SP Energy Networks

Eastern Green Link 4

Scottish Onshore Scheme

Routeing and Siting Consultation Document

April 2024

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01.
Introduction

1. Introduction

1.1 Introduction

This Routeing and Consultation Document (RCD) has been prepared by AECOM on behalf of SP Energy Networks (SPEN) as part of the development of Eastern Green Link 4 (EGL4, hereafter also referred to as 'the Project'). The Project is a High Voltage Direct Current (HVDC) link between Westfield in Fife, Scotland and Walpole in Norfolk, England. EGL4 will upgrade the existing cross-border electricity transmission system between Scotland and England providing an additional 2 gigawatts (GW) transmission capability.

The RCD explains the background to the Project and describes the approach to and results of the first stage of the development of the onshore components of the Project in Scotland only. These comprise the landfall, underground cable route and converter station (collectively referred to as the 'Scottish Onshore Scheme'). The objective of the routeing and siting study, described within this RCD, was to identify and assess alternative options for the Scottish Onshore Scheme and identify a Preferred Option to be taken forward.

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 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 10GW today to 40GW by 2030 originally being set in the Energy White Paper (2020), and then increased to 50GW by 2030 in the British Energy Security Strategy (2022). 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.

To facilitate offshore wind generation as well as other renewable and low carbon forms of generation, 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 transport it to areas of demand.

With electricity demand predominantly located in the south of the country 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 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 the UK.

SP Transmission plc (SPT), the Transmission Owner (TO) and Licence Holder responsible for the electricity transmission network in central and southern Scotland has a crucial role to play. Its transmission network enables the bulk transfer of renewable energy generated within its licence area as well as within SHE Transmission's (SHET) licence area to the north, south to National Grid Electricity Transmission's (NGET) licence area and large centres of demand.

National Grid Electricity System Operator (NGESO) is responsible for the operation of high voltage electricity transmission system, also known as the 'super grid', which operates at 275kV and 400kV. NGESO undertake a number of activities on annual basis to ensure the economic and efficient operation of the transmission system. This includes the Network Options Assessment (NOA), an economic assessment of projects proposed by TOs including SPT 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.

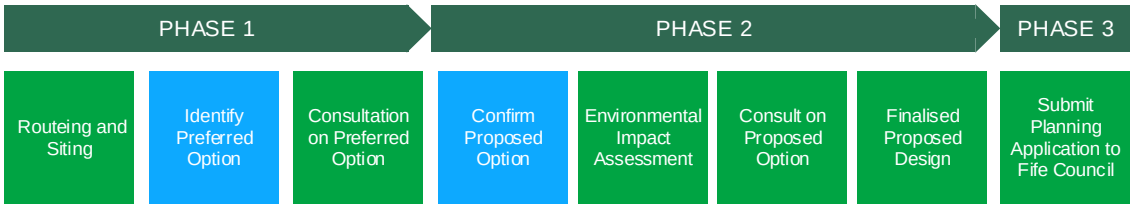
EGL4 is jointly proposed by SPT and NGET to provide additional cross-border transmission capability. The Project, referred to as TGDC, was given a 'proceed' signal in the 2021/22 NOA publication (also referred to as the NOA7 Refresh) and more recently was recommended as being required in the Transitional Central Strategic Network Plan (tCSNP) (also referred to as 'Beyond 2030'). In response to the NOA recommendations and the tCSNP, SPEN acting on behalf of SPT, is undertaking further detailed studies including this routeing and siting study to develop the Scottish Onshore Scheme.

1.3 SP Transmission's Statutory Duties and Licence Obligations

As the holder of a transmission licence under the Electricity Act 1989 ('the Act'), SPT is subject to a number of statutory duties and licence obligations. These include a requirement "*to develop and maintain an efficient, coordinated and economical system of electricity transmission*". SPT is also required to provide for new electricity generators 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 system is fit for purpose through appropriate reinforcements to accommodate the contracted capacity. In addition, in formulating transmission proposals, SPT 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.*"

These statutory duties and licence obligations underpin how SPEN approach the development of new electricity transmission infrastructure with the objective of ensuring that it 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 Development and Consenting of the Project



The approach taken to developing the Scottish onshore components of the Project is illustrated above and comprises the following key phases:

- Phase 1. Routeing and Siting. Phase 1 comprises this routeing and siting study in which alternative options for the landfall and converter stations sites as well as potential underground cable routes between them have been identified and assessed taking into account a range of environmental, technical and economic routeing and siting considerations. Phase 1 has concluded with the identification of a Preferred Option for the Scottish Onshore Scheme which is to be subject to consultation (referred to as Phase 1 Consultation). Responses to the consultation will be evaluated and inform confirmation of a Proposed Option to be taken forward as part of Phase 2.
- Phase 2. Environmental Impact Assessment (EIA). The Scottish Onshore Scheme will be subject to an EIA in accordance with the Town and Country Planning (EIA) (Scotland) Regulations 2017. The EIA process will take forward the Preferred Option, taking account of any modifications following Phase 1 Consultation, with the purpose of preventing, reducing or offsetting likely significant adverse effects of the Scottish Onshore Scheme on the environment through an iterative process. The EIA process comprises a number of steps starting with scoping and concluding with the production of an EIA Report which will accompany an application for planning permission. During this phase SPEN will also undertake a second round of public consultation (referred to Phase 2 Consultation) taking account of the requirements of the Planning etc. (Scotland) Act 2006.
- Phase 3. Application for Consent. SPEN will be applying to Fife Council for planning permission in principle (PiP) under the Town and Country Planning (Scotland) Act 1997 for the proposed converter station and full planning permission for the DC underground cable from Mean Low Water Springs (MLWS) to the converter station and for the AC underground cable from the converter station to Westfield Substation. The EIA Report will accompany the application to Fife Council.

