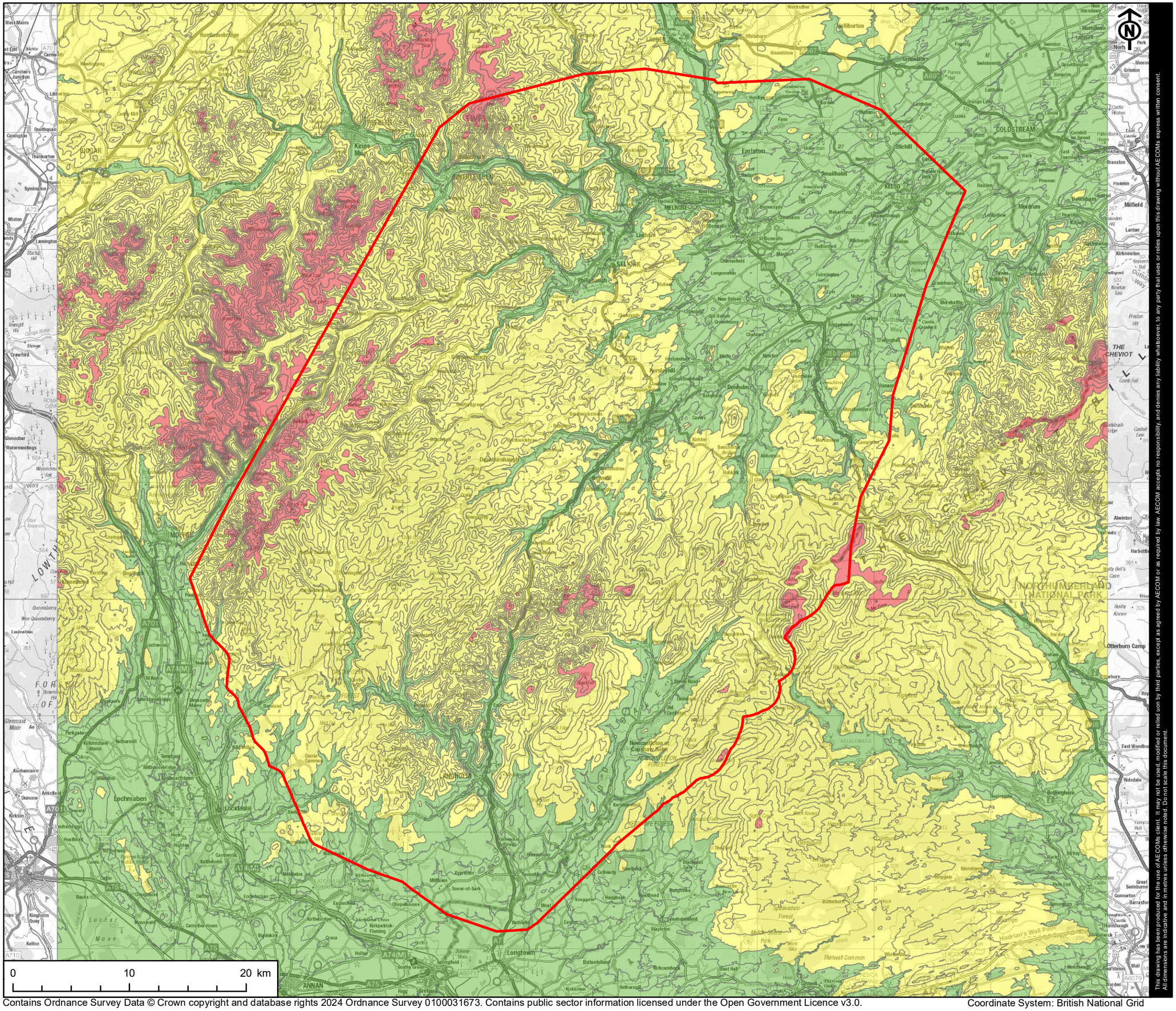

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AECOM

PROJECT

Cross Border Connection -
Gala North Substation to Border

CLIENT

SP Energy Networks

KEY

🟥 Study Area

— 50m Contour (OS Terrain 50)

Elevation - m (OS Terrain 50)

🟩 0 - 200

🟨 200 - 500

🟥 500+

TITLE

Figure C11
Topography

REFERENCE

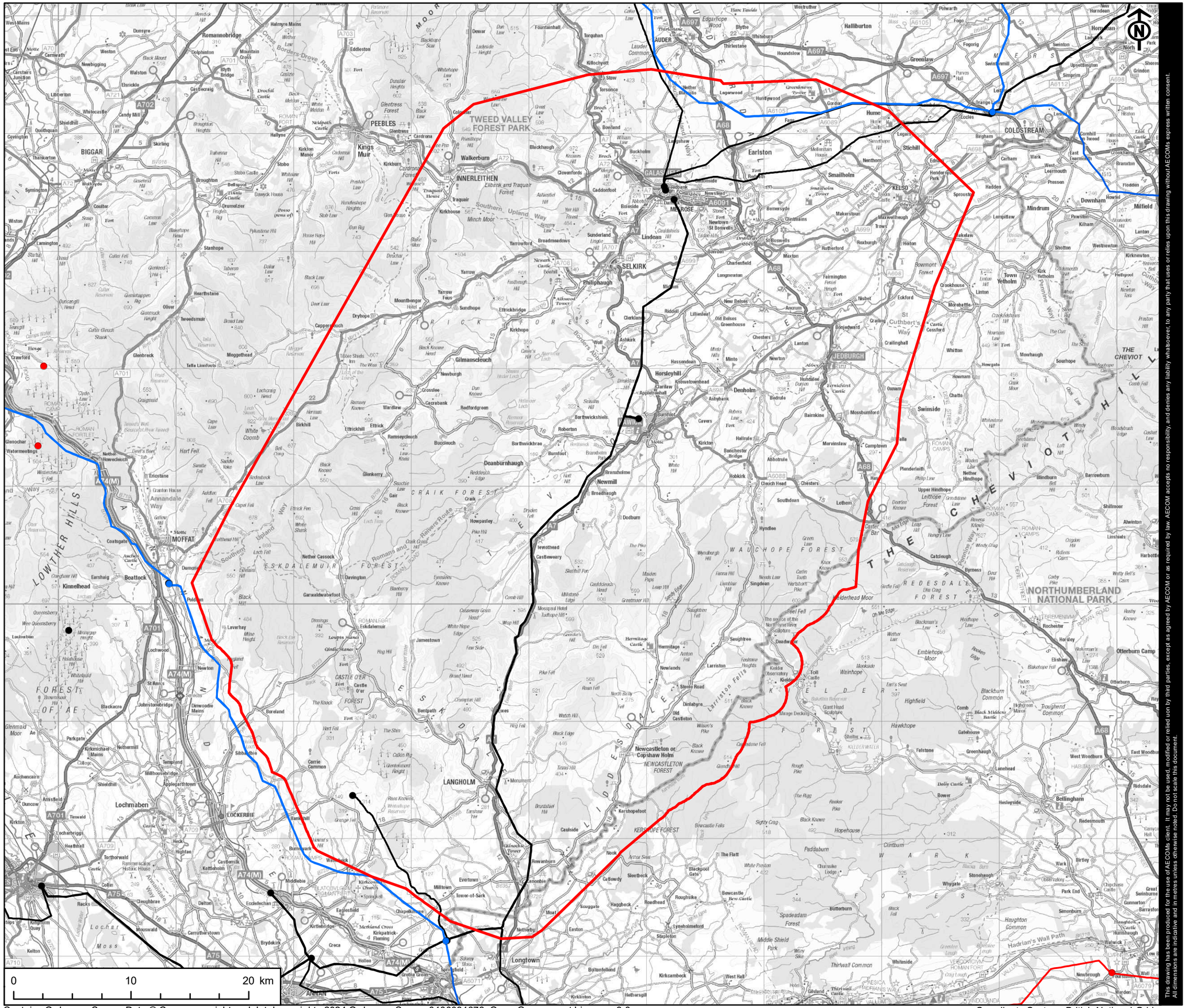
GH_20240822_RS_C11_v2

SHEET NUMBER 1 of 1

DATE 22/08/24

Coordinate System: British National Grid

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
▭ Study
Existing Transmission
● 132 kV Substation
● 275 kV Substation
● 400 kV Substation
— 132kV OHL
— 400kV OHL

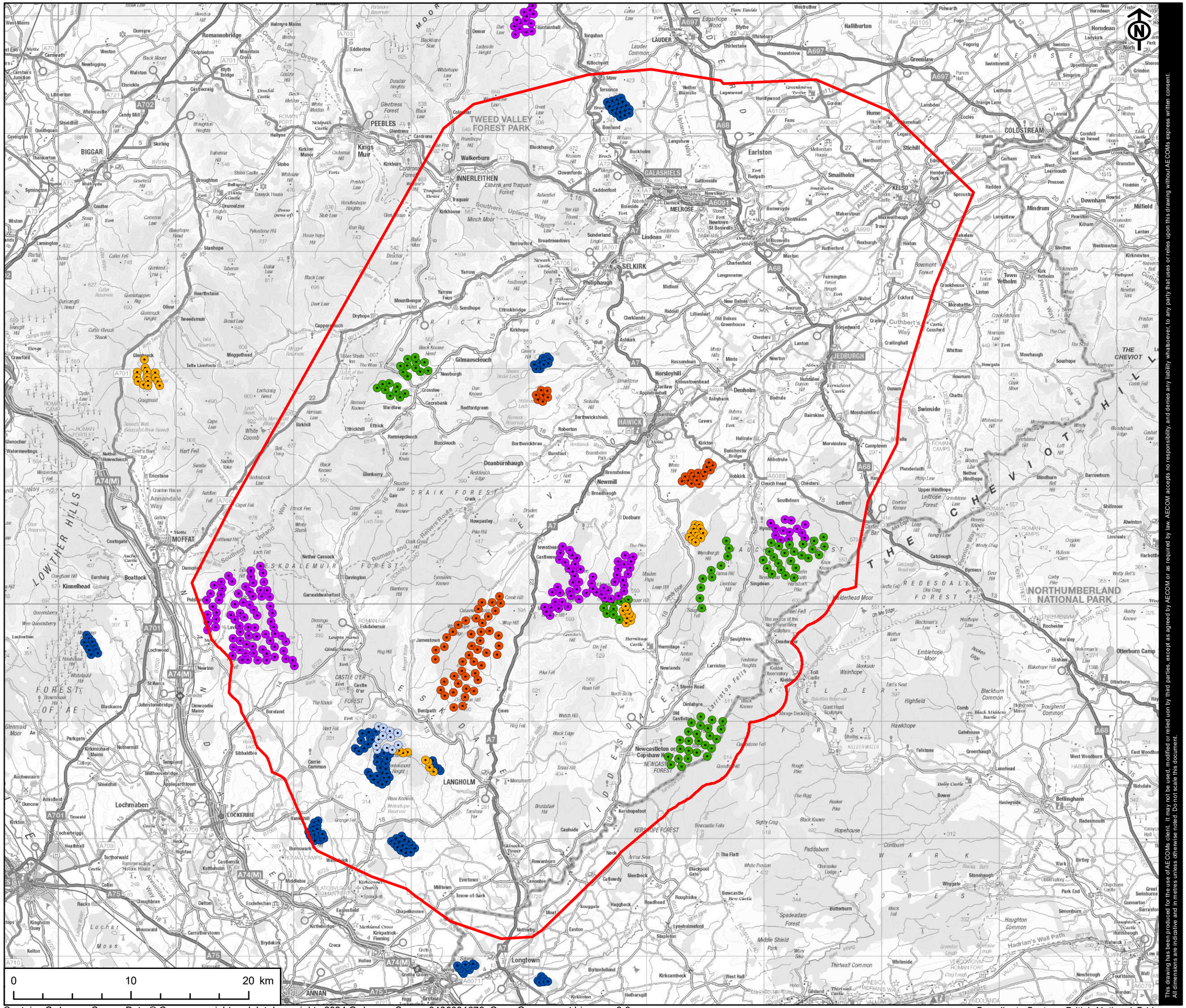
TITLE
Figure C12
Existing Transmission System

REFERENCE
GH_20240822_RS_C12_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
▭ Study Area

Wind Turbine Location (Status)

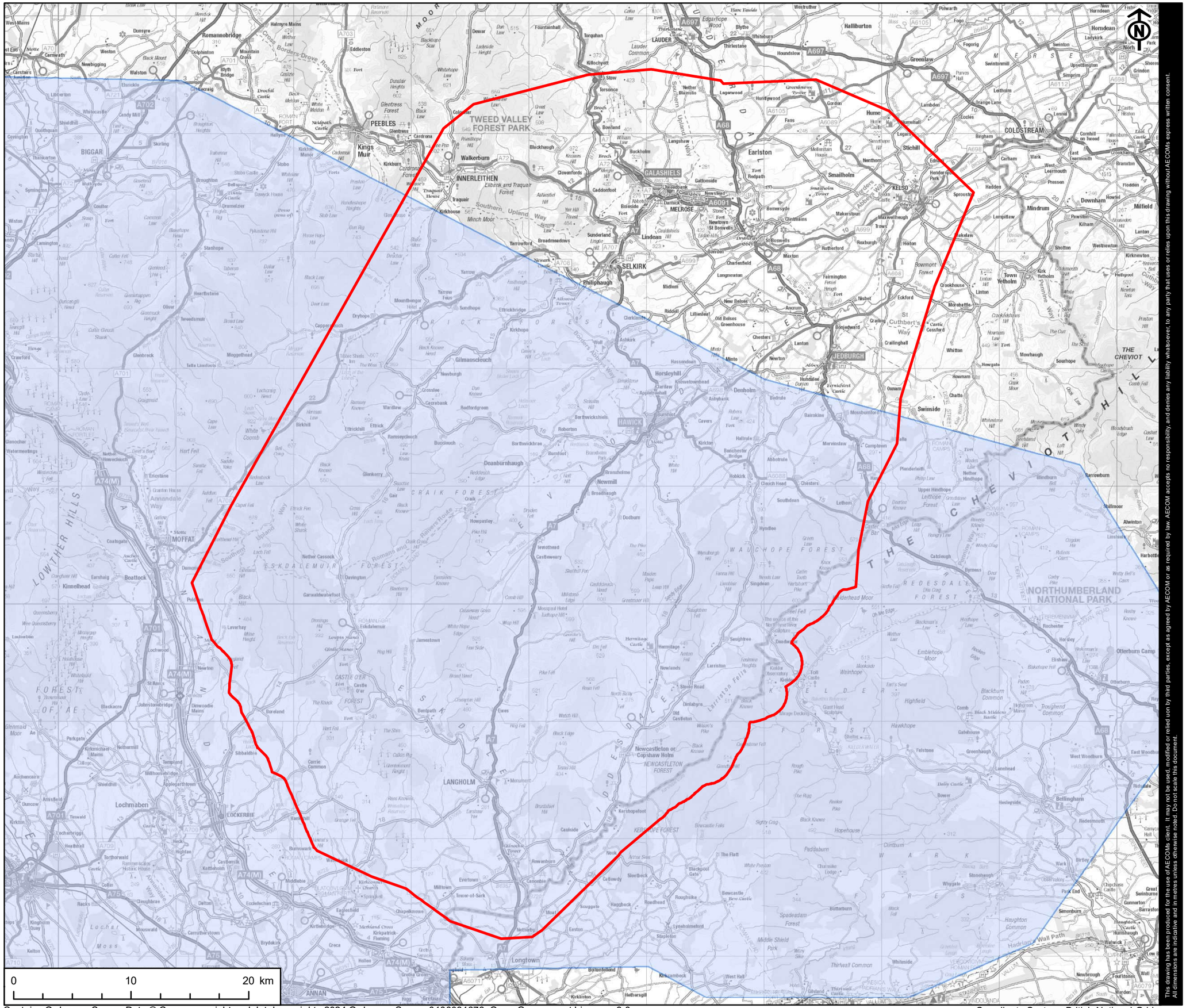
- ● Operational
- ● Consented
- ○ Appeal/Public Inquiry
- ● Application Submitted
- ● Design/Scoping; Scoping
- ● Refused

TITLE
Figure C13
Wind Farms

REFERENCE
GH_20240821_RS_C13_v2

SHEET NUMBER	DATE
1 of 1	21/08/24

Project Management Initials: DR Designer: LC Checked: DF Approved: DR



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Coordinate System: British National Grid

AECOM

PROJECT
Cross Border Connection -
Gala North Substation to Border

CLIENT
SP Energy Networks

KEY
🟥 Study Area
🟦 MOD Lowflying Tactical Training Area (Approximate)

TITLE
Figure C14
MoD Interests

REFERENCE
GH_20240822_RS_C14_v2

SHEET NUMBER
1 of 1

DATE
22/08/24

Appendix D Landscape Character Analysis

Table D.1 below identifies the factors which increase or decrease a landscape's sensitivity to overhead line infrastructure. The factors have been developed from criteria used in the Nature Scot guidance "Siting and Designing Wind Farms in the Landscape" (2017). Table D.2 provides a description of the special qualities of the designated landscapes within the strategic corridors along with the key characteristics of the LCTs. It also considers the sensitivity of these designated landscapes and LCTs to OHLs and their associated infrastructure. The following documents have been used to inform the analysis contained in Table D.2 along with professional judgement and focused site survey:

- Extract from: Scottish Natural Heritage (2010) The special qualities of the National Scenic Areas. SNH Commissioned Report No. 374
- Scottish Borders Council Supplementary Planning Guidance, Local Landscape Designations, August 2012
- Dumfries and Galloway Council Local Development Plan 2. Regional Scenic Areas Technical Paper, January 2018
- NatureScot 2019 Landscape Character Type interactive online database

Table D.1 Characteristics Influencing Landscape Sensitivity

Landscape Characteristic	Factors increasing Susceptibility	Factors decreasing Susceptibility
Landscape and scenic quality	Inability to accommodate towers/OHLs without fundamental change.	Existing OHL/windfarms or other tall / industrialised man-made structures.
Wilderness / remoteness	Absence of man-made structures and high increased appreciation of the natural world.	Limited sense of remoteness and strong influence of human activity, such as urban areas or highways.
Landform	Complex topography with high degree of variation in form, likely to contrast with OHL linear infrastructure.	Simple topography with little variation and unlikely to contrast with linearity of OHL.
Landscape scale	Small scale landscape elements.	Large scale landscape elements which reduce perceived scale and linearity of OHL.
Perspective	Skyline views a key characteristic.	Reduced presence of skyline views and potential for back clothing against larger landform.
Land use	Land uses dominated by natural elements.	Land uses dominated by man-made elements.
Landscape and visual pattern	Small scale fields or landscape features contrasting with large scale OHL linear infrastructure.	Large scale landscape elements or field pattern which will not contrast with OHL linear infrastructure.
Focal features	Presence of valued focal points as a key characteristic which OHL will diminish.	Absence of focal points and no strong visual elements.
Settlements and urban/industrial landscapes	Absence of urban/industrial influences.	Presence of urban/industrial influences.
Woodland or Forestry	Strong pattern of woodland or forestry which relates well to landform and would be truncated or divided by linear OHL.	Weak or discordant woodland/forestry pattern which does not relate to landform.
Cultural elements	Monuments/registered parks and gardens, listed buildings or artistic and literary associations present as a notable feature.	No or few cultural heritage or artistic and literary associations elements.

Table D.2 Landscape Analysis

Designated Landscapes	Special / Key Qualities	Landscape Sensitivity to OHLs
Eildon and Leaderfoot NSA	• Great landscape diversity within a compact area • The distinctive triad of the Eildon Hills • Spectacular views from the hill summits o The summits of the hills provide unparalleled viewpoints for long-distance panoramas over the border landscapes • A strongly united landscape pattern of lively rhythm and colour • A richly wooded scene of great variety • The Tweed, an iconic river of international renown • A rich array of historic buildings, structures and estates • The hub of Border settlement • A harmonious and varied prospect from unequalled viewpoints o Many elevated viewpoints provide broad, sweeping views encompassing both wild-looking land and areas of more richly intimate, managed character. o This varied prospect of beauty and grandeur is memorable. The balance, visual composition and variety of land use create an attractive landscape of great delight. • Inspiration for the arts, literature and painting o The picturesque scenery around Melrose, Dryburgh and the Tweed has long been an inspiration to writers, poets, dramatists and artists, and contributed to the discovery of 'Nature' and its appreciation as a major subject in literature and the arts. o This varied prospect of beauty and grandeur is memorable. The balance, visual composition and variety of land use create an attractive landscape of great delight. • Scott's View o The Eildon Hills, their shapely, heather-clad summits rising above the neatly ordered fields and woodlands of the meandering Tweed, are best seen from Scott's View, a panoramic beauty spot high on Bemersyde Hill, above Dryburgh. o This long-recognised, classic viewpoint is known to be one of Sir Walter Scott's most loved views; his funeral hearse stopped here as a mark of respect. • The Wallace Statue o A prime viewpoint to the Eildons is marked by a tall, red sandstone statue of William Wallace. He stands looking out over the Tweed, his broadsword in his right hand and his shield resting at his left. o As one of the follies within Buchan's designed landscape at Dryburgh, its siting (as with other follies) indicates awareness and appreciation of the scenic beauties of the area, allied with a conscious historical and cultural expression.	**Higher** sensitivity based on designated value at a national level and increased susceptibility evident in the following characteristics: landscape and scenic quality, striking landform, perspective, focal features and cultural elements and associations.
Tweedsmuir Uplands SLA1	• This is a highly scenic area of dramatic landform and has a significant degree of wildness. The more rugged, rocky summits in particular have a strong sense of remoteness, with little overt human influence on the landscape. • It comprises steep rolling landform, with deep valleys and rounded peaks of glacial origin. The area lacks the blanket forest cover that affects other areas and is predominantly open moorland of rough grass and heather. • The uplands are well used for recreation, with the Southern Upland Way among many signposted routes in the area.	**Higher** sensitivity based on designated value at a local level and increased susceptibility evident in the following characteristics: landscape and scenic quality,

Designated Landscapes	Special / Key Qualities	Landscape Sensitivity to OHLs
	Management recommendations: • Focus land-use management around recreational access • Positive management of valued habitats in line with LBAP, including ongoing protection of international-level designations • Seek to maintain the wildness character of the great majority of the hills • Promote the use of forest design plans for areas of proposed afforestation • Consider visual effects of tall development on views to and from the landscape • Seek cross-border cooperation on management of boundary areas such as Culter Fell.	landform characteristics, and wilderness / remoteness.
Tweed Valley SLA 2	• A strong sense of place, with certain views being instantly recognisable. • The varied mix of landscape elements is highly representative, with forestry, woodland, open hillsides and pastoral farmland all juxtaposed. • The contrast between the well settled valley and the bare heather and grass moors and landmark hills is striking. Well-designed forestry actively contributes to this visual experience in places. • There are numerous opportunities for enjoying this landscape, including the cycle routes at Glentress and elsewhere, golf courses, equestrian centres, and walking routes. • Time depth is evident in estate landscapes and historic buildings. Management recommendations: • Careful management of land use at settlement edges. • Consider landscape and visual impacts of proposed developments in and around settlements, • particularly the treatment of their edges • Seek opportunities to better integrate existing development into the landscape • Promote the restructuring of forests, and the use of forest design plans for new areas of • afforestation • Consider the effects of development on hilltops, such as masts or wind farms, which may be visible within the valley	Intermediate sensitivity based on designated value at a local level and increased susceptibility evident in the following characteristics: notable focal features, strong landscape and visual pattern and perspective likely to accentuate OHL perception.
Tweed, Ettrick and Yarrow Confluences SLA 3	• The area has a strong sense of place, and contains representative Border features, albeit that each valley retains its own character. • The enclosing uplands and upland fringes offer contrast and an attractive wider setting, and enable views across the valleys, the descending approach to Selkirk along the A699 being particularly scenic. • The Yarrow enters a narrow, picturesque section around Yarrowford, characterised by woodland and estate buildings. The Yarrow flows into the Ettrick south of Selkirk, where the valley broadens, and is characterised by parkland influences, with mixed woodland climbing the valley sides. Upland Way follows the ridge between Tweed and Yarrow, offering views across the area, before crossing the Tweed towards Galashiels, and there are numerous other paths. • Attractions in the area include Abbotsford and Bowhill, and the area is very accessible from the main Borders settlements and further afield. Management recommendations: • Continue to promote sustainable estate management to balance the needs of biodiversity, recreation and tourism • Careful management of land use at settlement edges	Intermediate sensitivity based on designated value at a local level and increased susceptibility evident in the following characteristics: strong landscape and visual pattern, landform and perspective likely to accentuate OHL perception.