1.5 Purpose and Structure of this Document

The primary purpose of this RCD is to report on Phase 1 of the development of the Scottish Onshore Scheme; the routeing and siting study which has been undertaken in order to identify a preferred option comprising the onshore components of Scottish Onshore Scheme (landfall, underground cable route and converter station).

The RCD has been published in parallel with the start of public consultation on the Scottish Onshore Scheme. 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 Scottish Onshore Scheme ahead of making the relevant consent applications. The structure of the RCD is set out below in Table 1.

Table 1 Routeing and Consultation Document Structure and Content

Section	Description
1. Introduction	Provides an introduction to EGL4, SPEN's statutory obligations and an outline of the purpose and structure of the RCD.
2. Project Description	Provides an overview of HVDC technology and the key onshore components of the Project in Scotland.
3. Approach to Routeing and Siting	Describes the approach to the identification of the Scottish Onshore Scheme taking account of SPEN's approach to developing new electricity transmission infrastructure and established industry practices.
4. Landfall Site Selection	Sets out the landfall parameters which have been applied to the Study and the identification and assessment of alternative landfall site options.
5. Converter Station Site Selection	Sets out the converter station parameters which have been applied to the Study and the identification and assessment of alternative converter station site options.
6. Underground Cable Route Selection	Sets out the underground cable routeing parameters which have been applied to the study and the identification and assessment of alternative route options taking account of the outcomes of landfall and converter station siting.
7. The Preferred Option	Identifies and describes the Preferred Option for the Scottish Onshore Scheme including the reasons for its selection.
8. Consultation and Next Steps	Describes the key next steps in the Project including consultation on the Preferred Option as well as an overview of subsequent stages.

02.
Project Description

2. Project Description

2.1 Overview of the Project

EGL4 is a major reinforcement of the National Electricity Transmission System (NETS) which will provide additional cross-border or north-south transmission capacity between Westfield in Fife, Scotland and Walpole in Norfolk, England. The existing NETS operates using predominantly Alternating Current (AC) technology, however, the use of Direct Current (DC) technology is expanding with a number of schemes in development, construction or operation including the Western Link, Caithness Moray Link, connections to the Shetland Isles and Western Isles as well as Eastern Green Links 1 (EGL1) and 2 (EGL2).

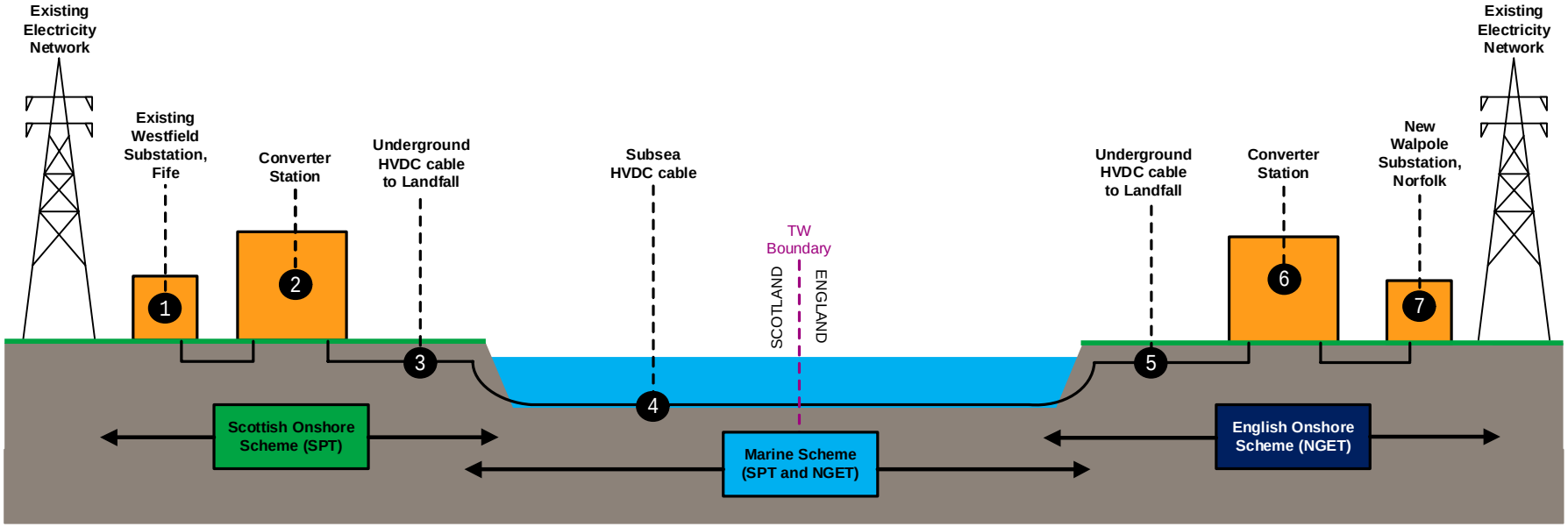
Both AC and DC are proven and reliable technologies with advantages and disadvantages depending on specific circumstances. DC systems enable electricity to be transmitted from point to point in much larger bulk volumes, over greater distances with fewer transmission losses compared to an equivalent AC system. They also provide a greater degree of control over the magnitude and the direction of the flow of electricity. Traditionally DC systems have been used for interconnectors between the NETS and other European countries including France, the Netherlands, Belgium, Norway, Denmark and Germany. This is because one of the benefits of DC systems is that they enable to connect asynchronous networks that operate at different frequencies.