Designated Landscapes	Special / Key Qualities	Landscape Sensitivity to OHLs
	• Consider landscape and visual impacts of proposed developments in and around settlements • Consider the effects of development on hilltops, such as masts or wind farms, which may be visible within the valley • Carefully consider the effects of smaller wind energy proposals, and the cumulative effects that may arise	
Tweed Lowlands SLA 4	• It is a recognisable Borders landscape of rolling mixed farmland, well-wooded and mature, with attractive vistas over its visual diversity available from several locations. • In views from the A699 it forms the foreground to the view of the Eildon Hills. • The area retains a rich cultural heritage with many historic and literary associations. • The remains of Roxburgh Castle across the river from the grandeur of Floors Castle reflect two very different • phases in the long history of the area. • The area is of importance to recreation and tourism, containing numerous opportunities for enjoying the landscape, including some key attractions such as Smailholm Tower, Floors Castle and the Borders Abbeys Way/St Cuthbert's Way. • The extensive estate landscapes give this area strong visual diversity, and add to the evident time-depth inherent in features such as Dere Street, Smailholm Tower and the battlefield monument at Lilliardsedge. Management recommendations: • Encourage the sustainable management of hedges, and where possible seek the reinstatement of hedges and hedgerow trees • Seek to direct farm diversification towards aims in keeping with the landscape, such as the creation of native broadleaf woodland	**Highe**r sensitivity based on designated value at a local level and increased susceptibility evident in the following characteristics: landscape and scenic quality, landscape scale, landscape and visual pattern, focal features and cultural elements.
Teviot Valleys SLA 5	• This area covers a series of distinctive Borders valleys and hills, and has been defined to draw together a number of landmark features with their pastoral and woodland settings. • Visually prominent hills include Minto Crags, Peniel Heugh, Dunion Hill, Minto Hills and Rubers Law, each of which has a strong relationship with the adjacent valleys and the wider landscape. • Minto Crags are a dramatic feature contrasting strongly with the gentle farmed valley Teviot below. • Rubers Law has a distinctive craggy summit, dissected and rocky. Bonchester Hill is almost a reduced version of the same, while Dunion Hill is a landmark above Jedburgh. • The Jed valley is important as a key gateway into the Borders along the A68, including the sense of sudden arrival at Jedburgh after the scenic drive through the wooded valley. Rocky cliff features of red sandstone along the Jed are particularly attractive against spring green of trees. Management recommendations: • Continue to promote sustainable land management to balance the needs of biodiversity, recreation and tourism • Encourage the sustainable management of hedges, and where possible seek the reinstatement of hedges and hedgerow trees • Promote the restructuring of forests, and the use of forest design plans for new areas of afforestation • Consider the effects of development on hilltops, such as masts or wind farms, which may be visible within the valleys	**Higher** sensitivity based on designated value at a local level and increased susceptibility evident in the following characteristics: notable landscape and scenic quality, landform, landscape and visual pattern and focal features.
Langholm Hills	• This RSA centres on the combinations of Upland Glen and other attractive valley landscapes of Eskdale and the Ewes Water valley, and the adjacent Southern Uplands.	**Lower** sensitivity based on designated value at a local level and decreased

Designated Landscapes	Special / Key Qualities	Landscape Sensitivity to OHLs
Regional Scenic Area	• The strong visual watershed of Great Hill has been selected to form the boundary, to include the major areas of heather moorland within the Southern Uplands. To the south, the boundaries were modified to follow the immediate visual envelope of the Esk Valley. • The smooth, rounded, multi-ridged peaks of the Southern Uplands on either side of the Ewes valley are covered with extensive areas of unenclosed heather moorland. The Ewes valley itself is an archetype long, straight sided, U shaped glaciated Upland Glen with improved pastures in the valley floor and long, contained views from the A7 running along it. • Scattered small to medium scale plantations break up the valley sides but the valley retains an essentially open character.	susceptibility evident in the following characteristics: simple topography, open landscape and visual pattern and potential for integration with forestry.

Table D.2 Landscape Character Types

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
LCT 103: Undulating Upland Fringe	• Large scale, moderately to steeply sloping and undulating landform incised in places by steep gullies and narrow valleys. • Unity of land cover characterised by improved pastures, with prominent field pattern delineated by a well maintained network of drystone dykes, and scattered small to medium sized coniferous plantations. • Medium density settlement with small villages and farmsteads sited typically in sheltered valleys and on lower slopes. • A simple, uniform landscape of smooth flowing curves, open in character with distant views over adjoining valley types and the Lammermuir and Moorfoot hills. • Boundaries clearly defined by major river valleys.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple landform, landscape and visual pattern, forestry and land use incorporating man-made elements.
LCT 91: Plateau Grassland-Borders	• Large scale, rolling plateau topography with gentle slopes and smooth relief. • Vegetation cover dominated by coarse grassland with localised patches of heather moorland, rush pasture and scattered small coniferous plantations and shelterbelts. • Low density settlement with widely dispersed farm buildings. • Wind farm development in the northern and central parts of the Landscape Character Type. • Remote, isolated quality. • Open, panoramic views.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple topography, land use incorporating man-made elements, landscape and visual pattern and potential integration with woodland or forestry.
90: Dissected Plateau Moorland	• Plateau landform consisting of a series of level-topped hills and ridges. • Strong topographic identity and overall grandeur of scale. • Individual hill masses separated by steep sided valley features of differing scales. • Semi-natural peatland, heather moorland and grassland communities dominant, with a high degree of perceived naturalness of vegetation cover. • Very low settlement density with isolated, dispersed pattern.	Intermediate sensitivity based on undesignated value, increased susceptibility evident in the following characteristics: wilderness/ remoteness, natural and

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
	• Scattered prehistoric settlement and burial mounds above water courses. • Sense of wildness created by wide horizons and long distance, unobstructed views.	cultural elements and decreased susceptibility due to simplicity of landform, and landscape and visual pattern.
114: Pastoral Upland Valley	• Flat valley floor with smooth moderately sloping sides incised by narrow tributary valleys and enclosed by rolling dissected plateau uplands. • Land cover of permanent pastures on valley floor and sides with frequent woodlands, merging with unimproved grassland and heather on upper slopes. • Scattered farms and villages along the valley floor and lower sides typically built around road junctions and river crossings. • A medium scale enclosed landscape of smooth curves, strongly influenced by the surrounding uplands.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landform enclosure and form, landscape and visual pattern and decreased by woodland or forestry pattern.
116: Upland Valley with Woodland	• Meandering river valley, strongly enclosed by uplands. • Flat valley floor, broad and open in places, narrow and more intimate in others. • Prominent terraces (haughlands) caused by fluvial and glacial action. • Strong influence of woodland, with extensive coniferous forest prominent on valley sides, and mature hedgerow tree lines, broadleaf, and mixed policy woodlands on valley floor. • Traditional dwellings, farmsteads and hamlets clustered at the foot of valley side slopes. • Mill towns prominent on valley floor and sides. • Tower houses and mansions common along river banks. • Prehistoric hillforts common on gently rounded hill tops. • Designed policies and parklands significantly contribute to woodland cover and character.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landform enclosure and form, landscape and visual pattern, cultural elements and decreased by woodland or forestry pattern.
93: Southern Uplands with Scattered Forest-Borders	• Large-scale rolling landform with higher dome or cone-shaped summits. • Significant areas of peatland and heather moorland. • Mosaic of grassland, bracken and rushes on lower ground. • Locally-prominent scattered large areas of forestry. • Degree of remoteness, wild character and grandeur of scale unique within the region.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: large-scale rolling landform, landscape scale, landscape and visual pattern and woodland or forestry pattern.
94: Rolling Moorland	• Large-scale rolling landform with ridges and intervening shallow basins. • Significant areas of grassland, peatland and heather moorland. • Mosaic of grassland, bracken and rushes on lower ground. • Locally-prominent scattered areas of forestry.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple large-

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
	• Occasional small lochs. • Sparse settlement of scattered steadings and cottages, along minor roads that traverse the area.	scale landform, landscape scale, landscape and visual pattern and woodland or forestry pattern.
96: Southern Uplands with Forest- Borders	• Large scale rolling landform with higher dome or cone-shaped summits. • Dominant coniferous forest cover characterised by Sitka spruce plantations with occasional areas of pine and larch. • Dispersed settlement pattern of farmsteads and forestry buildings, mainly within sheltered valleys. • Scattered pockets of past landuse from prehistoric to post-medieval times • Simple, uniform character. • Strong sense of enclosure, quietness and tranquillity.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple large-scale landform, landscape scale, landscape and visual pattern and woodland or forestry pattern.
113: Upland Valley with Pastoral Floor	• Glaciated valleys with moderately to strongly sloping sides and flat floor modified by river bluffs and glacial moraine. • Improved pastures with occasional small woodlands and tree lines on valley floors. • Rough unimproved grazing, heather moorland or coniferous forest on valley sides. • Scattered stone built villages with farmsteads and dwellings dispersed along river terraces, lower valley sides and tributary valleys. • A simple, distinctive landscape strongly enclosed by uplands with intermittent long views along valley corridors.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landscape scale, landscape and visual pattern and woodland or forestry pattern and increased by perspective likely to accentuate OHL perception.
117: Pastoral Upland Fringe Valley	• Medium scale pastoral valley with flat floor enclosed by upland fringe pastures, often with rough grassland and moorland covered hills above. • Smooth large-scale landform modified in places by bluffs and moraine on valley floor, scree slopes or rock outcrops on valley sides. • Narrow, often wooded tributary side valleys. • Broadleaf woodlands and scrub on bluff slopes and scattered trees along riverbanks, occasional coniferous plantations and shelterbelts on valley sides. • Valley floor pastures enclosed by drystone dykes with occasional hedgerows, interspersed with occasional patches of scrub, coarse grass and rushes. • Scattered villages, farmsteads and mansion houses with policy woodlands.	Intermediate sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple landform and increased susceptibility due to complex landscape and scenic quality and smaller scale landscape and visual pattern.
99: Rolling Farmland - Borders	• Undulating relief, becoming more pronounced at higher elevations. • Distinctive areas of flat or constant gentle gradients, giving wide horizons and skyscapes. • Large-scale strong geometric field pattern, enclosed by hedgerows, with scattered coniferous woods. • Mix of arable, ley pasture and permanent grazing land.	**Intermediate** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: landform, large-scale landscape and

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
	• Moderately densely settled, with frequent farmsteads and small villages. • Well kempt, prosperous appearance.	visual pattern and increased sensitivity based on dense settlement land use and perception.
109: Lowland Margin with Hills	• Distinctive topography consisting of conical and dome shaped hill groups and crags rising prominently above more gently rolling landform. • Land cover of pasture and arable fields divided by hedgerows or drystone dykes, with scattered mature broadleaf, coniferous and mixed woodlands. • Well-maintained beech and thorn hedgerows with mature hedgerow trees in lower areas. • Moderately dense settlement of frequent, evenly scattered small villages and farmsteads along minor roads and tracks. • A predominantly large-scale open landscape of strong curves, and intermittent distant views over the Tweed lowlands.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: smaller scale landscape and visual pattern/land use and decreased by large scale landform.
120: Lowland Valley with Farmland	• Broad, shallow, flat-bottomed valleys with gently sloping/undulating sides. • Neat pattern of medium to large sized arable and pasture fields divided by prominent hedgerows with some mature broadleaf tree lines. • Bluffs and terraces cut by rivers. • Occasional prominent volcanic hills, knolls and rock outcrops. • Broadleaf woodland common on strips on river bluffs and in side valleys, small blocks, shelterbelts and policy woodlands on lower slopes and valley floor. • Scattered small towns, stone built farmsteads, villages, and mansion houses along well-developed road network. • Fertile, neat, prosperous appearance.	**Intermediate** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landscape and visual pattern, perspective, land use and decreased by woodland or forestry pattern.
119: Wooded Upland Fringe Valley	• Small scale, intimate, enclosed character. • Strong visual containment. • Deeply-incised river channels with frequent cliffs and steep slopes. • Heavily wooded valley floors and lower valley sides. • Contrasting open rolling slopes at higher levels above rivers. • Generally tranquil, unspoilt character.	**Higher** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: small scale landscape and visual pattern with enclosure and perspective contrast between valley and upland, and landscape and scenic quality.
98: Rolling Foothills	• Discrete dome and cone-shaped hills and ridges, with occasional rock outcrops on steeper slopes and hill tops. • Wide visual influence, forming attractive backdrop from adjoining upland and Upland Fringe landscapes. • Grassland cover dominant, but with locally significant coniferous forestry. • Settlement includes small villages in the lower reaches of valleys. • Important group of bastle houses and cultivation remains of the late medieval period. • Open, expansive, unobstructed views.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landform variation, perspective and open views, decreased by

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
		presence of woodland or forestry.
102: Upland Fringe with Prominent Hills	• Typically steep, cone or dome-shaped hills, frequently of volcanic or igneous rock giving strong landform identity. • Diverse surrounding landform types, ranging from smooth undulations to strongly elongated ridges and hollows. • Land cover dominated by permanent pasture. • Locally frequent woodland cover. • Generally low settlement density with isolated farmsteads and occasional small settlements. • Rich in visual contrasts, with individual hills as dominant focal points of views. • Diversity of landscape scale.	**Intermediate** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landform variation, infrequent woodland or forestry and diversity of landscape and visual pattern.
101: Rocky Upland Fringe	• Distinctive irregular strongly undulating and angular landform. • Frequent knolls, ridges and rock outcrops. • Small lochans and mires in depressions. • Land cover characterised by permanent pastures with patches of gorse and rushes and scattered small woodlands, giving a strong sense of place. • Farmsteads and dwellings dispersed along minor road network. • Drystone dykes common. • Diversity of scale.	**Intermediate** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: variation in landform and scale.
178: Southern Uplands with Forest- Dumfries and Galloway	• Large, smooth dome-shaped hills with large scale dark green forests on slopes and over lower summits. • Predominantly simple, gently rolling landform. • Some areas of more complex and smaller-scale landscapes, with steep slopes enclosing heads of valleys and/or where uplands remain open. • Changing landscapes with large scale forestry operations and wind farm development. • Forested areas dominated by Sitka Spruce, interspersed with mixed conifers and broadleaf planting, and undergoing felling and replanting in large coupes. • Wind farms are a key characteristic in some areas. • Expansive scale.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: landform, landscape scale, land use, landscape and visual pattern.
177: Southern Uplands-Dumfries and Galloway	• Large, smooth dome/conical shaped hills, predominantly grass-covered. • Open and exposed character except within incised valleys. • Dramatically sculpted landforms and awe-inspiring scale. • Distinctive dark brown/purple colour of heather on some of the higher areas. • Pockets of woodland in incised valleys. • Stone dykes occasionally define the lower limit. • Legacy of lead and other mining activity, with extensive archaeological remains	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simplicity of landform, landscape scale, land use, landscape and visual pattern.

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
	• around the former mining village of Wanlockhead. • Wind farms locally characteristic, away from the more dramatic, scenic and sculptural • slopes and skylines.	
160: Narrow Wooded River Valley- Dumfries and Galloway	• Narrow incised valleys with wooded slopes enclosing pasture floors. • Small pastures and arable fields enclosed by hedges/fences in lower reaches and drystone dykes in upper reaches. • Dominant broadleaf (semi-natural) woodland character with conifers on higher slopes. • Lush trough-shaped river valleys with pasture/arable floors enclosed by deciduous wooded slopes. • Riparian trees and woodlands following meandering river courses in lower reaches. • Narrow lanes following valleys and linking isolated houses, occasional settlements and providing access to higher moorland. • Numerous arched stone bridges over the rivers. • Intimate unspoilt landscape focussing on river views with some adjacent policy landscape.	**Higher** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: complexity of landform, landscape scale, land use, landscape and visual pattern and perspective likely to accentuate OHL perception.
175: Foothills- Dumfries and Galloway	• Generally undulating land between 170 and 250 metres, with rounded peaks. Higher in the west, up to nearly 550 metres with craggier peaks. • Foothills dissected by incised valleys. • Semi-improved pasture enclosed in medium-large fields by stone walls. Grazed by sheep and cattle. Some rough pastures and heath on higher ground. • Trees in sheltered pockets with some copses on top of hills. • Many scattered farmsteads and small settlements. • Network of minor roads. • Numerous archaeological sites particularly Bronze Age funerary and ritual sites and Iron Age settlements and forts.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple landform, landscape scale, land use and landscape and visual pattern.
176: Foothills with Forest- Dumfries and Galloway	• Dark green blanket of forest covering undulating foothills. • Changing landscape with areas with large and medium scale forestry operations and wind farm development. • Forested areas dominated by Sitka Spruce, interspersed with mixed conifers and broadleaf planting, undergoing felling and replanting in large coupes. • Tall mature conifers at roadside. • Areas of more complex, locally distinctive and smaller-scale landscapes, with semi-improved pasture with walled enclosures on open ground, occasional lochs and estate policies, distinctive ridges and landmark summits. • Areas of relict landscape with remains of pre-improvement settlement and agriculture clustered in burn valleys. • Wind farms, locally defining the character in some areas of central Dumfries and Galloway.	**Lower** sensitivity based on undesignated value and decreased susceptibility evident in the following characteristics: simple landscape scale, land use with man-made influences, landscape and visual pattern and woodland or forestry to aid integration.
172: Upland Fringe- Dumfries and Galloway	• Elevated rolling pastures. • Improved and rough grassland in close proximity. • Hedgerow banks and treelines along roads in some lower areas. • Dry stone dykes.	**Lower** sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: perspective, focal features and cultural elements and decreased by

Landscapes Character Type	Key characteristics	Landscape Sensitivity to OHLs
	• Squared areas of forestry. • Contrast between wide open areas and more intimate landform. • Panoramic views over valley and coastal lowlands. • Small bridges over incised burns. • Notable landmark features, including Iron Age fortifications, designed landscapes and grand houses.	simple landform and landscape scale.
171: Flow Plateau	• Mostly flat and gently rolling topography with an incline towards the Solway. • Occasional long views over the Solway. • Waterlogged rush infested pastures, ochre green and brown. • Large fields with hedgerows in poor condition and fences. • Cattle grazing. • Shelterbelts and small informally shaped forests. • Riparian woodlands. • Scattered farmsteads.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: perspective/views and decreased by simple landform, landscape scale, land use and landscape and visual pattern.
163: Middle Dale-Dumfries and Galloway	• Broad valley with complex undulating topography and locally narrow sections. • River meanders eroding bluffs in the valley moraines. • Landcover predominantly improved pastures, lush green, sheep and cattle grazed. • Medium scale field enclosures, a mixture of hedgerows and dry stone dykes. • Extensive pattern of shelterbelts and farm woodlands with semi-natural woodlands on bluff slopes. • Dale contained by uplands with forests and rough grazing on horizons. • Semi-natural hanging woodlands on steep bluff slopes. • Country houses and designed landscapes. • Settlements of high townscape quality. • Communication routes. • ‘Red-earth” qualities relating to underlying red sandstones.	Intermediate sensitivity based on undesignated value and increased susceptibility evident in the following characteristics: landscape and scenic quality, complex landform, landscape scale, land use, landscape and visual pattern, presence of focal features and cultural elements.

Appendix E Routeing and Siting Considerations

Appraisal Topic	Constraints and Features within the Study Area	Routeing and Siting Objectives	Project Routeing and Siting Considerations
Landscape	• Eildon and Leaderfoot NSA (Holford Rule 1 and Horlock Rule 2) • Locally designated landscapes comprising multiple SLAs and RSAs (Holford Rule 2 and Supplementary Notes and Clarifications) • Landscape Character Types (LCTs) including landscape sensitivity (Holford Rules 4, 5 and 6 and Horlock Rule 4)	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	The Eildon and Leaderfoot NSA is the only statutory landscape designation or area of the highest environmental value within the Study Area and therefore must be avoided by route and site options. There are other nationally designated landscapes present in the immediate vicinity of the Study Area including the Upper Tweeddale NSA to the west and the Northumberland National Park to the east. While effects on these areas should be avoided consideration of potential landscape setting effects may be required if route options are located on the margins of the Study Area. There are a number of local landscape designations in the Study Area including multiple SLAs in the Scottish Borders and one RSA in Dumfries and Galloway. These areas are considered to be of moderate environmental value. While it is preferable to avoid these areas as much as possible, the scale and distribution of SLAs within the Scottish Borders means that some routeing within them will be unavoidable. Where routeing through local landscape designations regard should be had for the key features and attributes of the local designations and sensitivity to OHLs.
Visual Amenity	• Settlements (Holford Rule 4 and Supplementary Notes and Clarifications and Horlock Rules 4 and 5) • Scattered individual rural properties or clusters of properties (Holford Rule 4 and Supplementary Notes and Clarifications and Horlock Rule)	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	Settlements within the Study Area comprise a number of towns and larger villages which should be avoided as much as possible to prevent or reduce views from residential areas. The rural nature of large parts of the Study Area means that there are scattered individual properties or small clusters of properties present throughout. These should be avoided as much as possible in order to reduce potential adverse effects on views from residential receptors, however, this may require to be balanced against other routeing and siting considerations.
Ecology and Biodiversity	• Seven SACs including the River Tweed SAC (Holford Rule 1 and Horlock Rule 2) • Langholm-Newcastleton SPA (Holford Rule 1and Horlock Rule 2) • More than 60 SSSIs (Holford Rules 1 and 2and Horlock Rule 2) • Multiple LBS (Holford Rule 2 and Supplementary Notes and Clarifications)	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	There are a number of internationally and nationally designated sites (i.e. sites of the highest or high environmental value) present within the Study Area as well as locally designated sites (i.e. sites of moderate or low environmental value), however, they vary in terms of the basis of the designation as well as in scale from small discrete sites to larger scale or linear sites. Route and site options should avoid designated sites as much as possible in order to prevent or reduce potential adverse effects on them. Where sites cannot be avoided due to the extent of designation or because of other constraints, consideration should be given to the designations qualifying interests, the location of substation sites or where they are crossed by

Appraisal Topic	Constraints and Features within the Study Area	Routeing and Siting Objectives	Project Routeing and Siting Considerations
			overhead line routes in order to provide opportunities to develop a detailed design which reduces the potential for adverse effects on them.
Cultural Heritage and Archaeology	• Almost 400no. Scheduled Monuments scattered throughout the Study Area (Holford Rule 1 and Horlock Rule 2) • Three Inventory Battlefields (Holford Rule 1 and Horlock Rule 2) • 16 Inventory Gardens and Designed Landscapes (Holford Rule 1 and Horlock Rule 2) • More than 2,000no. Listed Buildings (Holford Rule 1 and Horlock Rule 2) • Archaeologically Sensitive Areas and non-inventory gardens and designed landscapes (Holford Rule 2 and Supplementary Notes and Clarifications)	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are a number of cultural heritage and archaeological designations which are of the highest or high environmental value. These vary in geographic scale (from small discrete sites to larger areas) and well as in distribution (from individual areas or sites to clusters of sites which are closely located and in some cases may be interrelated). Route and site options should avoid designated sites as much as possible in order to prevent or reduce potential adverse effects on them including effects on their setting. This may include using existing landscape features such as landform or woodland to avoid or reduce effects.
Forestry and Woodland	• More than 500 Ancient Woodland Inventory sites (Holford Rule 1 and Horlock Rule 2) • Native Woodland Survey of Scotland (Holford Rules 2, 4 and 5) • Other woodland or forestry sites (Holford Rules 4 and 5 and Horlock Rule 4).	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	There are a range of forestry and woodland resources present within the Study Area ranging from Ancient Woodland Inventory sites which are considered to be areas of high environmental value to large-scale commercial forestry which support land use and recreational functions and are of moderate or low environmental value. Route and site options should avoid forestry and woodland as much as possible, in particular Ancient Woodland Inventory sites, in order to prevent tree loss. Where route or site options cannot avoid woodland due to other constraints, effects should be reduced as far as possible with routes or sites identified having regard to forestry design as well as planting/restocking plans.
Water resources	• Waterbodies / watercourses • Flood Zones	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	There are a number of waterbodies and watercourses present within the Study Area, however, in general they are not considered to significantly constrain the development of route or site options. Route options should maintain a minimum separation distance of 50m in order to ensure watercourses could be spanned by OHL routes where they require to be crossed. Site options for the new substation should be sited away from watercourses as much as possible in order to reduce the potential for pollution of watercourses.

Appraisal Topic	Constraints and Features within the Study Area	Routeing and Siting Objectives	Project Routeing and Siting Considerations
Ground Conditions	• Eight geological SSSIs and/or Geological Conservation Review sites (Holford Rule 1) • Priority Peatland Habitats (Class 1 and Class 2) (Holford Rule 1) • Peatland Habitats (Classes 3, 4 and 5)	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	There are a small number of sites designated only for geological conservation purposes within the Study Area. These are typically small discrete sites which should be avoided by route and site options as much as possible. Where sites cannot be avoided due to the extent of designation or because of other constraints, consideration should be given the location of substation sites or where they are crossed by overhead line routes in order to provide opportunities to develop a detailed design which reduces the potential for adverse effects on them. Priority and other peatland habitats and other carbon rich soils are present throughout the Study Area. Route and site options should avoid peatland habitats as much as possible in order to reduce the loss of peat. Where peatland areas cannot be avoided losses should be minimised as far as possible, for example by routeing across peatland as directly as possible in order to minimise the length of routes within peat.
Tourism and Recreation	• Long distance walking and cycling routes or trails • Sites or areas supporting outdoor recreational activities • Other regionally important visitor attractions	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There is a range of tourism and recreational interests present within the Study Area. Route and site options should avoid tourism and recreational interests as much as possible in order to reduce potential adverse effects on the amenity of users of or visitors to routes, trails or other visitor attractions. Where routeing or siting cannot avoid tourism or recreational interests, regard should be had for the landscape setting of the attraction and visual amenity of visitors/users for example using existing landscape features such as landform or woodland to avoid or reduce effects.
Land Use	• Agricultural land capability • Commercial forestry	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	The majority of the land within the Study Area is not suitable for arable farming based on the National Land Capability Map for Agriculture. Route and site options should avoid or reduce impacts on agricultural land as much as possible. Large areas of commercial forestry are present throughout the Study Area. Route and site options should avoid commercial forestry as much as possible but where it cannot be avoided, effects should be reduced as far as possible with routes or sites for example having regard to forestry design and felling/restocking plans.
Engineering Constraints	• Route length (Holford Rule 3) • Topography, altitude and slopes • Existing electricity transmission infrastructure • Wind Farms	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability (including accessibility) and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Route options between the proposed Gala North Substation and new Teviot Substation as well as new Teviot Substation and the Scotland-England border should be as direct as possible subject to other routeing constraints considerations in order to reduce overall OHL route lengths. Consideration should be given to the impact of siting Teviot Substation on the overall directness and length of route options. Altitudes and slope angle have been derived from digital terrain data and reviewed as part of technical reviews of route options. Altitudes within the Study Area are highly variable from less 100mAOD in some river valleys to

Appraisal Topic	Constraints and Features within the Study Area	Routeing and Siting Objectives	Project Routeing and Siting Considerations
			more than 500mAOD in upland areas. Subject to other routeing constraints and considerations, route options should take account of altitudes in order to reduce potential exposure to increased ice and wind loads as much as possible (<200mAOD/low risk, 200-500mAOD/medium risk and >500mAOD/high risk). While routeing at higher altitudes is feasible it can require tower strengthening works as well as shorter spans (i.e. more towers) in order to mitigate exposure to wind and ice loads. The variable altitudes also influence the steepness of slopes within the Study Area with steep slopes often present within narrow V-shaped river valleys. Route options should take account of slopes which require to be routed over and/or along avoiding steep slopes where possible in order to reduce construction access risks. Sites for the new Teviot Substation should also take account of slopes seeking to avoid areas where significant earthworks may be required to establish a level platform for the substation where possible. There is a range of existing and proposed energy infrastructure within the Study Area including transmission assets as well as wind farms at various stages of development (pre-application, application, construction, operation). Existing infrastructure has been identified and should be taken account of in the identification of route and site options. This includes consideration of proximity to and/or requirements to cross other transmission infrastructure such as the 132kV OHL route (V route) which is routed north to south through the Study Area as well as application of appropriate separation distances to wind farms in line with industry guidance.

Appendix F New Teviot Substation Siting Appraisal

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	There are no landscape designations in proximity to TEV-01. This site lies within the Southern Uplands with Scattered Forest LCT. It is located within the narrow valley of the Phaup Burn which is surrounded by steeply rising slopes covered with grassland which provide a degree of containment to the site. However, due to the topography extensive earthworks would be required to accommodate the necessary platform which would contrast with the narrow valley landscape. Pockets of native woodland follow the Burn although the site is positioned to avoid directly impacting them. To the immediate east lies an area of forestry some of which has been felled.	There are no landscape designations in proximity to TEV-02. This site lies within the Southern Uplands with Scattered Forest LCT. It is located within a series of gently rising pastoral fields bound to the west along the A7 corridor by a short belt of mature vegetation. A small burn crosses the site and is surrounded by mature trees which would have to be removed to accommodate the site. To the north, the Linhope Burn follows the valley with pockets of mature woodland along its course, particularly along the northern side surrounding the cluster of buildings. The site is partially enclosed to the southeast and southwest by shelterbelt planting which provides some enclosure within the landscape and could be further strengthened through mitigation design.	There are no landscape designations in proximity to TEV-03. This site lies within the Southern Uplands with Scattered Forest LCT with a very small section falling into the adjacent Pastoral Upland fringe Valley LCT although the site doesn't exhibit characteristics of the latter. It is located within an area of rising ground covered by upland grazing across uneven terrain. Landform steeply rises from the Northhouse Burn to the southwest and continues across the site which occupies a relatively large area of exposed upland landscape on the north facing slope of Southdean Rig. Earthworks would be required to establish a platform and would be particularly apparent within the local landscape. Large areas of forestry are characteristic of the immediate landscape with an extensive area to the southeast of the site and an area to the northwest which	TEV-04 lies on the northern extent of the Langholm Hills RSA. This site lies within the Southern Uplands LCT. It is located in open rolling upland to the south of the minor road between Fiddleton and Hermitage. The site is typical of the wider landscape in which simple, gently rolling landform predominates exhibiting an open and exposed character. Trees and woodland are limited to the incised valleys including to the northeast although none are present across the site which occupies an open position in the landscape. Whilst the larger scale landscape could accommodate the site, it would be a noticeable element within this remote upland, locally designated landscape.	There are no landscape designations in proximity to TEV-05. This site lies within the Southern Uplands with Scattered Forest LCT and borders the Southern Uplands with Forest LCT which directly informs the setting of the site. It is located within a large-scale rolling landform on the north facing slopes of Black Rig, between Leap Hill to the northeast and Sundhope Rig to the south. The incised valley containing the Black Cleugh lies to the immediate east of the site. The site comprises a mosaic of open grassland and moorland surrounded by large tracts of forestry to the north, northwest and east which are locally prominent. The larger scale of the landscape combined with the backcloth of forestry would be relatively able to accommodate the site compared with the other sites considered.	There are no landscape designations in proximity to TEV-06. This site lies within the Southern Uplands with Scattered Forest LCT and is bordered to the north by the Southern Uplands with Forest LCT. It is located on the north facing slopes of White Hill on more gently sloping ground. The site comprises open grassland and within the wider landscape occasional tree planting is present along watercourses along with blocks of shelterbelt planting and plantation forestry. Cultural heritage features are present within the immediate landscape which increase the local landscape value and time depth which reduces the ability of the landscape to accommodate the site.

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
				provides some visual separation from the upland fringe valley landscape.			
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	The site is not located close to any settlements, however, two individual properties, Frostley Burn and Phaup Cottage are located to the west and east respectively. The proximity of these properties increases the potential for visual amenity impacts (as well as noise).	The site is not located close to any settlements. There is a cluster of buildings including residential property referred to as Linhope to the north of the site as well as a property, Braehead to the south. Existing woodland provides some screening, however, their proximity increases the potential for visual amenity impacts (as well as noise).	The site is not located close to any settlements, however, it is located in a relatively prominent position on the north-facing slope of Southdean Rig. It is likely that it will be partly visible from the A7 to the north, particularly for those travelling southbound. There is a cluster of properties to the west of the site as well as some to the north. While landform may help to screen some views, there is potential for some visual amenity impacts (as well as noise).	The site is not located close to any settlements. The valley in which the site is located is sparsely settled largely owing to the steep hillslopes to the north and south. There are some individual properties present where the landform widens and flattens including Carrett Rig to the west and Billhope to the east. While these are relatively distant to the site the rural nature of the valley means some visual amenity impacts are likely to occur (as well as noise).	The site is not located close to any settlements. There are some individual properties present along the B6399, however, these are usually well-screened from TEV-05 by a combination of distance, landform and/or commercial forestry. A result the potential for visual amenity related impacts (as well as noise) is considered to be lower relative to the other sites.	The site is located within a generally remote area and distant from settlement, however, some individual properties which could experience visual amenity impacts (s well as noise) are present including Penchrise Farm to the east of the site on the northeast of White Hill as well as properties on the local road to the west including Dodburn and Shankfoot.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Frostley Burn lies to the west of the site and is part of the River Tweed SAC. While it is unlikely to be directly affected by the site, TEV-01 is directly adjacent to and would require a new access crossing of the Phaup Burn which drains into the Frostley Burn and River Tweed SAC. This increases the potential to impact on the River Tweed SAC.	The site is bounded to the west and east by watercourses (Combe Sike and Linhope Burn) which drain into Frostley Burn which is part of the River Tweed SAC. An unnamed watercourse drains the hill into Combe Sike and would require to be diverted or culverted in order to accommodate a substation on the site. As a result, TEV-02 has increased potential to	Northhouse Burn lies to the north/northeast of the site and is part of the River Tweed SAC. While sufficient separation can be provided between the site and watercourse there remains the potential to impact the River Tweed SAC.	The site is generally remote from ecological designations. The Langholm-Newcastle SPA and SSSI lies to the south, less than 1 km at its nearest point.	There are no ecological designations of the highest or high environmental value near to the site.	There are no ecological designations of the highest or high environmental value near to the site.

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
			impact on the River Tweed SAC.				
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are no cultural heritage or archaeological sites of the highest of high environmental value close to the site.	There are no cultural heritage or archaeological sites of the highest of high environmental value close to the site.	There are four scheduled monuments lying in relative proximity to the north and west of the site. While there would be no direct physical impacts there is some potential to impact on the setting of the scheduled monuments. Setting impacts may be reduced due to landform and limits on intervisibility.	There are no cultural heritage or archaeological sites of the highest of high environmental value close to the site.	There are a small number of cultural heritage designations present including the Catrail, a linear earthwork broadly running eastwards through commercial forestry to the north of the site as well as some smaller sites to the north/northwest. The distribution of these designations as well as intervening commercial forestry and/or landform is such that setting impacts from a substation should be avoided.	There are a number of scheduled monuments present within the immediate vicinity of the site. These include hillforts and earthworks thought to date from the Iron Age as well as a number of sites related with Stobs camp which was used for military training before and during the First World War. The location and distribution of these sites means that some setting impacts would be unavoidable.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	While there are no Ancient Woodland Inventory sites close to TEV-01, some wet woodland as identified by the NWSS is present along the Frostley Burn and could be impacted by works required to enable access to the site.	There are no Ancient Woodland Inventory sites or woodland identified by the NWSS. Some mature woodland is present within the site on the banks of the unnamed watercourse which drains the hill. This would require to be removed as part of the development of a substation on the site.	There are no Ancient Woodland Inventory sites or woodland identified by the NWSS.	There are no Ancient Woodland Inventory sites or woodland identified by the NWSS.	There are no Ancient Woodland Inventory sites or woodland identified by the NWSS, however, the site is located on the margins of commercial forestry. Subject to micro-siting some forestry removal would be required to establish access and/or the substation site itself.	There are no Ancient Woodland Inventory sites or woodland identified by the NWSS.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or	The site is bounded to the north by the Phaup Burn (which drains into Frostley Burn) and to the east by Beathill Sike	The site is located to the south of a confluence where the Linhope Burn and Combe Sike meet. These watercourses	Northhouse Burn and Cromrig Burn lie to the north and east of the site respectively with the latter draining into the	Carewoodrig Burn lies to the south of the site within the valley formed by the hills to the north and south. The	There are no watercourses within or immediately adjacent to the site. The Black Cleuch and Sundhope	There are no watercourses within or immediately adjacent to the site.

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
	reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	(which drains into Phaup Burn). There is sufficient space to maintain appropriate separation distances and prevent or reduce impacts on water quality. The site is not in area identified as being at risk of river or surface water flooding based on SEPA Flood Maps, however, adjacent areas along the Phaup Burn which would require to be crossed to access the site are at risk of flooding.	bound the site to north/northeast and north/northwest. While these watercourses can be avoided and an appropriate separation maintained the unnamed watercourse which drains the hill would require to be diverted or culverted in order to accommodate a substation on the site. SEPA Flood Maps do not indicate that the site is at risk of river or surface water flooding, however, land adjacent to the site on the Linhope Burn is at risk of flooding.	former to the north of the site. There is sufficient space to maintain appropriate separation distances and prevent or reduce impacts on water quality. The site is not in area identified as being at risk of river or surface water flooding based on SEPA Flood Maps.	watercourse flows east to west eventually draining into the River Tweed SAC via a number of other watercourses. The site is not in area identified as being at risk of river or surface water flooding based on SEPA Flood Maps.	Burn both drain the hillslope in a generally southern direction. The site is not in area identified as being at risk of river or surface water flooding based on SEPA Flood Maps, however, land adjacent to watercourses downstream of the site are identified as being risk of surface water flooding.	The site is not in area identified as being at risk of river or surface water flooding based on SEPA Flood Maps, however, land adjacent to watercourses downstream of the site are identified as being risk of surface water flooding.
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. The Carbon and Peatland map does not show the site as being underlain by any peatland. Similarly, the British Geological Survey (BGS) Online viewer does not identify any peat within or immediately adjacent to the site.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. Neither the Carbon and Peatland map or the BGS Online Viewer show the site as being underlain by any peatland.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. Neither the Carbon and Peatland map or the BGS Online Viewer show the site as being underlain by any peatland.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. Neither the Carbon and Peatland map or the BGS Online Viewer show the site as being underlain by any peatland. The Carbon and Peatland map shows some peatland (classes 1, 4 and 5) lying to the south of the site.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. The Carbon and Peatland map indicates that the site is partly underlain by peatland (classes 1 and 5). While the amount of peatland affected could be reduced through micro-siting some permanent loss of peat is unavoidable.	There are no geological SSSIs or GCRSs present at or in the vicinity of the site. The Carbon and Peatland map indicates that the site is partly underlain by peatland (class 4). The BGS Online Viewer shows peat is present within the wider area on the lower slopes of the hill.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor	There are no tourism or recreational interests present within the immediate vicinity of the site.	There are no tourism or recreational interests present within the immediate vicinity of the site.	There are no tourism or recreational interests present within the immediate vicinity of the site.	There are no tourism or recreational interests present within the immediate vicinity of the site.	There are no tourism or recreational interests present within the immediate vicinity of the	There are no tourism or recreational interests present within the immediate vicinity of the site.