In the case of EGL4, the use of DC technology will allow large volumes of electricity generated in Scotland, where renewable energy generation exceeds demand, to be transmitted to demand centres in the south of the UK as part of the economic and efficient operation of the NETS.

The overall Project is illustrated in Figure 1 (schematic overview) and Figure 2 (geographic overview) and comprises the following key components:

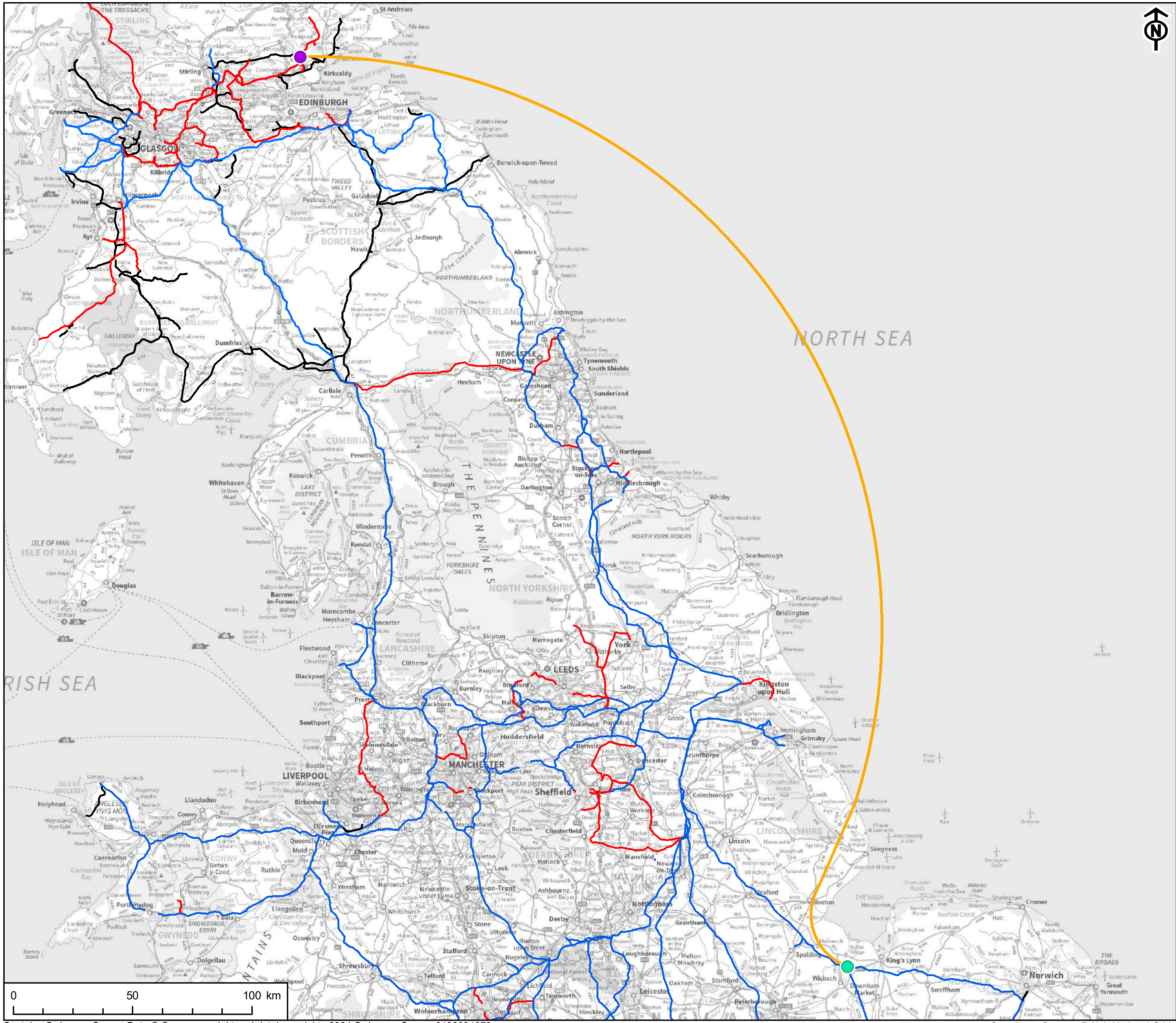
- Scottish Onshore Scheme: comprising a converter station connected to the existing NETS via Westfield Substation in Fife as well as underground DC cables from the converter station to a landfall where it connects to the Marine Scheme.
- Marine Scheme: comprising subsea DC cable route from a landfall on the Fife coast, where it connects to the Scottish Onshore Scheme through the North Sea to a landfall on the Lincolnshire Coast where it connects to the English Onshore Scheme.
- English Onshore Scheme: comprising a converter station connected to the NETS via Walpole in west Norfolk as well as underground DC cables from the converter station to a landfall on the Lincolnshire coast where it connects to the Marine Scheme.

Figure 1 Schematic Overview of the Project



1. Existing Westfield Substation in Fife, Scotland where EGL4 is connected to the existing electricity transmission system.
2. New converter station in the vicinity of Westfield Substation to enable conversion of electricity for onwards transmission to England.
3. Underground DC cables between the converter station and landfall where underground and subsea cables are connected together.
4. Subsea DC cables installed below the seabed between landfalls on the Fife coast, Scotland and Lincolnshire coast, England.
5. Underground DC cables between the landfall, where subsea cables come ashore, and a new converter station.
6. New converter station to enable conversion of electricity and onwards export to the electricity transmission network.
7. New Walpole Substation in Norfolk where EGL4 is connected to the existing electricity transmission system in England.

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



Scale @ A3 1:1,500,000

Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Walpole Substation Location
- Westfield Substation Location
- Indicative Route

Existing Network
- 132kV
- 275kV
- 400kV

TITLE
Figure 2
Geographic Overview of the Project

REFERENCE
EL4_20240410_RR_2_v2

SHEET NUMBER
1 of 1

DATE
10/04/24

2.2 Key components of the Scottish Onshore Scheme

There are three key parts to the Scottish Onshore Scheme which are described in the following sections.

Landfall

The landfall is the interface between the onshore and offshore components of the Project. It is where the subsea cables come ashore and are joined to the underground cables at a buried Transition Joint Pit (TJP). The exact installation method at the landfall will depend on the nature of the coastline and the constraints which are present. For example, where the coastline comprises soft sediments with a shallow gradient open cut trenching may be used. This involves excavation of a trench in which DC cables are laid and the trench backfilled. Alternatively, where the coastline comprises steep cliffs or designated sites are present, trenchless installation methods such as Horizontal Directional Drilling (HDD) may be used. This involves drilling seawards and installing ducts through which the subsea cables are pulled ashore. Once the works to install the landfall are completed, land will be reinstated with no permanent above ground infrastructure left in place.

Figure 3 Example of HDD Compound Setup

Converter Station

Converter stations are the key components of a DC systems. They enable electricity to be converted from AC to DC or vice versa depending on the direction of operation. There are two types of converter station, either voltage source conversion (VSC) or line-commutated conversion (LCC) which could be utilised by the Project. VSC technology is proposed for EGL4 as this provides greater control over the flow of electricity as well as having a smaller overall footprint for the converter station.

Converter stations contain specialist electrical equipment to undertake this conversion, some of this must be located indoors within buildings in order to protect the equipment. The size and number of buildings is informed by the size of the electrical equipment which they house as well as climatic factors such as proximity to the coast and exposure to saline pollution. The largest buildings which house the converters are up to 28.5m tall, however, other equipment including transformers could be located outdoors or in smaller buildings. The exact number and layout of buildings varies by specialist supplier, however, the total operational footprint of approximately 8-9 hectares (ha) (based on 350m by 250m) is broadly the same. Table 2 provides an overview of the types of buildings or equipment which a converter station comprises. This should be read with reference to Figure 5 which provides an overview of how buildings and equipment are typically arranged.