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
	attractions as much as possible in order to prevent impacts on the amenity of users or visitors.					site. Hermitage Castle lies more than 4km away.	
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	The site has no discernible use, however, livestock grazing is apparent in the wider area. An existing track is routed through the site from Frostley Burn in the west to commercial forestry to the east of the site.	The site or parts of it appear to be used for grazing livestock.	The site or parts of it appear to be used for grazing livestock.	The site has no discernible use, however, livestock grazing is apparent in the wider area.	Commercial forestry is present within and to the north and northeast/east of the site. As noted above subject to micro-siting some forestry removal would be required to establish access and/or the substation site itself.	The site or parts of it appear to be used for grazing livestock.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	The access to the valley is well established with a wide junction connecting to the A7. The access runs broadly west to east up the valley into the commercial forestry. Owing to topography the site is located on the southern side of the valley and would require a new crossing of the Phaup Burn to provide into TEV-01. The site is located the lower slopes of Meg's Hill. While the slope is more gentle to the north/north east of the site land rises up steeply to the south. Extensive earthworks would be required to establish a platform for the substation.	While the site is adjacent to the A7 it is constrained in terms of access. The existing access to the properties at Linhope is narrow and includes a bridge over the Frostley Burn. This would require significant upgrading in order to facilitate access. Alternatively, a new access could be established off of the A7 but would require a new crossing of the Combe Sike. TEV-02 is located on the north/northwest facing slope of Dod Hill. The slopes on this part of the hill are more gentle and should reduce the extent of earthworks required compared to other sites. In relation to the new OHL, the location of TEV-	Access to the site is via an established local road which is routed east/southeast following the landform. The majority of the road is single carriageway with passing places. An access track including a crossing of the Northhouse Burn could provide access into the site but would require upgrading. The site is located on a more gently sloping part of the site, however, land slopes down quite steeply to the north and east while rises up steeply to the south. Earthworks would be required to establish a platform for the substation.	Access to the site is via an existing local road which runs from west to east between Fiddleton and Hermitage. This is formed of a single track with passing places. Significant upgrades would be required to provide access to the site. While the valley has steeply sloping hills to the north and south, the site is located in area where slopes are more gentle in relative terms. Earthworks would be required to establish a platform for the substation. In relation to the new OHL, the location of TEV-04 is considered to be more constrained than other options. This is	Access to the site is via existing tracks within the commercial forestry which in turn are accessed from the B6399. A new access would be required to be constructed from the existing access tracks within the forestry. The site is located on more gently sloping land which forms a plateau before sloping away in a generally southern direction. The location of TEV-05 provides opportunities for the development of route options coming from the east of the Study Area only as well as from west of the Study Area and crossing over to the north of the proposed Teviot Wind	The site is considered to be significantly constrained in terms of access. An existing single carriageway track is routed southwards from the B6399 at Stobs to Penchrise Farm. This would require significant upgrading to enable access for construction of a substation. The site is located on the north facing slopes of White Hill. While slopes are more gentle within the site land on all other sides is more steeply sloping. Extensive earthworks would be required to establish a platform for the substation. In relation to the new OHL, the location of TEV-06 is considered to

Appraisal Topic	Routeing and Siting Objectives	TEV-01 (located to the west of the sub-Study Area)	TEV-02 (located to the west of the sub-Study Area)	TEV-03 (located to the northwest of the sub-Study Area)	TEV-04 (located to the south of sub-Study Area)	TEV-05 (located to the east of the sub-Study Area)	TEV-06 (located to the north of the sub-Study Area)
		In relation to the new OHL, the location of TEV-01 is considered to provide opportunities for the development of route options to the west of the Study Area. In relation to contracted customer connections TEV-01 lies to the west of the proposed Teviot and Liddesdale Wind Farms. While in closer proximity to the former, the latter is located further east.	02 is considered to provide opportunities for the development of route options to the west of the Study Area. In relation to contracted customer connections TEV-02 lies to the west of the proposed Teviot and Liddesdale Wind Farms. While in closer proximity to the former, the latter is located further east.	In relation to the new OHL, the location of TEV-03 is considered to provide opportunities for the development of route options to the west of the Study Area as well as those crossing over to the north of the proposed Teviot Wind Farm to the east of the Study Area. In relation to contracted customer connections TEV-03 lies to the west of the proposed Teviot and Liddesdale Wind Farms. While in closer proximity to the former, the latter is located further east.	because it is located to the south of the proposed Teviot Wind Farm within a valley formed by a series of hills to the north and south. The nature of the landform and topography constrains the development of OHL route options towards TEV-04 compared to other options on the western or eastern margins of the proposed wind farm. In relation to contracted customer connections TEV-04 lies to the south of the proposed Teviot and southwest of Liddesdale Wind Farms.	Farm to the east of the Study Area. In relation to contracted customer connections TEV-05 lies to the immediate east of the proposed Teviot Wind Farm and the west of the proposed Liddesdale Wind Farm.	provide opportunities for the development of route options coming from the west of the Study Area and crossing over to the north of the proposed Teviot Wind Farm to the east of the Study Area. In relation to contracted customer connections TEV-06 lies to the north of the proposed Teviot Wind Farm and the west of the proposed Liddesdale Wind Farm.

Appendix G Strategic Route Corridors Appraisal

Table G.1 Strategic Route Corridors – North of proposed Teviot Wind Farm

Strategic Routeing Consideration	Route Corridor A (NW Quadrant) Gala North to west of Teviot	Route Corridor B (NE Quadrant) Gala North to east of Teviot	Comparative Assessment
Areas of highest or high amenity value	While Route Corridor A has been developed to avoid larger sites of the highest or high environmental value as much as possible, some sites are unavoidable. These are typically smaller ecological and cultural heritage sites of highest or high environmental value including SSSIs and scheduled monuments. The River Tweed SAC and SSSI includes the River Tweed which flows broadly west to the east through the Corridor as it crosses the Tweed Valley as well as the tributaries which include a number of watercourses including the Yarrow Water and Ettrick Water draining the hillslopes within the Corridor in a northeastern direction. The River Tweed and its tributaries cannot be avoided as routes are required to cross them, however, potential impacts on it can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. Additional sites within Route Corridor include Bowland Garden and Designed Landscape, Wiliamshope, Glenkinnon Burn, Kirkhope Linns, Kingside Loch and Alemoor West Loch and Meadow SSSIs as well as a number of scheduled monuments. The Corridor is generally wide enough that it provides opportunities to develop route options which avoid smaller sites of highest or high environmental value within it subject to other routeing considerations.	Route Corridor B has been developed to avoid larger sites of the highest or high environmental value as much as possible, however, there is a small number of ecological and cultural heritage sites of highest or high environmental value including SSSIs and scheduled monuments. The River Tweed SAC and SSSI flows through the Corridor west to east. The designation also includes a number of tributaries which are within the Corridor including the River Teviot and Jed Water. Subject to the identification not all of these tributaries would necessarily require to be crossed by a route option. As with Route Corridor A, potential impacts on the River Tweed and its tributaries can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. Additional sites of highest or high environmental value within Route Corridor B include the Borders Woods SAC (which coincides with the Cragbank and Wolfehopelee SSSI), the Jed Water Woodland SSSI as well as a number of scheduled monuments. The Corridor is generally wide enough that it provides opportunities to develop route options which avoid smaller sites of highest or high environmental value within it, however, there are localised pinch points which increase the potential for adverse effects.	With the exception of the River Tweed SAC and SSSI, Route Corridors A and B both largely avoid sites of the highest or high environmental value. Where sites are located within the corridors there is scope to avoid these through the identification of route options. The distribution of high value constraints to the east of the Study Area, in particular a number of Gardens and Designed Landscapes to the east of the River Tweed Valley means that Route Corridor B is generally narrower than Route Corridor A. The number of potential crossings of the River Tweed SAC and SSSI is lower in Route Corridor B compared to Route Corridor A, however, as noted in the appraisal potential effects on the designated watercourses can be mitigated through the detailed route alignment. There is generally more scope to develop route options within Route Corridor A with greater potential to avoid or increase separation distances from sites of high environmental value compared to Route Corridor B. There are some localised narrow areas within Route Corridor B that increase the potential for pinch points and for adverse effects on areas of highest or high environmental value.
Settlement	Settlement pattern is varied within and immediately adjacent to Route Corridor A. A large part of the corridor, coinciding with upland moorland or forestry is sparsely settled. Smaller settlements or individual/clusters of residential properties are present, however, these are typically confined to lower lying valleys which run across the corridor, for example Clovenfords to the north of the River Tweed, Yarrow which comprises properties coalescing along the A6088 and the Yarrow Water or Teviothead long the A7 and the confluence of the Teviot Water and Frostley Burn.	Route Corridor B has been developed to avoid larger settlements as much as possible. Much of the Corridor comprises low-lying river valley which includes scattered individual/clusters of residential properties. The Corridor provides scope to avoid smaller settlements as well as scattered residential properties, however, the distribution of the latter may result in some properties being within or in closer proximity to route options and require further consideration in the development of a detailed route alignment.	Both Corridors avoid larger settlements and traverse land which is generally sparsely settled. There are some slightly larger villages within Route Corridor A typically present on the A and B roads which cut across the Corridor, however, there is scope to avoid these in the identification of Route Options. A key constraint in both corridors is the distribution of individual or small clusters of residential properties within the open countryside. While many of these will be avoidable, they may be in closer proximity to or within potential route options and

Strategic Routeing Consideration	Route Corridor A (NW Quadrant) Gala North to west of Teviot	Route Corridor B (NE Quadrant) Gala North to east of Teviot	Comparative Assessment
	The Corridor provides scope to avoid smaller settlements as well as scattered residential properties, however, the distribution of the latter may result in some properties being within or in closer proximity to route options and require further consideration in the development of a detailed route alignment.		require further consideration in the development of a detailed route alignment.
Landscape character and sensitivity	Approximately equidistant to the Upper Tweedale NSA to the west (outside of the Study Area) and the Eildon and Leaderfoot NSA to the east (inside of the Study Area). Route Corridor crosses three SLAs that extend along the River Tweed Valley between the two NSAs: Tweedsmuir Uplands SLA1, Tweed Valley SLA 2 and Tweed, Ettrick and Yarrow Confluences SLA 3. To the north of the River Tweed, the landscape is undulating relatively open upland with forestry/woodland typically more prevalent on the steeper slopes of valley sides, such as along Gala Water and the River Tweed. Existing influence of OHLs lines is limited to the far northern section of the corridor to the east of Allanshaws and to the west of the A7 in the southern corridor extents. The northern section of the corridor encompasses LCT 103 Upland Fringe, LCT 91 Plateau Grassland and LCT 114 Pastoral Upland Valley. The enclosed and populated nature of the valleys increases sensitivity and where accommodating settlement, such as at Stow, sensitivity is further increased. This applies both to Gala Water and the River Tweed, the latter being in the SLA. South of the River Tweed, Corridor A remains in SLA designated landscapes to Yarrow Water. Within the SLA the route crosses the Southern Upland Way, impacting an inherently sensitive long-distance route. Once beyond the SLA, the corridor enters an open and elevated upland landscape and then the highly forested Craik Forest in the west and land west of Hawick comprising rolling moorland and upland fringe in the east of the Corridor. In the west, the corridor encompasses large scale and expansive landscapes which are sparsely populated. In the east there is increased proximity to settled, partially enclosed farmland west of Hawick in which the Borders Abbeys Way is located, with greater settlement, recreational use and increased sensitivity.	Directly to the east of Eildon and Leaderfoot NSA and would cross SLA 4 Tweed Lowlands. The Eildon and Leaderfoot NSA forms a prominent landmark and triad of landforms and there is a high degree of inter-visibility towards it from SLA 4 and the rolling farmland outside of it. To the south, the Corridor would cross SLA 5 Teviot Valleys. The corridor encompasses LCT 103 Upland Fringe, LCT 117 Pastoral Upland Fringe Valley, a small section of LCT 99 Rolling Farmland, LCT 109 Lowland Margin with Hills and LCT 120 Lowland Valley with Farmland. The lowland farmland has a strong intact field pattern, with woodland and landform forming an attractive combination, reflected in the SLA designation but also in the wider landscape, increasing sensitivity. Much of this area of rolling mixed farmland forms the foreground to views of the Eildon Hills and is an important aspect of the setting of the NSA. Where present, existing OHLs and towers are widely visible and a prominent element, for example to the north and east of Earlston. South of SLA 4 Corridor B continues through LCT 120 Lowland Valley with Farmland and LCT 99 Rolling Farmland before entering SLA 5 and then LCT 96 Southern Uplands with Forest. The landscape remains broadly similar to the lowland farmland north of SLA 4 in that it has a strong intact field pattern of enclosed arable and pasture, with woodland and landform forming an attractive combination, increasing sensitivity. The A68 is a notable tourist route of scenic value and recreational access is high, as indicated by both the Borders Abbeys Way and St Cuthbert's Way, as well as scenic destinations such as Jedburgh. The proximity to Jedburgh is notable, albeit actual visibility is potentially limited by landform. The smaller scale of landscape elements and the more highly populated context increases sensitivity to OHLs.	Route Corridor A largely lies outside of designated landscapes, entering them in the steep sided valley of the River Tweed in the central part of the corridor. Route Corridor B passes through a more extensive area of SLA 4 Tweed Lowlands and in relative proximity to the east of Eildon and Leaderfoot NSA. There is therefore greater potential for impacts on the designated landscapes from Corridor B including the setting of the NSA. As a result of the striking landforms, views towards the NSA are important and perhaps more so than views outwards from the NSA, with the exception of the views from the Eildon hill summits. Corridor B would impact these views, whereas effects and inter-visibility from Corridor A is less likely. In addition, the settled and enclosed farmland to the north of SLA 4 is itself inherently more sensitive, populated and accessible than the open plateau upland associated with Corridor A. South of SLA 4 the landscape of Corridor B is inherently more sensitive to OHLs than the southern sections of Corridor A, due to scale, enclosure, recreational access and population potentially impacted, including visitors. On entering LCT 96 Southern Uplands with Forest the scale of the landscape, simplicity of landform and forested land use reduces sensitivity. There is generally more scope to develop route options within Route Corridor A with greater potential to avoid landscape and visual effects compared to Route Corridor B.

Strategic Routeing Consideration	Route Corridor A (NW Quadrant) Gala North to west of Teviot	Route Corridor B (NE Quadrant) Gala North to east of Teviot	Comparative Assessment
	The southern section of the corridor, south of Yarrow Water and terminating at the A7, encompasses LCT 93 Southern Uplands with Scattered Forest and the similar LCT 96 Southern Uplands with Forest, both expansive landscapes with large scale elements of landform and land use with a decreased sensitivity to OHLs.		
Substation siting considerations	Route Corridor A finishes to the west of the proposed Teviot Wind Farm adjacent to the A7. The Corridor enables the development of direct route options to TEV-01, TEV-02 and TEV-03. Connections to TEV-05 and TEV-06 would require route options extending across the north of the proposed Teviot Wind Farm using Corridor Link A-B.1 or A-B.2.	Route Corridor A finishes to the east of the proposed Teviot Wind Farm in commercial forestry adjacent to the B6399. The Corridor enables the development of direct route options to TEV-05 only. Connections to TEV-01, TEV-02 and TEV-03 and TEV-06 extending across the north of the proposed Teviot Wind Farm using Corridor Links A-B.2 or Corridor Link B-A.1.	With the exception of TEV-04, both corridors provide scope to connect to the substations under consideration but may result in increases in the length of route options when crossing the Study Area, for example crossing from west to east to connect to TEV-05 or TEV-06 compared to TEV-01, TEV-02 or TEV-03 (or vice versa).

Table G.2 Strategic Route Corridors – South of proposed Teviot Wind Farm

Strategic Routeing Consideration	Route Corridor C (SW Quadrant) west of Teviot to the Border	Route Corridor D (SE Quadrant) east of Teviot to the Border	Comparative Assessment
Areas of highest or high amenity value	Route Corridor C avoids larger sites of the highest or high environmental value with the exception of a small number of watercourses which are part of the River Tweed SAC and SSSI. These tributaries cannot be avoided as routes are required to cross them, however, potential impacts on it can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. Additional sites of the highest or high environmental value are present within Corridor C. These are predominantly scheduled monuments which are present throughout the Corridor as well as two smaller scale SSSIs; Bigholms Burn and Bells Flow towards the southeast of the Corridor. Much of Route Corridor C is generally wide enough that it provides opportunities to develop route options which avoid smaller sites of highest or high environmental value within it, however, there are localised pinch points which increase the potential for adverse effects. These are particularly pronounced in areas where scheduled monuments are more closely located together increasing the requirement for route options to be in closer proximity to them increasing the potential for setting effects. The River Esk valley is a notable constrained area where scheduled monuments are present along the valley with high potential for setting effects.	Route Corridor D avoids larger sites of the highest or high environmental value. The Langholm-Newcastleton SPA and SSSI lies to the west of the corridor and impacts should be avoided. The qualifying features of the SPA (hen harrier) are understood to be largely concentrated to the west of the designated site along the Tarras Water valley. Smaller sites of highest or high environmental value within Route Corridor D comprise three discrete geological SSSIs as well as a small number of scheduled monuments. The distribution of constraints within as well as the width of the Corridor is such that it provides opportunities to develop route options which avoid smaller sites of highest or high environmental value within it subject to other routeing considerations.	Route Corridor C requires crossings of the River Tweed SAC and SSSI which are avoided by Route Corridor D, however, as noted in the appraisal potential effects on the designated watercourses can be mitigated through the detailed route alignment. Both corridors contain smaller sites of highest or high environmental within them, however, there are slightly fewer in Corridor D compared to Corridor C. There is generally scope to develop route options within Route Corridor C and D which avoid small areas of highest or high environmental value, however, the distribution of scheduled monuments within Corridor C (particularly along the River Esk) increases the potential for setting effects compared to Corridor D.
Settlement	A large part of Route Corridor C encompasses upland moorland and commercial forestry and therefore provides opportunities to develop route options which avoid larger settlements. There are some exceptions within this area in particular along the River Esk valley where settlement coalesces along the B709. Moving southwards through the Corridor towards the Scotland-England border the elevation begins to fall (broadly from the B7078 to the border). Within this area there are a greater number of residential properties present throughout. While these are generally avoidable, their distribution means that route options may be in closer proximity to them.	Route Corridor D follows the Liddel Valley in a north to south direction from Route Corridor C to the Scotland-England border. Settlement is generally concentrated along the valley floor following the B6357 or B6399. Newcastleton is the largest settlement within the Corridor extending along the B6357, however, to the north and south of this there are scatted individual residential properties as well as small clusters of properties present. The Corridor provides opportunities to develop route options avoiding more densely settled areas by routeing to the west or east of the Liddel Water Valley.	Both Corridors avoid larger settlements and traverse land which is generally sparsely settled. Settlement within each corridor tends to follow landform meaning in Route Corridor C settlement is more localised extending west to east along the River Esk Valley before elevations reduce and individual properties are scattered through lower lying farmland approaching the border. Whereas Route Corridor D follows the Liddel Valley north to south with settlement including individual and small clusters of properties extending along the valley. Overall, both corridors provide opportunities to develop route options which avoid settlement, however, there is the potential to develop routes in close proximity to individual properties due to their more dispersed nature.

Strategic Routeing Consideration	Route Corridor C (SW Quadrant) west of Teviot to the Border	Route Corridor D (SE Quadrant) east of Teviot to the Border	Comparative Assessment
Landscape character and sensitivity	Langholm Hills RSA extends towards the eastern margins of the Corridor but given the forested nature of the landscape and landform variation there is likely to be limited inter-visibility between the two. The north of this corridor is highly forested, firstly in Craik Forest and then merging into Eskdalemuir Forest, covering a very large expanse of upland with reduced sensitivity to OHL. South of a line between Lockerbie and Langholm the landscape becomes more open and accessible as it enters LCT 75 Foothills, the lower lying areas of moorland and upland pasture. However, this remains a large-scale landscape, somewhat isolated between the A74(M) corridor and the A7. Lines of 33kV corridors cross the corridor in a NE/SW alignment along local B roads but exerting an influence on landscape character. As it turns east towards Langholm the corridor increases in proximity to the Langholm Hills RSA and there is increased highway and other infrastructure, along with a more populated context and greater sensitivity to OHLs.	No landscape designations lie within the Corridor, which in its eastern section is predominantly within the extensive Newcastleton and Kershope Forest areas, a simple landscape of large-scale landform and land uses. This is LCT 96 Southern Uplands with Forest and is of reduced sensitivity to OHLs due to scale and potential to accommodate them within a strongly defined landscape context. The section of the corridor to the west of the B6357 is more open and includes the western slopes of Liddesdale, albeit potentially on the western side of the ridgeline which defines the valley. LCT 160 Narrow Wooded River Valley is of higher sensitivity and likely increased impacts due to the presence of roads along the dale, the more intimate character of the landscape of narrow incised valleys, wooded slopes and enclosed pasture floors.	These two corridor options share similar broad characteristics for much of their extent, the differentiating aspects being the character of the foothills and landscape west of Langholm and in Corridor C and Liddesdale in Corridor D. On balance, the greater forested extent of the eastern section of Corridor D offers the greater opportunity to successfully accommodate the OHLs without undue landscape or visual effects. In addition, fewer visual receptors are likely given the nature of the forested upland throughout that section of the corridor compared to Corridor C and the proximity to highways and Langholm and associated smaller settlements.
Substation siting considerations	Route Corridor C begins to the west of the proposed Teviot Wind Farm adjacent to the A7. It enables more direct route options from TEV-01, TEV-02 or TEV-03. While route corridor links would provide scope to develop route options from TEV-05 or TEV-06 the overall directness of route options would depend on the Route Corridor used to the north. • A combination of Route Corridor A and Route Corridor C using TEV-01, TEV-02 or TEV-03 would enable relatively direct route options on the west of the corridor. • A combination of Route Corridor A and Route Corridor C (and corridor links) using TEV-05 or TEV-06 would be less direct overall. It would require the use of corridor links for route options to cross to the north of proposed Teviot Wind Farm but these would need to ‘doubleback’ to Route Corridor C.	Route Corridor D begins to the east of the proposed Teviot Wind Farm. It enables more direct route options from TEV-05 or TEV-06. While route corridor links would provide scope to develop route options from TEV-01, TEV-02 or TEV-03 the overall directness of route options would depend on the Route Corridor used to the north. • A combination of Route Corridor B and Route Corridor D using TEV-05 or TEV-06 would enable relatively direct route options on the east of the corridor. • A combination of Route Corridor B and Route Corridor D (and corridor links) using TEV-01, TEV-02 or TEV-03 would be less direct overall. It would require the use of corridor links for route options to cross to the north of proposed Teviot Wind Farm but these would need to ‘doubleback’ to Route Corridor C.	With the exception of TEV-04, both corridors provide scope to develop onwards route options from the substations to the Scotland-England border. Subject to the combination of route corridors utilised (north and south of the proposed Teviot Wind Farm) this may result in increases in the length of route options when crossing the Study Area, for example crossing from west to east to connect to TEV-05 or TEV-06 compared to TEV-01, TEV-02 or TEV-03 (or vice versa).

Table G.3 Strategic Route Corridors Links

Strategic Routeing Consideration	Corridor Link A-B.1 (NW to NE Quadrant)	Corridor Link A-B.2 (NW to NE Quadrant)	Corridor Link B-A.1 (NE to NW Quadrant)
Areas of highest or high amenity value	The route corridor link requires at least two crossings of the River Tweed SAC and SSSI due to tributaries flowing through the corridor, however, potential impacts on it can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including number of SSSIs as well as scheduled monuments. These are largely avoidable but the corridor link is relatively narrow which provides less scope for the development of route options within it and increases the potential for effects due to increased proximity.	The route corridor link requires at least four crossings of the River Tweed SAC and SSSI due to tributaries flowing through the corridor, however, potential impacts on it can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including number of SSSIs as well as scheduled monuments. These are largely avoidable particularly where the corridor is wider to the west, however, as it narrows to the east it provides less scope for the development of route options and the number and distribution of scheduled monuments increases. This increases the potential for setting effects to occur to the east of the corridor as it approaches TEV-05 or TEV-06.	The route corridor link requires at least three crossings of the River Tweed SAC and SSSI due to tributaries flowing through the corridor, however, potential impacts on it can be addressed through the identification of more detailed route alignments and consideration of tower positions and appropriate standoff distances to the designated watercourses. There are a small number of other areas of highest or high amenity value including number of SSSIs as well as scheduled monuments. These are largely avoidable but the corridor link is relatively narrow which provides less scope for the development of route options within it and increases the potential for effects due to increased proximity.
Settlement	The route corridor link is routed to the north of Hawick avoiding larger settlement but some smaller settlements and individual properties are present in particular to the east and south of Hawick.	There are a number of smaller settlements present including Ettrickbridge, Roberton, Branxholme and Newmill but the corridor link provides scope to develop route options which avoid them. Some scattered individual properties are present throughout which could be affected by the proximity of route options and/or affect the directness of route options.	The route corridor link avoids larger settlements, however, the corridor link extends in a southwestern direction which is contrary to settlement patterns. Smaller settlements and individual properties are typically present within valleys which require to be crossed by the corridor link. There is some scope to develop route options avoiding settlement but the potential for increased proximity and potential impacts to occur due to the pattern of settlement is more likely.
Landscape character and sensitivity	The route corridor link clips / is adjacent to the bottom end of SLA 3 Tweed, Ettrick and Yarrow Confluences and passes through the edge of SLA 5 Teviot Valleys to the north of Hawick. It runs broadly parallel or along the route of the Borders Abbeys Way north-west of Hawick. It crosses the 132kV line at Drinkstone Hill near the A7. Most of the corridor north of Hawick lies within the unenclosed but partially forested landscape of LCT 94 Rolling Moorland. LCT 94 is a sparsely settled landscape of large-scale rolling landform which is relatively open and, in this corridor, is close to the A7. Close to Hawick the landscape changes to a more enclosed field pattern of managed grassland within LCT 99 Rolling Farmland. The open nature and expansive views increase sensitivity in the section north of Hawick and through SLA Teviot Valleys. The route	The route corridor link broadly passes through the same landscapes as corridor link A-B.1 but includes an area of LCT 117 Pastoral Upland Fringe Valley encompassing the valleys of Ale Water and Borthwick in its central section. Sensitivity is largely as described for corridor link A-B.1 with added sensitivity derived from the valleys in LCT 117 counterbalanced by the relatively sparse population and the absence of designated landscapes. In the south the corridor is crossed by the A7 at a point which includes a 132kV line running parallel to the A7 valley and prominent from within it. South of the A7 the landscape is more forested and the scale of the forestry and potential to screen OHLs within it reduces sensitivity.	The majority of this corridor link falls within SLA 5 Teviot Valleys which increases sensitivity substantially compared with the other two route corridor links. Outside of the SLA the corridor link lies within LCT 101 Rocky Upland Fringe which is open and exposed in character on higher ground, with distant and panoramic views prevalent, resulting in increased sensitivity to OHLs. Overall, there is limited scope to avoid significant landscape and visual effects in this link corridor.

Strategic Routeing Consideration	Corridor Link A-B.1 (NW to NE Quadrant)	Corridor Link A-B.2 (NW to NE Quadrant)	Corridor Link B-A.1 (NE to NW Quadrant)
	corridor link passes close to Hawick, further increasing sensitivity and numbers of potential viewers. South of Hawick the route occupies LCT 101 Rocky Upland Fringe before terminating in LCT 93 Southern Uplands with Scattered Forest. LCT 101 Rocky Upland is open and exposed in character on higher ground, with distant and panoramic views prevalent, resulting in increased sensitivity to OHLs. LCT 93 is a large-scale landscape, open and exposed with a sense of remoteness and wildness which increases value and sensitivity. Overall, there is limited scope to avoid significant landscape and visual effects in this link corridor.	Overall, there is some scope to limit significant landscape and visual effects in the western and southern sections of this link corridor.	
Substation siting considerations	Enables an alternative and more direct route from the west of the Study Area towards TEV-05 and TEV-06.	Enables an alternative and more direct route from the west of the Study Area towards TEV-05 and TEV-06.	Enables an alternative and more direct route from the east of the Study Area towards TEV-01, TEV-02 and TEV-03.

Appendix H Route Options Appraisal

Table H.1 Section A Proposed Gala North Substation to the River Tweed Route Options Appraisal (Route Options 1 and 2)

Appraisal Topic	Routeing and Siting Objectives	Section A Route Option 1	Section A Route Option 2a	Section A Route Option 2b	Section A Route Link 2b to 2a
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	Option 1 is outside of designated landscapes and in proximity to the Long Park windfarm. It lies within LCT 103 Undulating Upland Fringe and LCT 91 Plateau Grassland. It is an undulating upland and plateau landscape with an open and simple character which can accommodate large scale infrastructure.	Route 2a lies within LCT 91 Plateau Grassland, LCT 114 Pastoral Upland Valley, LCT 103 Undulating Upland Fringe and LCT 116 Upland Valley with Woodland. For much of its length Option 2a occupies high ground defined by a series of local hills, including William Law and Mains Hill at over 350mAOD. It traverses the Gala Water valley from these high points such that there is likely to be a widespread and complex interaction with the host landscapes. This would include a locally sensitive area of rural valley farmland and river landforms in the vicinity of Craigneuk, as well as a complex crossing of the A7. Whilst this option does not directly impact on Bowland GARDEN AND DESIGNED LANDSCAPE it has the potential to effect views from the GARDEN AND DESIGNED LANDSCAPE across the parkland which extend to the south and south-east of the house towards this route option. The southern section of this route option lies within the Tweed, Ettrick and Yarrow Confluences SLA 3 where it crosses the Rover Tweed which contains mature woodland vegetation and steep topography along the northern edge of the valley resulting in greater landscape effects.	Route 2b lies within the same LCTs as Route 2a. The upland and open large-scale landscapes of this route option are broadly more remote and less accessible with fewer landscape elements of value. The landscape of Gala Water valley east of Stow is of particular sensitivity but contains landform which would reduce the geographical effects on character and forestry which would assist in screening, backclothing and integration of OHLs. This route option is not likely to affect the setting of Bowland GARDEN AND DESIGNED LANDSCAPE as substantial woodland surrounds the northern and western extents of the GARDEN AND DESIGNED LANDSCAPE and the parkland and views are orientated away from this route option. Within SLA 2 Tweed Valley, the location close to the edge of the large-scale forestry of Elibank and Traquair Forest and the associated woodland of Thornylee Crags north of the Tweed, coupled with the opportunity for a perpendicular crossing of the valley at a narrowing point, suggests mitigation of landscape effects is possible.	This link lies within LCT 103 Undulating Upland Fringe and would cut across the landform and involve multiple crossings of a local road to the west of Clovenfords before entering SLA 3 Tweed, Ettrick and Yarrow Confluences at an angle which would emphasise effects on the edge of the SLA. The character of the open, western route into Clovenfords would be impacted by the scale and alignment of the OHLs in this link corridor.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially	Views from Stow, largely within the valley of the Gala Water, are unlikely due to distance and intervening landform. There are several isolated properties within the route corridor but also blocks of woodland and	Although the northern section of the route is sparsely populated it contains a core path adjacent to the B710, increasing likely visibility within a locally enclosed context of the undulating landform. Thereafter the route passes	Views from Stow and the A7 which follows the Gala Water at that point, are a constraint which would require an alignment back from the valley ridgeline and behind intervening forestry where practicable to avoid impacting on	The link option runs broadly parallel to a core path within an enclosed valley side context and crosses the local road out of Clovenfords twice, resulting in an alignment with a likely high degree of

Appraisal Topic	Routeing and Siting Objectives	Section A Route Option 1	Section A Route Option 2a	Section A Route Option 2b	Section A Route Link 2b to 2a
	adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	topographical variation which would allow some mitigation, depending on sensitive micro-siting of the OHL and positioning of towers.	close to Clovenfords in a landform pinch point which would emphasize the scale of the towers in proximity to the village, with no likely mitigation and relatively large numbers of viewers. South of Clovenfords within SLA3 Tweed, Ettrick and Yarrow Confluences, visual amenity would be locally significantly impacted within the open valley side of the SLA as it crosses the River Tweed, reducing somewhat on the more wooded south side of the valley.	settlement views. The wind farm at Longpark is not visible from Stow, suggesting that towers and OHLs could be similarly accommodated, even within land to the west of the wind farm. The visual effects of the crossing of the Gala Water valley would be unavoidable, potentially resulting in a pinch point between Bow Farm and the monument of Bow Castle but away from the main settlement of Stow, screened by intervening landform. In the southern section numbers of properties and potential viewers diminish and an appropriate alignment between landforms would assist in limiting visual impact. In SLA 2 an alignment between the localised high point of Cauld Face and the edge of the large-scale forestry of Elibank and Traquair Forest and Thornylee Crags represents an opportunity to minimise effects on recreational users of the Tweed Valley SLA 2 and given distance, on residents of Clovenfords.	visual impact with little mitigation possible.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Route Option 1 avoids sites designated for nature conservation or ecological interests. The nearest site of highest or high environment value is Threepwood Moss SAC and SSSI which is located to the south of the proposed Gala North Substation and south/southeast of Route Option 1. Given the intervening distance (c.800m) it is unlikely that Route Option 1 would impact Threepwood Moss. There are no ecological sites of moderate or low environmental value within Route Option 1. The Lauder Burn Heriot Side to Threepwood Bridge LBS is located adjacent to the Route Option where it extends west from the proposed substation. The potential to	Route Option 2a is required to cross the Gala Water which is part of the River Tweed SAC south of Whitelee Farm as well as cross the River Tweed SAC and SSSI at the western/southern-most extent of the route option. Crossings of the designated site are unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects. There are no other ecological designations of the highest or high environmental value within the vicinity of Route Option 2a. Route Option 2a would be required to cross The Nest/Laidlawstiel Wood LBS, an area moderate or low environmental value where it crosses the River Tweed.	Route Option 2b is required to cross the Gala Water which is part of the River Tweed SAC southwest of Torsonce Hill. It is also required to cross the River Tweed SAC and SSSI at Thornielee. Crossings of the designated site are unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects. There are no other ecological designations of the highest or high environmental value within Route Option 2b, however, the Moorfoot Hills SAC and SSSI is located to the north of it. Impacts on the Moorfoot Hills should be avoided as Route Option 2b does not directly cross	The route link requires two crossings of the Caddon Water where it is part of the River Tweed SAC. There are no other ecological designations within or close to the link. The watercourse can be spanned with OHL towers carefully located to avoid/reduce the potential for adverse effects.

Appraisal Topic	Routeing and Siting Objectives	Section A Route Option 1	Section A Route Option 2a	Section A Route Option 2b	Section A Route Link 2b to 2a
		impact the LBS is low and can be addressed through detailed design.	Some loss of woodland within the site is likely to occur.	the site and blanket bog or heathland for which it is designated. There are no ecological sites of moderate or low environmental value within Route Option 2b.	
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are no cultural heritage or archaeology sites of the highest or high environmental value within or close to Route Option 1. There are two listed buildings located to the south approximately 600m from the route option at their nearest point. Impacts on cultural heritage or archaeological designations including on their setting are considered unlikely.	There is one listed building within Route Option 2a which could experience setting effects subject to the proximity of an OHL route. While Route Option 2a is routed to south of and avoids Bowland Garden and Designed Landscape it is directly within views from it. The Garden and Designed Landscape is orientated to have views south along the Gala Water within which Route Option 2a would be prominent. There are some scheduled monuments within the vicinity of Route Option 2a but impacts on these including their setting should be limited.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 2b. There are two scheduled monuments, Bow Castle broch on Bow Hill and cultivation terraces on Cauld Face which lie to the south of the Route Option. Subject to the identification of a detailed alignment, potential setting effects may be avoided through use of landform to reduce intervisibility.	There are no cultural heritage or archaeology sites of the highest or high environmental value within or close to the route link.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	There are small woodland shelterbelts present throughout Route Option 1 largely forming field boundaries. None of these woodlands are Ancient Woodland Inventory sites nor are they identified by the Native Woodland Survey of Scotland.	There are small woodlands present throughout including one Ancient Woodland Inventory site which slightly extends into the option where it crosses the River Tweed. Some woodland is identified in the Native Woodland Survey of Scotland including wet woodland on the Halk Burn, upland mixed ashwood on the Gala Water as well as small areas of lowland mixed deciduous woodland. The distribution of woodland within Route Option 2a means some tree removal will be unavoidable.	There is one Ancient Woodland Inventory site present, Steelburn Wood at the southern extent of Route Option 2b where is crosses the River Tweed. Other woodland is present throughout the Route Option including some areas identified in the Native Woodland Survey of Scotland The distribution of woodland within Route Option 2b means some tree removal will be unavoidable. This could include parts of Steelburn Wood which extends across the route option and would require to be crossed.	There are two small areas of woodland on the margins of the route link.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies	There are a small number of unnamed watercourses within Route Option 1 draining in a southern or southeastern direction towards the Allan Water. An	There are a number of watercourses which require to be crossed by Route Option 2a. These range from small unnamed watercourses to larger	There are a number of watercourses which require to be crossed by Route Option 2b. These range from small unnamed watercourses to larger	As noted above the route link requires to cross the Caddon Water twice. The watercourse could be spanned with OHL towers carefully located to

Appraisal Topic	Routeing and Siting Objectives	Section A Route Option 1	Section A Route Option 2a	Section A Route Option 2b	Section A Route Link 2b to 2a
	in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	OHL route would be required to cross the watercourses, however, impacts on them could be mitigated through design and construction.	watercourses including the Gala Water and the River Tweed. An OHL route would be required to cross multiple watercourses within Route Option 2a, however, impacts on them could be mitigated through design and construction.	watercourses including the Gala Water and the River Tweed. An OHL route would be required to cross multiple watercourses within Route Option 2b, however, impacts on them could be mitigated through design and construction.	avoid/reduce the potential for adverse effects.
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	There are no sites designated for geological reasons within or in close proximity to Route Option 1. The Carbon-rich Soils and Peatland Map does not identify any peatland or other carbon rich soils within Route Option 1.	There are no sites designated for geological reasons within or in close proximity to Route Option 2a. The Carbon-rich Soils and Peatland Map does not identify any peatland or other carbon rich soils within Route Option 2a.	There are no sites designated for geological reasons within or in close proximity to Route Option 2b. A small area of Class 3 and Class 4 peat is present to the east of Route Option 2b north of the existing Long Park Wind Farm. This could be avoided in developing a detailed route alignment so adverse effects should be prevented.	There are no sites designated for geological reasons within or in close proximity to the route link. The Carbon-rich Soils and Peatland Map does not identify any peatland or other carbon rich soils within the route link.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions or recreational routes within Route Option 1.	There are no major visitor attractions or recreational routes within Route Option 2a with the exception of a section of Core Path which follows the B710.	There are no major visitor attractions or recreational routes within Route Option 2b with the exception of a section of Core Path which between Blackhaugh and Stow which would require to be crossed.	There are no major visitor attractions or recreational routes within the route link.
Land Use	• To develop route and site options while having regard to existing land	Land use within Route Option 1 is largely agricultural. The national scale land capability for agriculture map	Land use within Route Option 2b is largely agricultural. The national scale land capability for agriculture map	The national scale land capability for agriculture map indicates that the majority of Route Option 2b is underlain	Land use within the route link is mainly agricultural. The national scale land capability for agriculture map indicates

Appraisal Topic	Routeing and Siting Objectives	Section A Route Option 1	Section A Route Option 2a	Section A Route Option 2b	Section A Route Link 2b to 2a
	uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	indicates that the majority of Route Option 1 is underlain by land which is capable of producing a narrow range of crops or for use as improved grassland.	indicates that the majority of Route Option 2a is underlain by land which is capable of producing a narrow range of crops or for use as improved grassland. A small narrow area close to and following the River Tweed is identified as having higher capability.	by land which is capable of producing a narrow range of crops or for use as improved grassland. A small narrow area close to and following the River Tweed is identified as having higher capability.	that the majority of Route Option 2b is underlain by land which is capable of producing a narrow range of crops.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Altitudes within Route Option 1 steadily increase moving westwards from around 260mAOD close to the proposed substation to between 330 and 380mAOD to the west. Land is typically more elevated to the north of Route Option 1 where it reaches Sell Moor. To the south close to Woodplaw elevations are slightly lower. Route Option 1 widens out at its western extent where it approaches the existing Long Park Wind Farm. The Route Option avoids the wind turbines as well as maintaining an appropriate separation distance.	Altitudes with Route Option 2a are heavily influenced by the three watercourses which flow through it: Gala Water, Caddon Water and River Tweed. Elevations for much of the Route Option are between 350 and 400mAOD dropping down to 120mAOD within river valleys. This results in some localised steep slopes particularly to the north of Caddon Water and north and south of the River Tweed.	The majority of land within Route Option 2b is at altitudes of between 350 and 400mAOD. There are some areas coinciding with the Stantling Craig Reservoir, Gala Water and River Tweed where elevations are much lower. The latter two areas result in some steep topography descending Bow Hill to cross the Gala Water and Cauld Face towards the River Tweed.	Altitudes are typically around 250mAOD within the route link. It is routed across some steep side slopes in particular crossing Laidlawstiel Hill.

Table H.2 Section B River Tweed to the A7 Route Options Appraisal (Route Options 1 and 2)

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 1	Section B Route Option 2a	Section B Route Option 2b	Section B Route Link 2b to 2a
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	This Route Option lies entirely within LCT 93 Southern Uplands with Scattered Forest and the SLA 3 Tweed, Ettrick and Yarrow Confluences, which is unavoidable as an extension of any of the Section A options. Effects on the character of the SLA would be partially mitigated and localised by an alignment along the forest edge and between localised landforms of Middle Hill and Broom Law.	The northern section passes through SLA 3 Tweed, Ettrick and Yarrow Confluences and then a small section SLA 1 Tweedsmuir Uplands and then entering LCT 93 Southern Uplands with Scattered Forest followed by LCT 113 Upland Valley with Pastoral Floor to the south. The landform is particularly complex between rounded hills and the Yarrow valley but of a scale that can potentially accommodate the towers and OHLs. However, this is a relatively remote and undeveloped area with recreational value expressed in long distance routes and the SLAs and isolated properties such that, away from the A708 along the Yarrow, there is increased sensitivity to the introduction of towers and OHL.	This Route Option is predominantly within SLA 1 Tweedsmuir Uplands and partially within SLA 3 Tweed, Ettrick and Yarrow Confluences, both designations denoting increased sensitivity. The LCTs it crosses remain the same as Route Option 2a. The northern section of 2b is forested and this increases mitigation potential through screening and backclothing opportunities, whilst the southern section is a complex series of hills within a relatively remote and undeveloped area. Careful siting in relation to these landforms would assist in localising effects on landscape character.	This Route Link lies predominantly within LCT 113 Upland Valley with Pastoral Floor with a small section falling into LCT 93 Southern Uplands with Scattered Forest. This short link would exit SLA 1 across the Yarrow Valley and up the steep hillside of Rough Knowe, resulting in effects on the enclosed valley, with limited mitigation and wider effects on the fringes of the SLAs.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	There are a small number of isolated properties, views from which would potentially be impacted. The Southern Upland Way/Cross Borders Drove Road/Old Drove Road long distance paths cut across the corridor perpendicularly which would result in localised impacts (partially contained by forestry and landform) over approximately 2 to 3km.	In addition to views from isolated properties in a sparsely populated area, users of the Cross Borders Drove Road would cross the route perpendicularly while users of the Southern Upland Way would cross part of the route. Views from the A708 would occur within the confines of the Yarrow valley, increasing perceived magnitude in the enclosed context.	There are three isolated properties within this route option, views from which could be avoided through careful routeing. Apart from views from The Southern Upland Way/Cross Borders Drove Road/Old Drove Road long distance path in the north of the option, there are few identifiable viewpoints other than the series of isolated hills, all within the SLA.	Views would predominantly be from the A708 and isolated properties in the Yarrow Valley. The enclosed nature of the value and viewpoint locations within the lower sections of the landform would accentuate visual effects.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	There are no ecological designations of the highest or high environmental value within Route Option 1. The route option narrows at it crosses Ashistiel Hill to avoid Williamhope SSSI.	Route Option 2a is required to cross the Yarrow Water which is part of the River Tweed SAC and SSSI. A crossing of the designated site is unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects. There are no other ecological designations of the highest or high	There are no ecological designations of the highest or high environmental value within or adjacent to Route Option 2b. Fingland Burn LBS is located to the north of Route Option 2b extending north to south along the western boundary of plantation woodland and slightly into Route Option 2b. There is scope to develop a	The route link requires to cross the Yarrow Water which is part of the River Tweed SAC and SSSI. A crossing of the designated site is unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 1	Section B Route Option 2a	Section B Route Option 2b	Section B Route Link 2b to 2a
			environmental value within the vicinity of Route Option 2a. To the south of Route Option 2a it partly crosses Hangingshaw Wood and Rig and Lewenshope Brae LBS. Some loss of habitat within the LBS would be unavoidable, however, there would be opportunities to reduce this in developing a detailed route alignment.	detailed alignment which avoids the LBS.	
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 1. Wallace's Trench, a scheduled monument lies to the south of Route Option where it meets Route Options 2a and 2b. Subject to detailed routeing there is the potential for setting effects, however, there are opportunities to reduce potential effects through the use of landform.	Wallace's Trench scheduled monument lies to the north/northwest of Route Option 2a extending northwards from Minchmoor Road to Brown Knowe and the Southern Upland Way. Physical adverse effects on the scheduled monument can be avoided, however, there is the potential for setting impacts subject to detailed route alignment. There are no other cultural heritage designations of the highest or high environmental value within or close to Route Option 2a.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 2b. Wallace's Trench scheduled monument lies to the northeast of but can be avoided. Subject to detailed route alignment there may be some potential for setting impacts. There are no other cultural heritage designations of the highest or high environmental value within or close to Route Option 2b.	There are two small scheduled monuments present within the route link: Glebe Stone and Yarrow Stone. There is scope to avoid these sites, however, subject to detailed route alignment there is some potential for setting effects.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	Route Option 1 is adjacent to the southern or eastern boundary of Traquair Forest as it ascends Ashistiel Hill, however, there is no woodland within the route option.	A section of Route Option 2a is routed through plantation woodland between Whitehope Rig and Old Hill. Two unnamed Ancient Woodland Inventory Sites are present to the south of the option, north of the A708. Some of the woodland present is identified on the Native Woodland Survey of Scotland including upland oakwood and upland birchwood. Some tree removal including within an Ancient Woodland Inventory site will be unavoidable, however, there are opportunities to limit this following existing breaks or seeking to cross through areas of less mature planting.	Part of Route Option 2b crosses plantation forestry to the south of Tweed Valley Forest Park. There are no Ancient Woodland Inventory sites and only a very small proportion of woodland cover is identified in the Native Woodland Survey of Scotland. The extent of plantation woodland to north of this option means tree removal would be unavoidable, however, there are some opportunities to reduce this by utilising existing breaks as much as possible in developing a detailed route alignment.	There are small areas of woodland within the route link. Subject to detailed route alignment and consideration of other routeing constraints some tree removal may be required.
Water resources	• To develop route and site options which adhere to a minimum 50m separation	Some minor watercourses are present including Stiel Burn and North and South Grain. While these may require	There are a number of watercourses present draining hillslopes in a southern or southeastern direction	There are a number of watercourses present within Route Option 2b typically draining southeast or east	The Yarrow Water as well as some other smaller watercourses require to be crossed by the route link. While