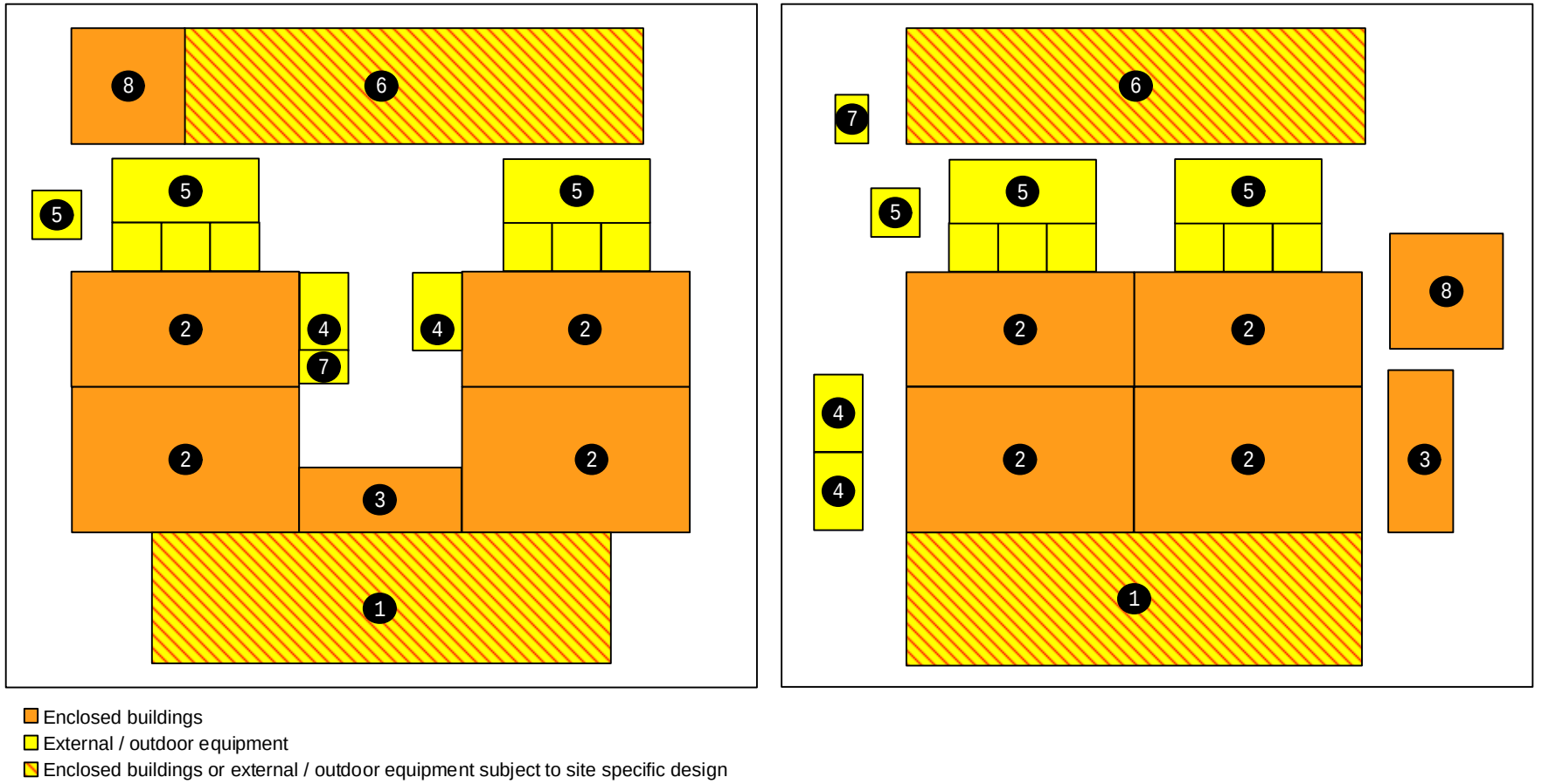
Figure 4 Example of converter station

Table 2 Typical Converter Station Components (see Figure 5)

Component	Description	Reference
DC Hall	The underground DC cables terminate inside the DC Hall. It also contains DC switchgear to connect to power electronics. This equipment will be enclosed in a building of up to 26m in height. The height requirement is a direct result of the highly specialist electrical equipment to be installed within the Hall, and the consequent need to provide the clearances necessary for that equipment to operate safely, as well as provide for the space required to enable the undertaking of maintenance.	1
Valve Halls and AC inductors	These buildings contain high voltage power electronics equipment that converts electricity from DC to AC or vice-versa depending on the direction of operation. This equipment must be located indoors in order to provide a controlled environment in buildings up to 28.5m in height. The height accounts for the space for the electrical equipment as well as clearances for safety and maintenance purposes.	2
Control building	This building contains control panels and associated operator stations, protection and communication equipment, offices and welfare facilities and other auxiliary systems. Subject to detailed design the control building may be a smaller standalone building or may be incorporated into the larger converter station buildings.	3
Cooling fans	This comprises external fan units located outside of the Valve Halls. The fans are used to cool down the valves. Power electronic valves may be cooled by water or glycol. Coolant is pumped through the fan units.	4
Transformers	These change the AC voltage to an appropriate level for transmission via the AC system/ or prior to conversion to DC. The transformers are normally sited outdoors and separated by concrete fire protection walls. Cooling fans are also required. Noise enclosures can be fitted around the transformers if required	5
AC switch gear and filters ('switchyard')	This connects the converter station to the AC transmission system. It includes a range of electrical equipment including harmonic filtration and reactive compensation equipment, circuit breakers, transformers, busbars and insulators. The main function is to allow the effective integration of the DC system into the AC system. Typically, the AC switchyard and associated equipment is located outdoors or enclosed in a building or a series of buildings between 16 and 20m high.	6

Component	Description	Reference
Backup generator	The converter station requires its own power typically provided at 11kV via the distribution network. The diesel back-up generator will be used to provide a backup electricity supply in the event of a failure of the low voltage electricity supply.	7
Spare parts building	A building to house spare parts and components; this will be supplemented by hardstanding areas on the proposed platform to provide storage for spare transformer and spare cable drums as required.	8

Figure 5 Typical Converter Station Layouts



Note: (a) images are not to scale and (b) refer to Table 2 for description of numbered elements.

DC Underground Cables

DC underground cables will be required between the landfall and converter station. A DC system comprises two cables (i.e. a single pair is one circuit), generally installed in ducts, typically up to 300mm in diameter. These are laid side by side within a trench typically 1.0 m wide by 1.4 deep. To enable DC cable installation a working corridor approximately 40m wide will be required comprising temporary access, haul road, cable trench, drainage and topsoil and subsoil storage. A cross section of a typical working width is illustrated in Figure 6.

Typically, cable installation will be undertaken using open trenching methods. In this method, cables could either be directly laid into the trench and backfilled, or a duct could be laid into the trench after which cables will then be pulled through the pre-laid duct. At some locations where obstacles or constraints such as roads, railway lines or watercourses require to be crossed trenchless methods such as HDD, augur boring or micro-tunnelling could be used and the working corridor may increase locally to enable these specialist engineering works.

DC cables are typically laid in sections with cables pulled off cable drums into trenches or through ducts. DC cable sections are typically between 800 m and 1.0 km long between joint bays, however, the exact length of sections will take into account a range of factors including the constraints which are present, installation methods and cable pulling requirements. Adjacent cable sections are joined together at joint bays on buried concrete pads, which are set at the base of the cable trench.

On completion of installation the working corridor would be fully reinstated. Generally, there would be no permanent above ground infrastructure with the exception of potentially marker posts at key locations.

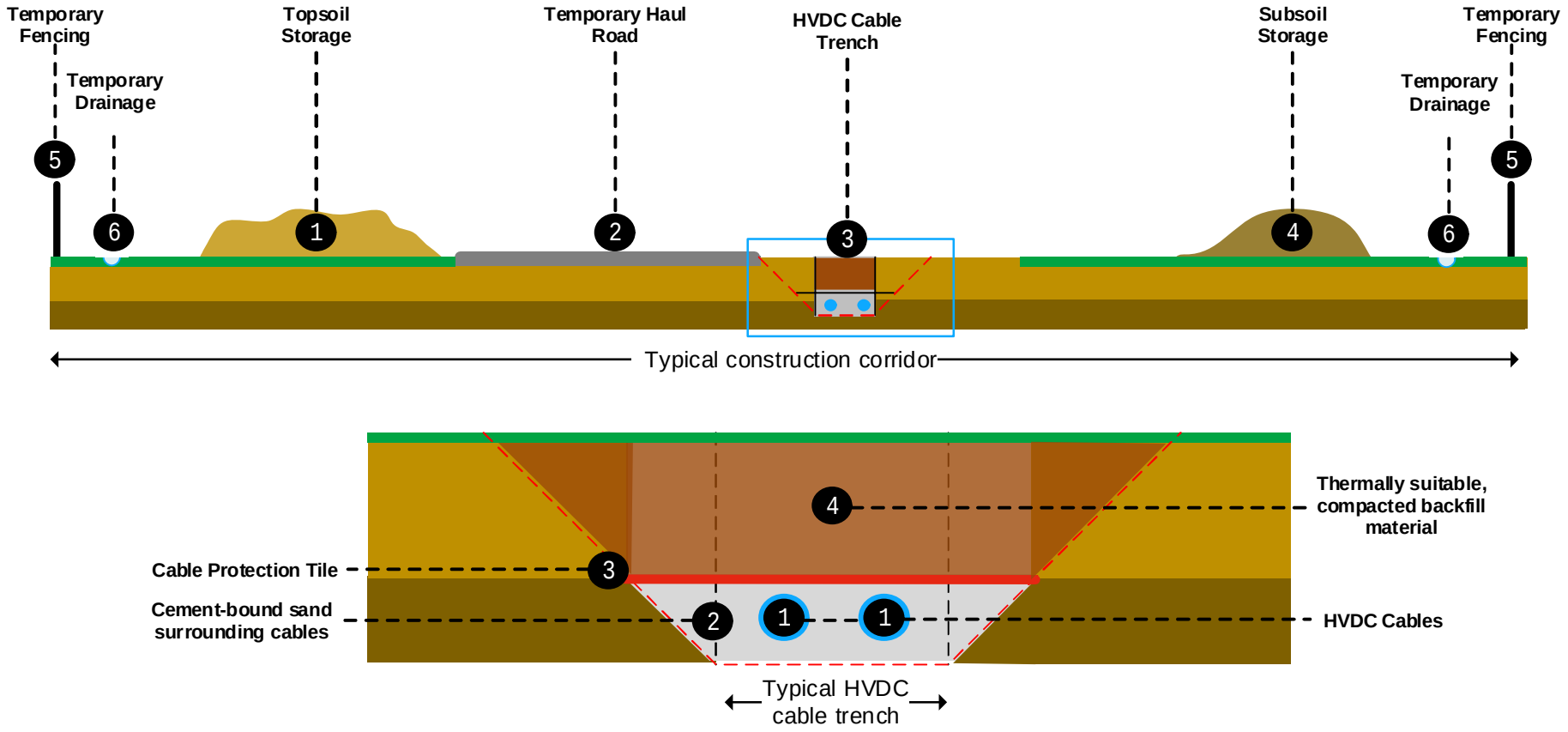
AC Underground Cables

AC underground cables will be required between the converter station and Westfield Substation. The exact configuration and requirements will depend on the length of the connection (i.e. the proximity of the converter station to Westfield Substation). It will comprise of up to 6 cables, generally installed in ducts, typically up to 300mm in diameter, laid 3 per trench; with each trench typically 1.5 m wide by 1.6 deep (i.e. up to two trenches). As above, to enable cable installation a typically 40m wide working corridor will be required comprising temporary access, haul road, cable trench, drainage and topsoil and subsoil storage. The increased width is due to the increased spacing required for AC cables.