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 1	Section B Route Option 2a	Section B Route Option 2b	Section B Route Link 2b to 2a
	zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	toward the Yarrow Water. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	across the route option. While a number of these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	There are no sites designated for geological reasons within or in close proximity to Route Option 1. The Carbon-rich Soils and Peatland Map identifies Class 5 soils extending into the route option from the north over South Height while some Class 4 soils are present extending into the route option from the north over Middle Hill.	There are no sites designated for geological reasons within or in close proximity to Route Option 2a. The Carbon-rich Soils and Peatland Map identifies Class 3 and Class 5 are present to the south of route option extending into the east of the option south of the Yarrow Water. This includes small areas of Class 3 soils north of Craighope Burn and on Kershope Burn as well as a larger area of Class 5 soils north of Black Knowe Head.	There are no sites designated for geological reasons within or in close proximity to Route Option 2b. The Carbon-rich Soils and Peatland Map identifies a number of small areas of Class 3 and 5 soils present within Route Option 2b. The scale and distribution of these areas provides opportunities to develop detailed route alignments which could avoid them.	There are no sites designated for geological reasons within or in close proximity to the route link. Two small areas of class 3 and class 5 soils are present within the route link based on the Carbon-rich Soils and Peatland Map.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	Part of the Southern Upland Way is routed in an east-west direction across the southeast of the route option on the slopes of Brown Knowe. This section of the Southern Upland Way coincides with Old Drove Road and is also part of a Core Path.	A small section of the Southern Upland Way crosses the northwestern corner of the route option. Further south the Cross Borders Drove Road crosses the option in northwestern direction between Whitehope Rig and Lewenhope Rig.	Small sections of the Southern Upland Way and Cross Borders Drove Road cross this route option to the north.	There are no major visitor attractions or recreational routes within the route link.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and	The national scale land capability for agriculture map indicates that the majority of Route Option 1 is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the majority of Route Option 2a is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the majority of Route Option 2b is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the majority of Route Option 2a is underlain by land which is capable of producing a narrow range of crops or for use as improved grassland.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 1	Section B Route Option 2a	Section B Route Option 2b	Section B Route Link 2b to 2a
	seeking to reduce impacts on existing land use as much as possible.				
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Altitudes within Route Option 1 change significantly rising up from around 200mAOD immediately south of the River Tweed to 500mAOD at the peak of Brown Knowe. There are some significantly steep slopes including the north facing slope of Ashiestiel Hill and northeast facing slope of Brown Knowe.	North of the Yarrow there is a series of relatively steep sided valley present within Route Option 2a typically orientated northwest to the southeast. Altitudes are generally between 350 and 400mAOD except within these valleys where it reduces to around 200mAOD. At the Yarrow Water landform is less steep to the north and gently slopes down from Old Hill to the watercourse. On the south-side of the valley hillslopes are steeper rising up from 200mAOD to around 400mAOD.	Altitudes within Route Option 2b are typically between 450 and 500mAOD. There are a number of steep-sided valleys preset orientated across the Route Option which would require to be crossed.	Altitudes within the route link are less than 300mAOD. The Yarrow Water flows within a lower lying valley. The Valley slopes vary in steepness; the western side of the route link (north of Yarrow) is more gentle, however the eastern side (south of Yarrow) rises up more steeply and then routes across the side slopes of Rough Knowe.

Table H.3 Section B River Tweed to the A7 Route Options Appraisal (Route Option 3)

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 3a	Section B Route Option 3b	Section B Route Option 3c	Section B Route Link 3c to 3b
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	This Route Option falls within small sections of LCT 93 Southern Uplands with Scattered Forest and LCT 116 Upland Valley with Woodland with the majority of the Route Option sitting within LCT 94 Rolling Moorland. Option 3a will traverse the steep landform of the Ettrick Water valley on the edge of SLA 3 in a way which cuts across the topography and introduces prominent infrastructure with limited mitigation options.	This Route Option is in open, elevated and undulating landscape of LCT 93 Southern Uplands with Scattered Forest, a large-scale rolling landform with simple land use increasing ability to accommodate large scale infrastructure. In its southernmost extent the option lies within LCT 113 Upland Valley with Pastoral Floor and will traverse the steep landform of the Ettrick Water valley at a narrow point, partially mitigating effects from OHL.	This Route Option lies within the same LCTs as Option 3b. On leaving SLA 1 the route crosses LCT 93 Southern Uplands with Scattered Forest. As described for option 3b this is a large-scale rolling landform with simple land use increasing ability to accommodate large scale infrastructure.	This option will be sited in the open, elevated and undulating landscape of LCT 93 Southern Uplands with Scattered Forest, a large-scale rolling landform with simple land use increasing ability to accommodate large scale infrastructure. Whilst the Route Link doesn't entirely avoid LCT 113 Upland Valley with Pastoral Floor it would be possible to entirely avoid the more sensitive Ettrick Water valley.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	The option traverses the valley perpendicular to the landform and views along the valley will include those from Ettrickbridge to the south-west, multiple isolated properties and from a core path along the Ettrick Water.	If the OHL is sited to the west of the corridor the majority of it will be in an isolated area with few viewers. Visual impacts will increase within the Ettrick Water valley but potentially, if located westwards, in an area less prominent and with the benefit of some forestry screening the number of views affected could be limited. Numbers of viewers are potentially low.	The main visual impact, apart from isolated properties and from the hamlets of Sundhope and Gilmanscleuch, will be for users of the A708 in the north of the corridor and B7009 in the south. Accessible elevated viewpoints are likely to be limited or visited by few people.	The main visual impact, will be experienced by isolated properties and as a result of passing between the hamlets of Sundhope and Gilmnanscleuch, equidistant from both and with likely open views towards the corridor.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Route Option 3a is required to cross the Ettrick Water which is part of the River Tweed SAC and SSSI. A crossing of the designated site is unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 3b is required to cross the Ettrick Water which is part of the River Tweed SAC and SSSI. A crossing of the designated site is unavoidable, however, it can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 3c requires crossings of the Yarrow Water and Sundhope Burn to north and the Ettrick Water to the south, all of which are part of the River Tweed SAC and SSSI. Crossings of the designated sites are unavoidable, however, these can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	There are no ecological designations within or close the route link between route options 3c and 3b.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 3a	Section B Route Option 3b	Section B Route Option 3c	Section B Route Link 3c to 3b
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are two scheduled monuments present within the route option, Huntly Burn enclosure and earthwork located close together between the B7009 and Huntly Burn. While direct physical impacts on the scheduled monuments can be avoided, subject to detailed routeing there is the potential for setting effects. There are additional scheduled monuments within the vicinity of the route option including an earthwork at Brockill Burn which would experience setting effects.	A scheduled monument and listed building are present at Kirkhope tower to the northeast of Route Option 3b. The scheduled monument relates to the barmkin and barmkin wall while the listed building relates to the tower. There is scope avoid the designations within the route option, however, subject to detailed route alignment there is the potential for setting effects.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 3c.	There are no cultural heritage or archaeology sites of the highest or high environmental value within the route link.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	There are a number of small Ancient Woodland Inventory sites present within Route Option 3a including on the west and south facing slopes of Fauldshope West Hill and along the northern banks of the Ettrick Water stretching across almost the full width of the route option. Parts of the ancient woodland sites coincide with woodland identified on the Native Woodland Survey of Scotland. The extent and distribution of woodland within Route Option 3a means some tree removal including within Ancient Woodland is unavoidable.	There are pockets of woodland present within the route option including some which are identified on the Native Woodland Survey of Scotland. Woodland is typically avoidable subject to other routeing considerations and detailed route alignment.	There are pockets of woodland present within the route option including some which are identified on the Native Woodland Survey of Scotland. Woodland is typically avoidable subject to other routeing considerations and detailed route alignment.	There is limited woodland cover present within or on the margins of the route link.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	There are a number of watercourses present within Route Option 3a draining toward the Ettrick Water. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	In addition to the Ettrick Water, there are some smaller watercourses present which would require to be crossed by an OHL route. Adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There are a number of watercourses present within Route Option 3c. This includes larger watercourses such as the Yarrow Water broadly flowing across the route option as well as smaller unnamed watercourses some of which flow south to north or north to south draining into the larger watercourses. Adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers, however, the	There are some unnamed watercourses draining the hillslopes within the route link within a southeastern direction. Adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 3a	Section B Route Option 3b	Section B Route Option 3c	Section B Route Link 3c to 3b
				number of watercourses present may result in increased proximity to them.	
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	There are no sites designated for geological reasons within or in close proximity to Route Option 3a. The Carbon-rich Soils and Peatland Map identifies Class 1, 3 and 5 soils are present within the route option. Class 3 soils occupy a large area extending across the option to the south of Hutlerburn Hill. The extent and distribution of soils means that some impacts on peatland would be unavoidable.	There are no sites designated for geological reasons within or in close proximity to Route Option 3b. The Carbon-rich Soils and Peatland Map identifies Class 3 soils are present within the route option including on Newhouse Kip and Singlie Hill. Subject to detailed route alignment impacts on peatland should be avoidable.	There are no sites designated for geological reasons within or in close proximity to Route Option 3c. The Carbon-rich Soils and Peatland Map identifies Class 3 soils are present within the route option extending across it from Black Knowe Head to Scar Hill. The extent of Class 3 soils means some impacts on peatland would unavoidable.	The Carbon-rich Soils and Peatland Map identifies Class 3 soils are present on the southern and eastern margins of the route link. The limited scale and distribution of these areas means impacts on peatland should be avoidable.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions within the route option. There are two core paths which cross Route Option 3a, one to the north of the Ettrick Water routed west to east and one to the south of Hutlerburn Hill also extending across the route option.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	The national scale land capability for agriculture map indicates that the majority of Route Option 3a is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the majority of Route Option 3b is underlain by land which is capable for use as improved grassland.	The national scale land capability for agriculture map indicates that the majority of Route Option 3a is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the majority of route link is underlain by land which is capable for use as improved grassland or for rough grazing.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations.	Altitude varies through the route option from over 400mAOD at the north/west dropping to around 160mAOD within the Ettrick Water valley and then increasing moving south of this. There are localised steep slopes descending	Altitudes within Route Option 3b are typically between 200 and 350mAOD with lower altitudes present to the south of the option along the Ettrick Water. There are localised steep slopes including on Witchie Knowe to	Altitudes within Route Option 3c are variable due to the nature of landform. The Yarrow Water and Ettrick Water flow within lower lying valleys between 200 and 250mAOD, however, some of the hills within the route option exceed	Altitudes within the route link generally reduce in a southeastern or eastern direction from more 500mAOD in the northwest on Sundhope Height to

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 3a	Section B Route Option 3b	Section B Route Option 3c	Section B Route Link 3c to 3b
	• To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Fauldshope West Hill to the north of the Ettrick Water and ascending Hutlerbun Hill to the south.	the north of the route option and Singlie Hill to south descending to the Ettrick Water.	500mAOD. There are particularly steep slopes on the three hills present within the centre of the option including on Black Knowe Head and Scar Hill. The route option has been developed taking account of the proposed Brown Rig Wind Farm. The option has been narrowed where it descends Black Knowe Head towards the Ettrick Water taking account of publicly available information regarding the wind farm layout.	around 250mAOD in the southeast closer to the Ettrick Water.

Table H.4 Section B River Tweed to the A7 Route Options Appraisal (Route Option 4 and Route Option 5)

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	The northern section of Option 4a lies with LCT 94 Rolling Moorland indicating an open expansive, simple landscape of reduced sensitivity to OHL. The central and southern section passes through LCT 101 Rocky Upland Fringe perpendicular to the linear extent of the LCT. It then passes through LCT 117 Pastoral Upland Fringe Valley, again perpendicular such that direct effects on landscape character are localised. This is the landscape of the River Teviot, which also accommodates the A7. Although a smooth large-scale landform it also has characteristics which increase sensitivity compared to the neighbouring LCTs. These include the medium scale pastoral valley, narrow side valleys and valley floor pastures enclosed by drystone dykes, all being scale comparators which emphasize the effects of an OHL. The scattered farms and	As described for Option 4a, which crosses the same LCTs with likely similar effects but further to the west. Langhope Rig wind farm lies to the immediate west of Option 4b. influencing landscape character. Other comments as per Option 4a	In the north the route passes LCT 94 Rolling Moorland, clipping LCT LCT 93 Southern Uplands with Scattered Forest before entering LCT 96 Southern Uplands with Forest. All are similar large scale, simple landscapes, relatively remote and with characteristics which indicate lower sensitivity to OHLs and towers. This Route Option terminates with a small section in LCT 117 Pastoral Upland Fringe Valley, landscape of the River Teviot, which also accommodates the A7. Although a smooth large-scale landform it also has characteristics which increase sensitivity compared to the neighbouring LCTs. These include the medium scale pastoral valley, narrow side valleys and valley floor pastures enclosed by drystone dykes, all being scale comparators which emphasize the	Comments as per Option 4c.	Predominantly in LCT 94 Rolling Moorland of reduced sensitivity to OHLs due to open, upland nature and simple form with few scale comparators. The route transitions into LCT 101 Rocky Upland Fringe and LCT 99 Rolling Farmland north of Hawick, both of intermediate sensitivity. There is some forestry but predominantly the character is open and given the proximity to settlements and transport routes effects on character would be widespread. There would also be increased wirescape where the Route Option crosses the existing 132kV OHL within the transition in landscapes between the upland fringe and farmland which becomes more sensitive to OHL and towers.	This Route Link sits entirely within LCT 93 Southern Uplands with Scattered Forest, an isolated, open, upland landscape which indicates lower sensitivity to OHLs and towers.	This Route Link is located entirely within LCT 94 Rolling Moorland and largely through forest in the west and adjacent to Langhope Rig. This is a relatively isolated and open upland which indicates lower sensitivity to OHLs and towers.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
		settlement along the valley floor and lower sides along with frequent woodland all contribute to this section of the Route Option being more sensitive to an OHL. Noting that the incursion into LCT 117 is limited and the valley of the Teviot already includes the 132kV OHL and the A7. The route would cross this at 90 degrees, increasing localised effects from the wirescape.		effects of an OHL. The scattered farms and settlement along the valley floor and lower sides along with frequent woodland all contribute to this section of the Route Option being more sensitive to an OHL. Noting that the incursion into LCT 117 is limited and the valley of the Teviot already includes the 132kV OHL and the A7. The route would cross this at 90 degrees, increasing localised effects from the wirescape.				
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	Option 4a is closest to Hawick and would be visible on the approach/egress on the A7 and the A711, acting as a detractor at the confluence of the main approaches to the town and from Branxholmtown. Views from Hawick itself would be unlikely due to distance/intervening elements. All Option 4 routes involve a crossing of the Teviot Valley and the existing 132 kV OHL at 90 degrees, increasing	Option 4b passes close between Roberton and Burnfoot, increasing potential for visual effects in proximity to residential properties. Comments regarding the Teviot Valley and existing 132 kV line apply and Romans and Reivers long distance trail as noted in Route Option 4a.	In its northern section Option 4c passes adjacent to and through forestry, limiting the extent of views and likely number of viewers. There are multiple isolated properties in the vicinity of Burnfoot and Hoscote and Deanburnhaugh but some scope for alignment refinement to reduce or mitigate effects. Further south, Option 4c is away from settlements	Option 4d is significantly more forested than the other options, passing through Craik Forest but also close to Craik itself. Screening from forestry would be locally beneficial, reducing visual impact compared to the other options. Comments regarding the Teviot Valley and existing 132 kV line apply and the Romans and Reivers long distance trail as	There are numerous core paths within the vicinity and the corridor also is broadly parallel to the Old Drove Road and Borders Abbeys Way long distance paths for most of its length. Numbers of viewers increase close to Hawick and in sections where it is close to the A7, resulting in the potential for extensive visual impact.	Isolated open upland with few visual receptors.	Largely through forest in the west and adjacent to Langhope Rig with few visual receptors.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
		effects on visual amenity and wirescape. They all involve a crossing of the Romans and Reivers Route affecting views of recreational users of this long distance trail.		and benefits from an alignment on lower ground between two local hills, Holt Hill and Swanstead Hill/Dryden Fell which potentially represents an alignment more sympathetic to the landform. Comments regarding the Teviot Valley and existing 132 kV line apply and the Romans and Reivers long distance trail as noted in Route Option 4a.	noted in Route Option 4a.			
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Route Option 4a requires multiple crossings of watercourses which are part of the River Tweed SAC (and in some cases also the River Tweed SSSI). This includes Todrig Burn, Ale Water, Borthwick Water and the River Teviot. Crossings of the designated sites are unavoidable, however, these can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 4b requires multiple crossings of watercourses which are part of the River Tweed SAC (and in some cases also the River Tweed SSSI). This includes Langhope Burn, Todrig Burn, Ale Water, Borthwick Water and the River Teviot. Crossings of the designated sites is unavoidable, however, these can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 4c requires multiple crossings of watercourses which are part of the River Tweed SAC (and in some cases also the River Tweed SSSI). This includes the Borthwick Water and the River Teviot. Crossings of the designated sites are unavoidable, however, these can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 4c requires multiple crossings of watercourses which are part of the River Tweed SAC (and in some cases also the River Tweed SSSI). This includes Rankle Burn, Clear Burn, the Borthwick Water and the River Teviot. Crossings of the designated sites are unavoidable, however, these can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 5 requires a crossing of the Ale Water which is part of the River Tweed SAC. A crossing of the designated site is unavoidable, however, the watercourse can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects. Ashkirk Loch SSSI and Long Moss - Drinkstone Hill SSSI lies to the south of outside of the route option with sufficient separation to reduce the	There are no ecological designations within or close the route link between route options 4d and 4c.	There are no ecological designations within or close the route link between route options 4c and 4b.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
			Slaidhills Moss occupies a small area to the south of the route option northwest of Teinside. The extent of the designation means that it should be avoidable.			potential for adverse effects.		
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are a number of cultural heritage and archaeological designations present within or on the margins of Route Option 4b. These include scheduled monuments including Wester Essenside fort to the west of the route option, earthworks at Leap Hill, cairns to the north of Mabonlaw Moss, a fort at Highchesters as well as listed buildings including Branxholme Castle. While direct physical impacts on the scheduled monuments and listed buildings can be avoided, subject to detailed routeing there is the potential for setting effects.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 4b, however, some sites including scheduled monuments and listed buildings are present on the margins of the route option. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 4c. A small number of sites are present within the vicinity of Route Option 4c. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate some setting effects through the use of landform and other features.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 4d. A small number of sites are present within the vicinity of Route Option 4d. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate some setting effects through the use of landform and other features.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 5, however, there are two scheduled monuments present to its north. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features.	There are no cultural heritage or archaeology sites of the highest or high environmental value within the route link.	There are no cultural heritage or archaeology sites of the highest or high environmental value within the route link.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as	Small areas or pockets of woodland are present through the route option. This	Small areas or pockets of woodland are present through the route option	There are some small areas of woodland present within Route Option	There are some small areas of woodland present within Route Option	Small areas or pockets of woodland are present within the route option.	There is an area of forestry plantation to the east of the link where it connects to	The western part of the route linked is routed through an extensive part of forestry plantation. While

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
	possible in order to prevent or reduce the loss of tree cover.	includes Ancient Woodland Inventory sites which are present to the south of the Borthwick Water. Some of the woodland present within Route Option 4a is identified on the Native Woodland Survey of Scotland. The distribution of woodland within the route option means that some tree removal would be unavoidable including potentially ancient woodland.	including woodlands identified on the Native Woodland Survey of Scotland. The distribution of woodland within the route option means that some tree removal would be unavoidable.	4c including some which coincide with areas identified on the Native Woodland Survey of Scotland, however, these are typically small-scale and avoidable. Larger areas of forestry plantation are present to the east of Whitehill and north of Byrelee Hill. The distribution of forestry plantation and woodland within the route option means that some tree removal would be unavoidable.	4d including some which coincide with areas identified on the Native Woodland Survey of Scotland, however, these are typically small-scale and avoidable. Larger areas of forestry plantation are present with a large part of the route option crossing through Craik Forest. he distribution of forestry plantation and woodland within the route option means that some tree removal would be unavoidable.	This includes woodland identified on the Native Woodland Survey of Scotland. There are larger areas of forestry plantation to the north of Route Option 5 and south of the Ale Water. The extent of forestry within the option means some tree removal is unavoidable, however, there may be opportunities to reduce this by utilising existing breaks.	Route Option 4c. There may be some scope to minimise tree removal, however, some would be unavoidable.	there would be opportunities to utilise existing breaks some tree removal would be unavoidable.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	There are a number of watercourses present within Route Option 4a. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There are a number of watercourses present within Route Option 4b. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses present within Route Option 4c. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers	There is a small number of watercourses present within Route Option 4d. While these may require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers	There is a small number of watercourses present within Route Option 5 which would require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There are some unnamed watercourses draining the hillslopes within the route link. Adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There are a number of small unnamed watercourses within the route link as well as two relatively small lochs. Adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.
Ground Conditions	• To develop route and site options which avoid sites designated for	The Carbon-rich Soils and Peatland Map identifies Class 3 soils	The Carbon-rich Soils and Peatland Map identifies small	The Carbon-rich Soils and Peatland Map identifies	The Carbon-rich Soils and Peatland Map identifies	The Carbon-rich Soils and Peatland Map indicates that	The Carbon-rich Soils and Peatland Map identifies Class	The Carbon-rich Soils and Peatland Map identifies Class 3 and 5 soils are

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
	geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	are present in small areas. The limited scale and distribution of these areas means impacts on peatland should be avoidable.	areas of Class 3 soils are present. The extent of Class 3 soils means some impacts on peatland should be avoidable.	extensive areas of class 3 and 5 soils are present between Whitehill and the Borthwick Water. The scale of peatland areas present means some impacts would be unavoidable.	extensive areas of class 3 and 5 soils are present. The scale of peatland areas present means some impacts would be unavoidable.	the majority of the route option avoids peatland, with the exception of Class 3 soils to the north. The extent of the area of class 3 limits opportunities to avoid it, however, overall this option avoids areas of peatland.	3 soils are present across the majority of the route link. The scale of peatland areas present means some impacts would be unavoidable.	present across the majority of the route link. Class 5 soils are present across the western extent of the link and would require to be crossed. The scale of peatland areas present means some impacts would be unavoidable.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions within the route option. The Roman and Reivers Road crosses the route option to the north of Branxholm. There is a small number of core paths present which may require to be crossed or be in close proximity to OHL routes.	There are no major visitor attractions within the route option. The Roman and Reivers Road crosses the route option over the peak of Chapel Hill. There is also a core path which crosses the route option to the south of Chapel Hill.	There are no major visitor attractions within the route option. The Roman and Reivers Road crosses the route option doglegging to the south of Muselee increasing the length of the trail present within the route option. There is also a core path which extends westwards from just within the route option at Muselee towards Craik Forest.	There are no major visitor attractions within the route option. The Roman and Reivers Road crosses the route option within Craik Forest. There is also a core path crossing the route option to the north of the Borthwick Water	The Borders Abbey Way (which also coincides with a core path) is routed through the Route Option as well as sections running almost parallel to it to the north and south of the option.	There are no major visitor attractions or recreational routes within the route link.	There are no major visitor attractions or recreational routes within the route link.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of	The national scale land capability for agriculture map indicates that the majority of Route	The national scale land capability for agriculture map indicates that the majority of Route	The national scale land capability for agriculture map indicates that the majority of Route	The national scale land capability for agriculture map indicates that the majority of Route	The national scale land capability for agriculture map indicates that the majority of Route	The national scale land capability for agriculture map indicates that the majority of route link	The national scale land capability for agriculture map indicates that the majority of route link is underlain by land which is

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
	agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	Option 4a is underlain by land which is capable for use as improved grassland with some lower lying areas capable of growing a narrow range of crops.	Option 4b is underlain by land which is capable for use as improved grassland with some lower lying areas such as along the Borthwick Water and River Teviot capable of growing a narrow range of crops.	Option 4c is underlain by land which is capable for use as improved grassland or for rough grazing, however, some smaller areas such as along the Borthwick Water and River Teviot capable of growing a narrow range of crops.	Option 4d is underlain by land which is capable for use as improved grassland or for rough grazing, however, some smaller areas such as along the Borthwick Water and River Teviot capable of growing a narrow range of crops.	Option 5 is underlain by land which is capable for use as improved grassland with some lower lying areas to the southeast closer towards Hawick and River Teviot valley capable of growing a narrow range of crops.	is underlain by land which is capable for use for rough grazing.	capable for use for rough grazing.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Altitudes within Route Option 4a are typically between 200 and 350mAOD. Localised high points above 300mAOD include Leap Hill, Cringie Hill and Smasha Hill. Lower altitudes coincide with river valleys. The nature of the landform within the route option means that there are localised steep slopes particularly in/adjacent to valleys. This option would require to cross the existing 132kV OHL route.	Altitudes within Route Option 4b are typically between 300 and 350mAOD, however, lower altitudes are present along river valleys. The nature of the landform within the route option means that there are localised steep slopes particularly in/adjacent to valleys. The existing Langhope Rig Wind Farm lies to the west of the route option. The option has been developed to maintain an appropriate separation distance from the wind turbines. This option would require to cross the	With the exception of within lower lying valleys which coincide with watercourses, altitudes within the route option are typically between 300 and 400mAOD. Land is generally gently undulating, however, some steeper slopes are present in localised areas including to the west of Whitehill, along the B711 and to the north of the Borthwick Water. This option would require to cross the existing 132kV OHL route.	Altitudes within Route Option 4d are variable from almost 500mAOD at the north to around 200mAOD in some river valleys. The majority of route option crosses land around 350 to 450mAOD. The nature of the landform within the route option means that there are localised steep slopes particularly in/adjacent to valleys. This option would require to cross the existing 132kV OHL route.	Altitudes are generally falling in the southeastern direction along Route Option 5 from just over 300mAOD to the north to 200mAOD to the south where the route option approaches the A7. There are some undulating hills within the route option resulting in some localised higher points as well as slopes which would require to be crossed.	Altitudes within the route link are typically around 400mAOD with a localised high point within the centre of the link of 470mAOD. There are localised steep slopes to the west of the route link.	Altitudes within the route link are relatively consistent between 300 and 350mAOD forming a plateau which broadly extends west to east between Route Options 4c and 4b. While there are some relatively steep slopes these are located to the north or south of the route link and could be avoided.

Appraisal Topic	Routeing and Siting Objectives	Section B Route Option 4a	Section B Route Option 4b	Section B Route Option 4c	Section B Route Option 4d	Section B Route Option 5	Section B Route Link 4d to 4c	Section B Route Link 4c to 4b
			existing 132kV OHL route.					

Table H.5 Section C: A7 to Teviot Substation Route Options Appraisal (Route Options 1 and 2)

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 1A	Section C Route Option 1B	Section C Route Option 1C	Section C Route Option 2
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	The route commences in LCT 117 Pastoral Upland Fringe Valley associated with the River Teviot and A7 corridor. As explained previously, the valley landform, degree of enclosure and concentration of smaller scale elements increases sensitivity. The route transitions into LCT 101 Rocky Upland Fringe and LCT 93 Southern Uplands with Scattered Forest, both with characteristics which assist in accommodating OHLs, the former to a lesser extent.	The route commences at the A7 before immediately entering SLA 5 Teviot Valleys close to Hawick. It rises up White Hill in LCT 101 Rocky Upland Fringe, with few landscape elements of a scale that would mitigate the introduction of the towers and OHLs. Sensitivity theoretically reduces as it enters LCT 93 Southern Uplands with Scattered Forest but there are roads and valleys which complicate the alignments relationship with landform and landscape and are of a scale which increases sensitivity.	Largely as described for Option 1A. The route commences in LCT 117 Pastoral Upland Fringe Valley associated with the River Teviot and route of the A7. As explained previously for Option 1C, the valley landform, degree of enclosure and concentration of smaller scale elements increases sensitivity. The route transitions into LCT 101 Rocky Upland Fringe and LCT 93 Southern Uplands with Scattered Forest, both with characteristics which assist in accommodating OHLs, the former to a lesser extent.	Commencing and terminating in LCT 93 Southern Uplands with Scattered Forest with a central section in LCT 96 Southern Uplands with Forest, the northern section traverses open upland before entering large scale forestry for much of its route. Characteristics of the LCTs favour integration of OHLs in this route corridor.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	The option is potentially close to the settlements of Broadhaugh and Dodburn and visual impact as it rises directly up The Pike in its eastern section would be increased.	There are potentially numerous sensitive receptors on the edge of Hawick and isolated properties, local roads and core paths in the route beyond it. Likelihood of multiple significant effects on visual amenity experienced by a large number of people.	Isolated properties at Branxholme and to the east of the A7 within the confines of the Teviot valley and then at Pilmuir and several isolated properties further east, with limited screening potential from landform or forestry.	Remote with very few visual receptors and potential for reducing visual impact as a result of screening by forestry. No core paths or long-distance trails and numbers of potential viewers likely to be limited.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Route Option 1a starts within the Teviot Valley close to the River Teviot where it is part of the River Tweed SAC and SSSI. As noted elsewhere, the potential for impacts on the River Tweed SAC and SSSI can be avoided or reduced by careful siting of OHL towers to maximise separation distances as much as possible.	Route Option 1b requires to cross the River Teviot, part of the River Tweed SAC and SSSI. A crossing of the designated sites is unavoidable, however, the watercourse can be spanned with OHL towers carefully located either side to avoid/reduce the potential for adverse effects.	Route Option 1c starts within the Teviot Valley close to the River Teviot where it is part of the River Tweed SAC and SSSI. As noted elsewhere, the potential for impacts on the River Tweed SAC and SSSI can be avoided or reduced by careful siting of OHL towers to maximise separation distances as much as possible.	There are no ecological designations within Route Option 2.

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 1A	Section C Route Option 1B	Section C Route Option 1C	Section C Route Option 2
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are a number of cultural heritage and archaeological designations present within or on the margins of Route Option 1a. This includes a number of scheduled monuments. While direct physical impacts on the scheduled monuments can be avoided, subject to detailed routeing there is the potential for setting effects. There may be some opportunities to reduce setting effects on some of the scheduled monuments through the use of landform to reduce intervisibility.	There is one listed building, Orchard House, within the route option as well as a number of scheduled monuments in the wider area. Direct physical impacts on the listed building as well as scheduled monuments can be avoided, subject to detailed routeing there is the potential for setting effects. There may be some opportunities to reduce setting effects of the scheduled monuments through the use of landform to provide some physical separation.	There are a number of cultural heritage and archaeological designations present within or on the margins of Route Option 1c. This includes scheduled monuments within the route option as well as on its immediate margins. Direct physical impacts can be avoided in developing a detailed route alignment, however, setting effects would occur. Some setting effects may be reduced through careful routeing, however, the distribution of scheduled monuments means some effects are unavoidable.	There is a small number of scheduled monuments present within or close to Route Option 2. These include Blakebillend a 2nd World War target range as well as the Catrail a linear earthwork which extends across the majority of the route option. Direct physical impacts on scheduled monuments can be avoided, however, some setting effects would occur subject to detailed route alignment. The Catrail is a notable constraint as any OHL route within Route Option 2 (which connects to a potential substation site TEV-05) would be required to cross it with the exception of a small 'gap' within the earthwork to the west of the route option.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	There are small woodlands present within the option. This includes some linear woodland to the east largely following the River Teviot (this woodland is also identified on the Native Woodland Survey of Scotland). There is on Ancient Woodland Inventory site, Howden Cleuch as well as some small undesignated woodlands. Subject to other routeing considerations the majority of woodland is considered to be avoidable. Once exception is the linear woodland extending across the option which would require to be crossed and result in some tree removal.	There are small woodlands present throughout Route Option 1b. This includes small areas of Ancient Woodland Inventory sites which extend into the route option as well as number of woodlands which are identified on Native Woodland Survey of Scotland. The extent and distribution of woodland within Route Option 1b means that some tree removal is likely to be unavoidable, particularly where the route crosses the River Teviot.	There are a number of small woodlands present within Route Option 1c. This includes an Ancient Woodland Inventory site on the western extent of the route option close to the River Teviot as well as woodlands which are identified on Native Woodland Survey of Scotland. In some places woodland extends across the route option meaning that some tree removal would be unavoidable.	Much of the southern part of Route Option 2 is located within plantation forestry. While there would be some opportunities to reduce tree removal by following existing breaks, permanent tree removal is unavoidable.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality	There is a small number of watercourses present within Route Option 1a which would require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There are a number of watercourses present within Route Option 1b which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses present within Route Option 1c which would require to be crossed by an OHL route, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers	There is small number of watercourses present within Route Option 2 which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 1A	Section C Route Option 1B	Section C Route Option 1C	Section C Route Option 2
	• To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point				
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	The Carbon-rich Soils and Peatland Map indicates that the majority of the route option avoids peatland, with the exception of Class 4 soils to the east around Penchrise. The extent of the area of class 4 limits opportunities to avoid it, however, overall this option avoids areas of peatland.	With the exception of two small areas of class 3 and class 5 soils the Carbon-rich Soils and Peatland Map indicates that the majority of the route option avoids peatland.	There are no areas of peatland within the route option.	The Carbon-rich Soils and Peatland Map indicates that large part of the south of Route Option 2 is within class 1 and class 5 soils. The extent of the area means routeing through peatland is unavoidable.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option, however, there are a number of core paths which criss-cross it and would required to be crossed by an OHL route.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	The national scale land capability for agriculture map indicates that the Route Option 1a is underlain by land which is capable for use as improved grassland with some areas capable of growing a narrow range of crops.	While the national scale land capability map for agriculture indicates that the majority of Route Option 1b is underlain by land which is capable for use as improved grassland as well as some areas capable of growing a narrow range of crops, more capable land (i.e. capable of higher) yields is present in the lower lying wider valley to the north/northeast of Hawick.	The national scale land capability for agriculture map indicates that the Route Option 1c is underlain by land which is capable for use as improved grassland with some areas capable of growing a narrow range of crops.	The national scale land capability for agriculture map indicates that the Route Option 2 is underlain by land which is capable for use as improved grassland with some areas capable of use for rough grazing.

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 1A	Section C Route Option 1B	Section C Route Option 1C	Section C Route Option 2
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Land rises up from the west of the option at the River Teviot and is typically around 250 to 300mAOD as it extends eastwards until the Allan Water. From here land rises up steeply to more than 400mAOD before falling again towards the east of the option at Penchrise Burn. The undulating valleys are typically orientated north-south with route option requiring to cross them. There are some localised steep slopes, particularly to the east around Penchrise.	Landform within the route option is generally more gentle and lower-lying. Altitudes for much of the corridor are around 250mAOD but rise up to around 300mAOD further south. Slopes are relatively gentle and where steep slopes are present they are highly localised and can be avoided.	Land rises up from the west of the option at the River Teviot and is typically around 250 to 300mAOD throughout the route option. Slopes are generally gently undulating, however, localised steep slopes are present to the south of the River Teviot valley.	Altitudes within Route Option 2 are typically between 200 and 300mAOD. The nature of some of the landform within the route option means that there are localised steep slopes particularly in/adjacent to valleys within the forestry plantation.

Table H.6 Section C: A7 to Teviot Substation Route Options Appraisal (Route Options 3 and 4)

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 3	Section C Route Option 4
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	A small corridor with LCT 117 Pastoral Upland Fringe and LCT 93 Southern Uplands with Scattered Forest, in an open context running parallel to the A7. The OHLs would run along the plateau on top of the valley ridgeline predominantly impacting the corridor of the A7.	Traversing LCT 96 Southern Uplands with Forest and LCT 93 Southern Uplands and Scattered Forest, in a forested context in the western extent and an open eastern section with steep slopes around Blackcleuch Rig which would result in towers appearing prominently along the ridge and slope. Nonetheless characteristics of the LCTs generally favour integration of OHLs in this Route Option exhibiting large scale rolling landform with a simple, uniform character. The existing 132kV OHL would have to be crossed within the A7 corridor increasing wirescape within the narrow section of the valley.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	Principal visual impact would be for residents at Teviothead, looking along the alignment of the OHL, increasing impacts. Conversely, users of the A7 would likely see the towers and OHL on the skyline of the valley side to the east. This would mirror and accentuate effects from the 132kV line on the western ridgeline of the valley.	Although forested there is potential for views from Craik settlement, potentially along the wayleave through the forest to accommodate the OHL. At the eastern end receptors would include users of the A7, and to a lesser extent looking along the valley from Teviothead, noting the crossing perpendicular with the existing 132kV line along the A7.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Route Option 3 extends in northeastern direction broadly paralleling the River Teviot where it is part of the River Tweed SAC and SSSI. Any OHL within Route Option 3 would be upslope of the SAC and SSSI with some potential to impact it through runoff from within the route option. The potential impact would depend on which substation site is being connected to from Route Option 3 (TEV-03 to the north of Route Option 3 or TEV-01 to the south). Connecting to TEV-03, then Route Option 3 could be used for an onward route south to the Scotland-England border which would result in an OHL route extending north to south. Alternatively, it could be used for an OHL route coming from Section B Route Options 4c or 4d to connect to TEV-01 requiring an OHL route north to south through Section C Route Option 3.	Route Option 4 has the potential to be used for north-south OHL routes from Section B Route Option 4b to Section C Route Option 4 or for north-south OHL routes from Section C Route Option 3 to Section D Route Option 3. OHL routes within Route Option 4 would be required to cross the Limiecleuch Burn and the River Teviot, both of which are part of the River Tweed SAC and SSSI. The potential for impacts on the River Tweed SAC and SSSI can be avoided or reduced by careful siting of OHL towers to maximise separation distances as much as possible.

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 3	Section C Route Option 4
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are two scheduled monuments within Route Option 3 as well as other monuments and listed buildings within its immediate vicinity. Subject to which substation site is being connected to from Route Option 3 (TEV-03 to the north of Route Option 3 or TEV-01 to the south) there is the potential for setting effects, particularly on those monuments to the north of Route Option 3 close to TEV-03.	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 4, however, there is one scheduled monument, Lairhope Cottage present to its north. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features including forestry.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	There is a small amount of woodland to the south of Route Option 3 which could be affected. This includes a small woodland on Bink's Hill as well as a narrow woodland extending along Phaup Burn which is also identified on the Native Woodland Survey of Scotland. Some tree removal within Route Option is unavoidable, however, there are opportunities to reduce it.	There is a large area of forestry plantation to the north of Route Option 4 where it crosses the southern extent of the Craik Forest. Moving through the Route Option there are smaller pockets of woodland including Ancient Woodland Inventory sites and woodlands identified on the Native Woodland Survey of Scotland. The extent and distribution of forestry and woodland within Route Option 4 means some tree removal would be unavoidable.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	There is a small number of watercourses present within Route Option 3 which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a number of watercourses present within Route Option 4which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as	There are no constraints relating ground conditions considerations present within Route Option 3.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 3 and class 5 soils. These are particularly extensive to the west of Route Option 4 on the margins of Craik Forest. The extent and distribution of peatland within Route Option 4 means that some impacts would be unavoidable.

Appraisal Topic	Routeing and Siting Objectives	Section C Route Option 3	Section C Route Option 4
	possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.		
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts on existing land use as much as possible.	The national scale land capability for agriculture map indicates that the Route Option 3 is underlain by land which is capable for use as improved grassland.	The national scale land capability for agriculture map indicates that the Route Option 4 is underlain by land which is capable for use as improved grassland of for rough grazing.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Altitude climbs relatively steeply west to east with Route Option 3 ascending the Teviot Valley but otherwise are generally between 300 and 350mAOD north to south. The valley formed by Far Height and Bink's Hill is a notable constraint that would require to be crossed north to south. There are localised steep slopes that an OHL route would require to traverse.	Landform within Route Option 4 is formed by a series of valleys running southwest to northeast. As result altitude rises and falls moving southeast through the route option from around 200mAOD in the base of valleys to more than 300mAOD on hilltops. There are localised high points in excess of 400mAOD to the west and east of Route Option 4. As a result valley sides form steep slopes that would require to be crossed by an OHL route. This option would require to cross the existing 132kV OHL route (V route).

Table H.7 Section D: Teviot Substation to Scotland-England Border Route Options Appraisal (Route Options 1 and 2)

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 1	Section D Route Option 2a	Section D Route Option 2b	Section D Route Option 2C	Section D Route Option 2D
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	The corridor is within an isolated area of LCT 96 Southern Uplands with Forest, passing through a highly forested area in the north before entering a sharply defined upland ridgeline of Amton Fell in the south. The route would cross the hilltop or side for a short section, locally increasing visibility and influence, albeit with some forestry to the east and west which could be used as screening and/or backclothing to partially mitigate effects. Overall lower sensitivity in the north of the Route Option with increased sensitivity as a result of the nature of the landform, and alignment crossing it, in the south.	As described for Option 1 (LCT 96 Southern Uplands with Forest) this is an area of dense large-scale forestry in an upland context of lower sensitivity to OHL. Initially, the route crosses Liddesdale, traversing the B6357 and spanning the narrow valley (LCT 113 Upland Valley with Pastoral Floor) of the Liddel Water. Towers will add infrastructure to the narrow valley, most likely on the upper slopes, increasing change in character, albeit effects are likely to be localised. Thereafter it is largely within the extensive upland forestry of Newcastleton Forest but potentially cresting a number of open hill tops at Castleton Muir and Blinkbonny Height, which the alignment could avoid in favour of adjacent forest to the east or following lower contours to avoid skylining, reducing impacts.	The landscape context comprises a short section within LCT 113 Upland Valley with Pastoral Floor followed by LCT 96 Southern Uplands with Forest, as for other Section D options. The alignment is on open upland adjacent to Newcastleton Forest edge, rising perpendicularly up the steep hillside of Larriston Fell, which will accentuate localised impacts on landscape character. Crossing small sections of shelterbelt planting some of which include ancient woodland would also be unavoidable.	Route Option 2C starts in LCT 96 Southern Uplands with Forest before extending along the western valley side of Liddesdale in LCT 113 Upland Valley with Pastoral Floor. A small section of the western part of the Route Option extends into LCT 93 Southern Uplands with Scattered Forest. The enclosed nature of the upland landform strongly contains the open character of the valley floor, which increases the sensitivity of this landscape and the relationship of the route along it to the landform. Careful routeing along contours of the valley side, to enable backclothing of the OHL could assist in limiting wider effects on the more sensitive valley landscape. The existing 11KV network runs along the valley.	This Route Option is largely in LCT 176 Foothills with Forest and LCT 172 Upland Fringe before crossing Liddel Water and terminating in LCT 160 Narrow Wooded River Valley. The majority of the northern/central section could be routed alongside or through extensive forestry, reducing impacts on character providing sections of ancient woodland are avoided. The sensitivity increases as the alignment skirts the valley south of Harelaw Pike, when the OHL and towers will dominate the enclosed narrow valley before crossing the B6357, with limited scope for mitigation.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	There are a small number of isolated residential properties/farms within the corridor which is otherwise relatively unpopulated and with a single core path in the southern extent. Potential skyline views from hamlets of Toftholm and Shaws. Potential views from Hermitage and associated heritage sites, in which the southern section of the OHL/towers would need to	There are isolated properties and a core path at Steele Road and at Dinnlabyre on the B6357. The majority of views would be users of the B6357 within Liddesdale. South of Liddesdale there are few visual receptors although the area includes Newcastleton Forest mountain biking and walking trails which are widely used for recreational purposes. Given the dense forestry, views are	Views would be obtained from multiple properties on the B6357 at Larriston, Riccarton and Burnmouth, potentially with oversailing at Larriston and looking along the OHL as it rises on the steep landform, accentuating visual impact. Scope exists to position the OHL between linear forestry which is continuous on the	Liddesdale accommodates both the locally important B6357 and linear settlement between Newcastleton and Kershope. There are core paths at Newcastleton and multiple local roads off the B6357 to the east, connecting isolated properties. There is also a local viewpoint on the local road west to Langholm which is well used overlooking Newcastleton and the valley.	A number of isolated properties in the southern section around Harelaw Hill and along the B6357 would be impacted by the proximity and addition in the narrow valley.