Installation methods for AC cables are the same as those described above for DC cables. They will typically be installed by open cut trenching methods unless obstacles or constraints require trenchless methods to be used.

AC cables are laid in sections typically between 700m and 1km. Adjacent sections are joined together at joint bays. At each joint bay location there will be a requirement for an earthing link pillar, similar in scale and appearance to a telecommunication kiosk.

Figure 6 Cross section of a typical working width



03.

Approach to Routeing and Siting

3. Approach to Routeing and Siting

SPEN's Approach to Routeing and Siting

In 2022 as part of preparing their RIIO-T2 Business Plan, SPEN undertook a review of their approach to developing major infrastructure projects. SPEN consulted on and published an updated version of 'Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment'. It describes the approach taken to identifying and assessing alternative site and route options in a clear, systematic manner in accordance with SPEN's statutory duties and licence obligations; taking into account industry-recognised approaches.

The focus of this document is mainly on the routeing of new overhead lines, however, it also describes how SPEN approach the development of underground cable routes. The underlying premise of the approach is that the most significant effects of underground cables are likely to result from the level of ground disturbance required for the construction of cable trenches and associated works. While the document makes no specific reference to converter stations, it does outline SPEN's approach to the siting of substations, with reference to the Horlock Rules, which is considered to be applicable to the siting of converter stations which have similar characteristics.

Established Routeing and Siting Practice

Overview

Guidance on the routeing of overhead lines and the siting and design of substations is set out in the Holford Rules and Horlock Rules respectively. While these do not make reference to landfalls, underground cables or converter stations the underlying principles of the guidance which promote careful routeing and siting as a means to avoid or reduce potential environmental impacts are applicable to the routeing and siting of the Scottish Onshore Scheme.

The Holford Rules

The Holford Rules were developed in the 1950s and set out a series of guidelines on the routeing of overhead lines. The Rules were reviewed in the early 1990s by the National Grid Company (NGC) Plc. (now National Grid Electricity Transmission (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 Holford Rules as well including notes added through subsequent reviews by NGC, SHETL and most recently by SPEN is contained in Appendix A.

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 states "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" while Rule 2 states "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)." While Rule 2 refers to angle towers,

the same underlying principle regarding changes of direction applies to underground cables as there are limitations on their bending radii.

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 SPT’s duties under Schedule 9 to the Electricity Act 1989. For the purposes of this 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 “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 purposes of this study, such areas include international and national designations such as sites designated for nature conservation or cultural heritage/archaeological interests.

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 study this has been interpreted as the extent to which areas of the highest or high amenity or environmental value are avoidable in routeing or siting options.

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 study, such areas are considered to comprise local wildlife sites or reserves, woodland and outdoor recreational areas such as country parks.

While the Rules do not address residential areas, the subsequent notes and clarifications provide guidance stating “avoid routeing close to residential areas as far as possible on grounds of general amenity”. For the purposes of this study, settlements have been defined as areas of the highest amenity or environmental value. Smaller clusters or individual properties are considered to be a deviation issue in finalising the route design within a Preferred Option.

The reviews of the Rules also included guidelines on the siting substations, referred to as 'Supplementary Notes on the Siting of Substations'. These also emphasise the need to consider areas of high amenity or environmental value but also highlight that consideration should be given to the screening or containment provided by woodland or landform as well as landscape character.

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. A copy of the Horlock Rules is contained in Appendix B. While developed for substations, they are considered to be applicable to converter stations as they have similar characteristics. The guidelines cover a range of aspects of site selection and design including, of particular relevance to this study, guidelines with respect to:

- Avoiding sites of amenity, cultural or scientific value (including international, national and local sites) in site selection.
- Local context taking account of existing features such as landform or woodland to screen sites and reduce intrusion into surrounding areas as much as possible.
- 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.

Approach to the Identification of the Scottish Onshore Scheme

The approach to the identification of the Scottish Onshore Scheme is illustrated in Figure 7. It has comprised two main steps; firstly, the identification and assessment of alternative landfall and converter station sites ('Siting') and secondly the identification and assessment of alternative underground cable routes ('Routeing'). The approach to identifying and assessing alternative sites and routes has ensured the iterative consideration of potential impacts on the environment and communities, alongside technical and economic considerations consistent with SPT's statutory duties and taking account of established routeing and siting practice including the Holford and Horlock Rules described above. It concludes with the identification of a Preferred Option to be subject to consultation.