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 1	Section D Route Option 2a	Section D Route Option 2b	Section D Route Option 2C	Section D Route Option 2D
		be carefully sited to avoid appearing prominently on the skyline.	likely to be limited and localised although forestry clearance would be required to facilitate an OHL which could open up views. Distant views are also likely from the settlement of Newcastleton. Care would also need to be taken with the detailed routeing of this Route Option to avoid sections of the OHL appearing juxtaposed against the proposed Liddesdale windfarm in views from settlement and properties to the west.	southside but fragmented to the north.	Careful routeing to the west to avoid impacting this viewpoint would be required. Potential sensitive viewers are therefore relatively numerous with this Route Option, with limited scope for mitigation.	
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	There are no sites designated for nature conservation or ecological interests within or immediately close to Route Option 1.	There are no sites designated for nature conservation or ecological interests within or immediately close to Route Option 2a.	Route Option 2b avoids sites designated for nature conservation or ecological interests, however, it would cross the Scotland-England border into the Kielder Forest and into an area where components of the Border Mires Kielder-Butterburn and Kielder Mires SSSI are present and would be likely to constrain onwards routeing within England.	Route Option 2c avoids sites designated for nature conservation or ecological interests. It is routed on the west of the Liddel Water valley to the east of the Langholm-Newcastleton SPA and SSSI. Routeing to the east of the designated site should prevent impacts on it. The qualifying features of the SPA (hen harrier) are understood to be largely concentrated to the west of the designated site along the Tarras Water valley which is more than 5km west of route option 2c.	There are no sites designated for nature conservation or ecological interests within or immediately close to Route Option 2d.
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse	There are two scheduled monuments within Route Option 1 as well as further scheduled monuments and listed buildings outside of it. This includes Hermitage Castle to the west of Route Option 1. While there will be no direct physical impacts on	There is one listed building within Route Option 2a as well as scheduled monuments and listed buildings within its vicinity. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting	There are no cultural heritage or archaeology sites of the highest or high environmental value within Route Option 2b, however, there are listed buildings to the north. While there will be no direct physical impacts on designated cultural heritage or	There is one scheduled monument within Route Option 2c on Kirk Hill as well as scheduled monuments and listed buildings within its vicinity. The option would not result in direct physical impacts on designated cultural heritage or	There are some listed buildings within Route Option 2d as well as scheduled monuments and listed buildings present within the wider area. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 1	Section D Route Option 2a	Section D Route Option 2b	Section D Route Option 2C	Section D Route Option 2D
	effects on them including upon their setting.	designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features including forestry.	impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features including forestry.	archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features including forestry.	archaeology sites, however, there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform.	potential for some setting impacts subject to detailed routeing.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	A large part of Route Option 1 crosses the southwestern forestry plantation where it extends across part of Wauchope Forest. Some woodland is present which is either Ancient Woodland Inventory or identified in the Native Woodland Survey of Scotland. The former occupies only a small area. The extent of forestry present within the route option means tree removal is unavoidable, however, there may be opportunities to reduce it utilising existing breaks.	Route Option 2a crosses large areas of forestry plantation including routeing along the western margins of Newcastleton Forest. This includes crossing woodland identified in the Native Woodland Survey of Scotland. There are some limited opportunities to avoid forestry and woodland, however, the extent and distribution is such that some tree removal would be unavoidable.	Small areas of woodland as well as extensive areas of plantation forestry are present within Route Option 2b. This includes an Ancient Woodland Inventory site which extends across the option and would require to be crossed as well as areas of woodland identified in the Native Woodland Survey of Scotland. A large part of the route option crosses through forestry plantation including the northern part of Newcastleton Forest and then Kielder Forest where it crosses into England. The extent of forestry present within the route option means tree removal is unavoidable, however, there may be opportunities to reduce it utilising existing breaks.	There are small areas of woodland scattered through Route Option 2c. This includes Ancient Woodland Inventory sites as well as woodlands identified in the Native Woodland Survey of Scotland. Part of the route option also crosses forestry plantation. There are some limited opportunities to avoid forestry and woodland, however, the extent and distribution is such that some tree removal would be unavoidable.	Much of Route Option 2d has the potential to impact on forestry and woodland. The northern part of the route option crosses plantation forestry and then as it turns to cross the Scotland-England border crosses Ancient Woodland Inventory sites as well as woodland identified in the Native Woodland Survey of Scotland. The extent of forestry present within the route option means tree removal is unavoidable.
Water resources	• To develop route and site options which adhere to a minimum 50m separation zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within	There is a small number of watercourses which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	There is a small number of watercourses which would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 1	Section D Route Option 2a	Section D Route Option 2b	Section D Route Option 2C	Section D Route Option 2D
	flood zones or where they cannot be avoided by route options can be crossed at their narrowest point					
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 3 and class 5 soils, particularly to the north within and on the margins of forestry plantation. The extent and distribution of peatland within Route Option 1 means that some impacts on peatland would be unavoidable.	Kershope Bridge SSSI designated for geological purposes occupies a small area within the route option where it meets the Scotland-England border. There are opportunities to avoid the site and prevent impacting it. The Carbon-rich Soils and Peatland Map indicates that class 3 and class 5 soils are present within the route option. They extend across the route option where it approaches the border but elsewhere there are some opportunities to avoid them. The extent and distribution of peatland within Route Option 2a means that some impacts on peatland would be unavoidable.	The Carbon-rich Soils and Peatland Map indicates that an area of class 1 peat extends across Route Option 2b where it would cross the Scotland-England border. As a result, impacts on peatland would be unavoidable.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 3 and class 5 soils. The extent and distribution of peatland within Route Option 1 means that some impacts on peatland would be unavoidable.	Penton Linns SSSI designated for geological purposes occupies a small area to the north of the route option where it meets the Scotland-England border. The Carbon-rich Soils and Peatland Map indicates that a large part of the route option would be required to cross class 3 and class 5 soils which extend across it. The extent of peatland within Route Option D means some impact on peatland is unavoidable.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions or recreational routes within the route option, however, Hermitage Castle lies to the west of the option.	Route Option 2a crosses part of the Newcastleton Forest which supports recreational activities. There are extensive mountain bike tracks on the west of the forestry which would require to be crossed by an OHL route.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and seeking to reduce impacts	The national scale land capability for agriculture map indicates that the Route Option 1 is underlain by land which is capable for use as	The national scale land capability for agriculture map indicates that the Route Option 2a is underlain by land which is capable for use as	The national scale land capability for agriculture map indicates that the Route Option 2b is underlain by land which is capable for use as	The national scale land capability for agriculture map indicates that the Route Option 2c is underlain by land which is capable for use as improved grassland.	The national scale land capability for agriculture map indicates that the Route Option 2d is underlain by land which is capable for use as improved grassland with small

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 1	Section D Route Option 2a	Section D Route Option 2b	Section D Route Option 2C	Section D Route Option 2D
	on existing land use as much as possible.	improved grassland of for rough grazing.	improved grassland of for rough grazing.	improved grassland of for rough grazing.		areas for rough grazing and closer to the border in the Liddle Water valley capable of supporting a narrow range of crops.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	Altitudes within Route Option 1 are typically between 300 and 400mAOD. There are some localised areas where they are below this coinciding with narrow river valleys such as along the Roughley Burn. While for large parts the route option crosses land which is gently undulating there are localised steep slopes coinciding with valleys which have to be crossed.	Route Option 2a crosses the Liddel Water valley to its north and then is routed across the eastern slopes of the valley. It largely follows the valley landform crossing land between 150 and 250mAOD. There are some localised steep slopes which would require to be crossed including the Tweeden Burn and Kershope Burn at the border where the watercourses flow across the route option within relatively steep valleys. Route 2a has been narrowed as it crosses the Newcastleton Forest to account for the proposed Liddesdale Wind Farm to the east. The route option takes account of the wind farm layout including application of an appropriate separation distance from the wind turbines.	Altitudes within Route Option 2b range from around 150mAOD within where the route option crosses the B6357 to more than 500mAOD where it crosses the Scotland-England border. Land to the north slopes down steadily towards the B6357, however, moving southeast of this there are localised steep slopes including around Larriston and ascending the hillslopes towards the border.	Route Option 2c is routed over the western side of the Liddel Water valley. With the exception of some localised high points such as Kirk Hill altitudes are typically between 100 and 200mAOD. The majority of the landform is gently undulating with relatively shallow slopes.	Altitudes within Route Option 2d range from just over 200mAOD to around 50mAOD where the route option crosses the Scotland-England border. The majority of the landform is gently undulating with relatively shallow slopes.

Table H.8 Section D: Teviot Substation to Scotland-England Border Route Options Appraisal (Route Options 3, 4 and 5)

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 3	Section D Route Option 4a	Section D Route Option 4b	Section D Route Option 5
Landscape	• To develop route and site options which avoid nationally and locally designated landscapes as far as possible while accounting for other routeing considerations. • To develop route and site options which take account of landscape character and sensitivities and utilise landform and vegetation and integrate within the landscape as much as possible to reduce potentially adverse landscape effects.	In succession this option passes through LCT 96 Southern Uplands with Forest, LCT 178 Southern Uplands with Forest, LCT 177 Southern Uplands, LCT 176 Foothills with Forest, LCT 160 Narrow Wooded River Valley and LCT 175 Foothills. These are essentially upland forested areas of lower sensitivity and of a scale to potentially accommodate OHLs/towers. The exception is LCT 160 Narrow Wooded River Valley which is of increased sensitivity. Most of the northern and central section is forested in the western area and an OHL could be routed through the forestry or on its edge. The southern section is on more open terrain or lower elevation forming a transitional landform from the upland to lowland.	The route is predominantly in LCT 175 Foothills, terminating in LCT 172 Upland Fringe, both indicating lower elevation and a transitional landform and landscape from the upland landscape further north. Apart from in the vicinity of the A708 crossing much of this route passes through open, locally undulating landscape with isolated settlements and proximity to the A708. Increased wirescape could occur where the corridor contains a section of existing 132 kV OHL around Crawthat Hill, aligned to the end of woodland/forestry. In its eastern section the route is close to Solwaybank wind farm.	Option 4b passes through LCT 175 Foothills, LCT 172 Upland Fringe and LCT 171 Flow Plateau. This marks a transition in landform from the lower areas of upland foothills and fringes to an open and low lying plain associated with the Solway Firth. Minsca and Solway Bank windfarms lie close to the corridor which is increasingly open as it approaches the Solway plain flow plateau. A section of existing 132 kV OHL crosses the Route Option where there could result an increase in wirescape particularly within the open flow plateau.	Predominantly in LCT 171 Flow Plateau in a populated area with numerous isolated properties and settlements linked by local roads. There is some limited woodland in an otherwise open and largely flat landform, defined by enclosed fields of pasture. The smaller scale landform and pattern increases sensitivity of the landscape.
Visual Amenity	• To develop route and site options which avoid settlements as far as possible in order to reduce potentially adverse effects on visual amenity. • To develop route and site options which avoid rural residential properties as much as possible in order to reduce potentially adverse effects on visual amenity.	There are very few residential receptors in much of the northern and central section until the route crosses the A709 at Baliehill and proceeds to Paddockhole, between which a local road parallel to the corridor provides access to several isolated properties. There are cycle tracks and recreational access in the forestry areas, especially in the south. Overall, this is an isolated corridor in a forested landscape with few viewers but an alignment potentially on ridgeline, in the south in particular could increase visual effects.	There are few residential receptors, the main grouping being around Winterhope, centrally within the OHL corridor and already partially impacted by the existing 132 kV. Recreational users of the core path at Gowd Muir, which runs along the corridor would be impacted. There will likely be views from the B7068 but overall, few receptors	The corridor is noticeably more populated than upland and foothills to the north and is crossed by multiple local roads. Blocks of forestry in the central section indicate possible mitigation but the settlement of Waterbeck and multiple isolated properties would view the OHL/towers, adding to existing views of the 132 kV line and 33 kV lines, exacerbating the wirescape present in views.	In addition to multiple isolated hamlets and properties the main settlements include Evertown and Canonbie, all likely to have views of the OHL in a relatively open landscape, adding to the existing 132 kV route in the vicinity of the A7 and 33 kV routes crossing the corridor centrally either side of the B6357.
Ecology and Biodiversity	• To develop route and site options which avoid sites designated for nature conservation or ecological interests as far as possible	Worms Cleuch, which is part of the River Tweed SAC, is located within the route option at its northern extent. It drains the route option in a southern/southeastern direction.	There are no ecological designations within Route Option 4a.	There are no ecological designations within Route Option 4b. Bells Flow SSSI is located to the south of it and sufficiently far enough away that it should be adversely affected.	There are no ecological designations within Route Option 5.

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 3	Section D Route Option 4a	Section D Route Option 4b	Section D Route Option 5
	in order to avoid or reduce potentially adverse effects on the sites and their qualifying features.	Potential for impacts on the River Tweed SAC and SSSI can be avoided through route selection or, should it required to crossed avoided or reduced by careful siting of OHL towers to maximise separation distances as much as possible.			
Cultural Heritage and Archaeology	• To develop route and site options which avoid sites designated for archaeological or cultural heritage conservation purposes as much as possible in order to avoid or reduce potentially adverse effects on them including upon their setting.	There are a number of scheduled monuments within and on the margins Route Option 3 as well as a small number of listed buildings. This includes Mid Raeburn to Craik Cross Hill, Roman road and watch tower which runs parallel to the north of the route option as well as the remains of settlements and hillforts within the option. While there will be no direct physical impacts on designated cultural heritage or archaeology sites there is the potential for some setting impacts subject to detailed routeing. There are opportunities to mitigate setting effects through the use of landform and other features including forestry.	There is a number of scheduled monuments and listed buildings within Route Option 4a as well as some on the margins of it. There will be no direct physical impacts on designated cultural heritage or archaeology sites, however, there is the potential for some setting impacts subject to detailed routeing. There are some opportunities to avoid or reduce setting effects through the use of landform and other features including forestry.	There are a number of listed buildings present within Route Option 4b as well as well as scheduled monuments and listed buildings just outside of it. There is the potential for some setting impacts subject to detailed routeing, however, there are some opportunities to avoid or reduce setting effects.	There are a small number of scheduled monuments and listed buildings within or close to the route option. This includes Scots Dike a linear scheduled monument which follows the boundary of the route option along part of the border as well as extends into Route Option 5. There will be no direct physical impacts on designated cultural heritage or archaeology sites, however, there is the potential for some setting impacts subject to detailed routeing.
Forestry and Woodland	• To develop route and site options which avoid forestry and woodland as much as possible in order to prevent or reduce the loss of tree cover.	The route option crosses an extensive part of Eskdalemuir Forest some of which includes woodlands identified on the Native Woodland Survey of Scotland. The route option would require large amount of tree removal within forestry plantation.	There are small areas of woodland present within the route option including sites on the Ancient Woodland Inventory which extend into it, sites on the Native Woodland Survey of Scotland which are wholly within it and forestry plantation. The extent of forestry and woodland means that some tree removal would be required. While smaller areas are avoidable subject to other routeing considerations there are localised areas such as at Gowd Muir where forestry cannot be avoided.	There are small areas of woodland and forestry present throughout the route option. This includes a number of Ancient Woodland Inventory site some of which cannot be avoided, as well as sites on the Native Woodland Survey of Scotland. The extent of forestry and woodland means that some tree removal would be required including within Ancient Woodland Inventory sites which extend across the route option and cannot be avoided.	There are small areas of woodland and forestry present throughout the route option. This includes Ancient Woodland Inventory sites as well as sites on the Native Woodland Survey of Scotland. The extent of forestry and woodland means that some tree removal could be required subject to detailed routeing.
Water resources	• To develop route and site options which adhere to a minimum 50m separation	There are a number of watercourses present within Route Option 3 which	There are a number of watercourses present within Route Option 4a	There are a number of watercourses present within Route Option 4b which	There are a number of watercourses present within Route Option 5 which

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 3	Section D Route Option 4a	Section D Route Option 4b	Section D Route Option 5
	zone from watercourses or bodies in order to prevent or reduce adverse effects on water quality • To develop route or site options which avoid routeing or siting within flood zones or where they cannot be avoided by route options can be crossed at their narrowest point	would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	including Winterhope Reservoir. Potential adverse effects on watercourses can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.	would require to be crossed by an OHL route, however, adverse effects can be avoided/reduced through the development of a detailed alignment and siting of OHL towers.
Ground Conditions	• To develop route and site options which avoid sites designated for geological conservation as far as possible in order to avoid or reduce potentially adverse effects on the sites and their qualifying features. • To develop route and site options which avoid priority peatland and peatland habitats as much as possible in order to avoid or reduce the loss of peatland or other carbon-rich soils as much as possible.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 3 and class 5 soils while some small areas of class 1 soils are present. The extent and distribution of peatland within Route Option 3 means that some impacts on peatland would be unavoidable.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 1, 3 and 5 soils. The extent and distribution of peatland within Route Option 4a including across Priestbutts Moss and Gowd Muir means that some impacts on peatland would be unavoidable.	The Carbon-rich Soils and Peatland Map indicates that extensive areas of the route option are underlain by class 1, 3 and 5 soils. The extent and distribution of peatland east of the B722 means that some impacts on peatland would be unavoidable.	The Carbon-rich Soils and Peatland Map indicates that small areas of the route option are underlain by class 5 soils. The extent and distribution of these means that impacts should be avoidable subject to other routeing constraints.
Tourism and Recreation	• To develop route and site options which avoid or reduce impacts on recreational routes and areas as well as other visitor attractions as much as possible in order to prevent impacts on the amenity of users or visitors.	There are no major visitor attractions or recreational routes within the route option, however, there is a core path towards its southern extent.	There are no major visitor attractions or recreational routes within the route option, however, there is a core path running through the option from the B7068 to Barnglieshead.	There are no major visitor attractions or recreational routes within the route option.	There are no major visitor attractions or recreational routes within the route option, however, there is a core path towards its southern extent.
Land Use	• To develop route and site options while having regard to existing land uses including the nature and extent of agricultural land or commercial forestry and	The national scale land capability for agriculture map indicates that the Route Option 3 is underlain by land which is capable for use as improved grassland or for rough grazing.	The national scale land capability for agriculture map indicates that the Route Option 4a is underlain by land which is capable for use as improved grassland.	The national scale land capability for agriculture map indicates that the Route Option 4b is underlain by land which is capable of growing a narrow range of crops or for use as improved grassland.	The national scale land capability for agriculture map indicates that land capability is variable with capability generally improving moving eastwards through the option. Land includes land capable of producing a narrow range of

Appraisal Topic	Routeing and Siting Objectives	Section D Route Option 3	Section D Route Option 4a	Section D Route Option 4b	Section D Route Option 5
	seeking to reduce impacts on existing land use as much as possible.				crops as well as land capable of average production on eastern most areas close to the border.
Engineering Constraints	• To develop as short and direct a route as possible taking account of other routeing constraints and considerations. • To develop route and site options taking account of topography, altitude and side slopes which could affect constructability and/or operability. • To develop route and site options having regard to existing and proposed wind farms and the application of an appropriate separation distance.	The northern part of Route Option 3 up to the River Esk is typically between 300 and 400mAOD, however, there are some small areas with higher or lower altitudes for example some the hills where route option 3 starts are around 450mAOD while the River Esk valley sits around 200mAOD. South of the River Esk elevations are lower typically between 200 and 250mAOD. There are a number of areas within the route option where locally steep slopes are present and would require to be crossed by route options. Route Option 3 was developed to avoid the proposed Faw Side Wind Farm by routeing to the west of it. It should be noted that during the course of the routeing and siting study the application was refused on appeal. Consideration was given to widening the route option, however, much of the proposed wind farm is located on highly elevated land including land greater than 500mAOD which would not provide any significant benefits in routeing terms.	Altitudes within the route option are relatively low typically between 150 and 250mAOD, however, there are some localised high points to the western side of it. While landform is gently undulating moving from west to east altitudes are falling around 150mAOD. Route Option 4a avoids the existing wind farms which are present including Ewe Hill to the north and Solwaybank to the south. This includes applying an appropriate separation distance from the wind turbines.	Altitudes within the route option are typically falling from west to east. They range from 250mAOD at the far north/west of the route option to 120mAOD at the far south/east of the route option. Sections of Route Option 4b have been narrowed to avoid existing wind farms including Minsca Wind Farm and to a lesser extent Solwaybank Wind Farm. This includes applying an appropriate separation distance from the wind turbines. Route Option 4b would be required to cross the 132kV OHL route which is routed from Ewe Hill Substation towards Gretna.	Altitudes fall from west to east from around 120mAOD to around 50mAOD close to the Scotland-England border. Land is very gently undulating in places with no significant slopes. Route Option 5 would be required to cross the 132kV OHL route which is routed north to south from Hawick towards Harker in England.