Siting has been undertaken as the first step in order to ensure the approach is focused. The landfall requires consideration of both terrestrial and marine factors, and is therefore a critical element in the overall identification of the Project. Through early identification and appraisal of potential landfalls, it has ensured that onwards underground or subsea cable routeing is focused on shortlisted landfall options which enable feasible marine and terrestrial alternatives.

In line with SPEN's approach to major infrastructure projects, a Routeing and Siting Objective has been established which underpins the approach illustrated in Figure 7, it is:

"*To identify a technically feasible and economically viable Scottish Onshore Scheme connecting to Westfield 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.*"

The objective ensures that in considering alternative options and identifying the Preferred Option for the Scottish Onshore Scheme appropriate consideration has been given to impacts of it on the environmental and people alongside technical and economic factors.

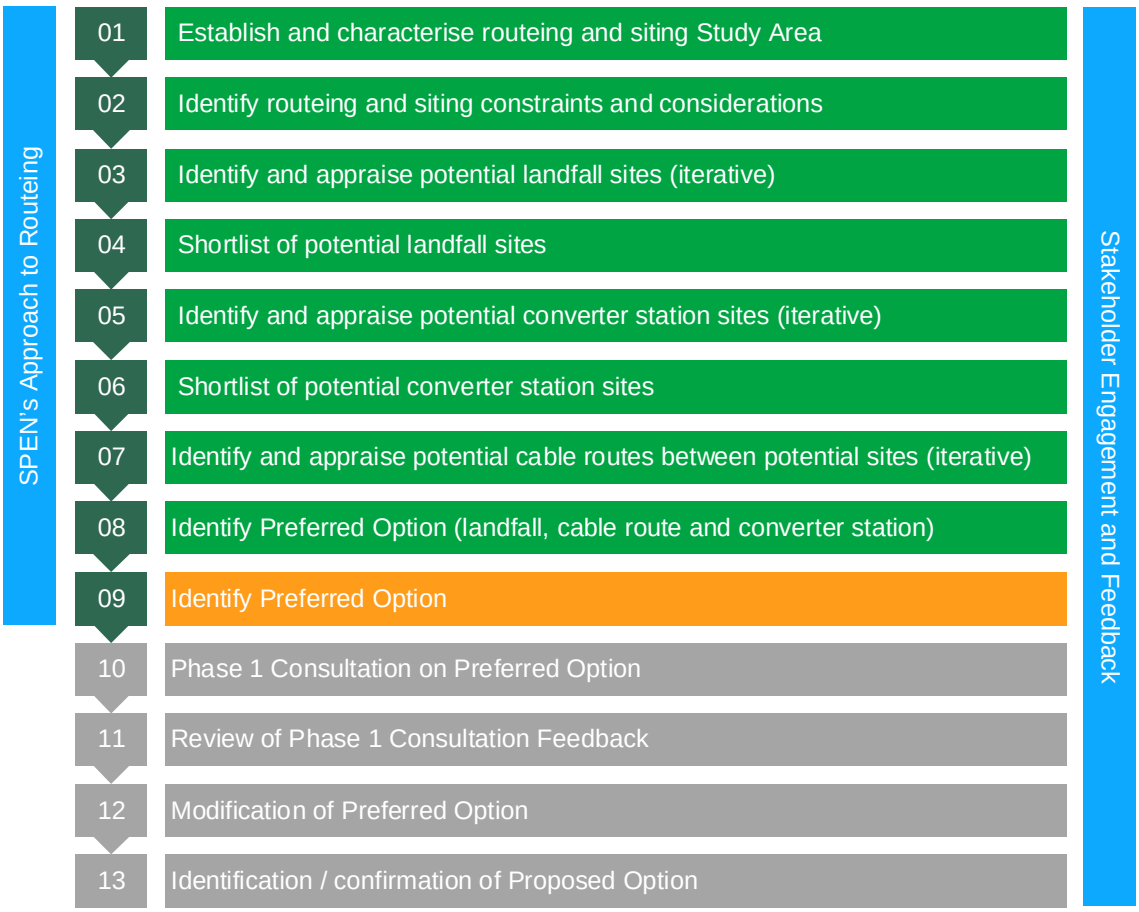


Figure 7 Approach to Identification of the Scottish Onshore Scheme

Stakeholder Engagement

At key stages during the study, targeted consultation has been undertaken with stakeholders and statutory consultees including Fife Council, NatureScot, Historic Environment Scotland (HES), the Scottish Environment Protection Agency (SEPA), the Coal Authority, Forth Ports Authority and Scottish Forestry. The purpose of this has been to provide stakeholders with information on Project, in particular the Scottish Onshore Scheme, as well as seek feedback on:

- The approach to routeing and siting, in particular regarding specific routeing or siting constraints or considerations which stakeholders wish to see addressed as part of the study, and
- Emerging landfall and converter station site options as well as underground cables routes options in order to identify and address potential constraints or concerns as part of an iterative approach to identifying and refining options.

Constraints Mapping

To inform routeing and siting a study area (illustrated in Figure 8) was established taking account of the location of Westfield Substation and its proximity to the coast. This extends

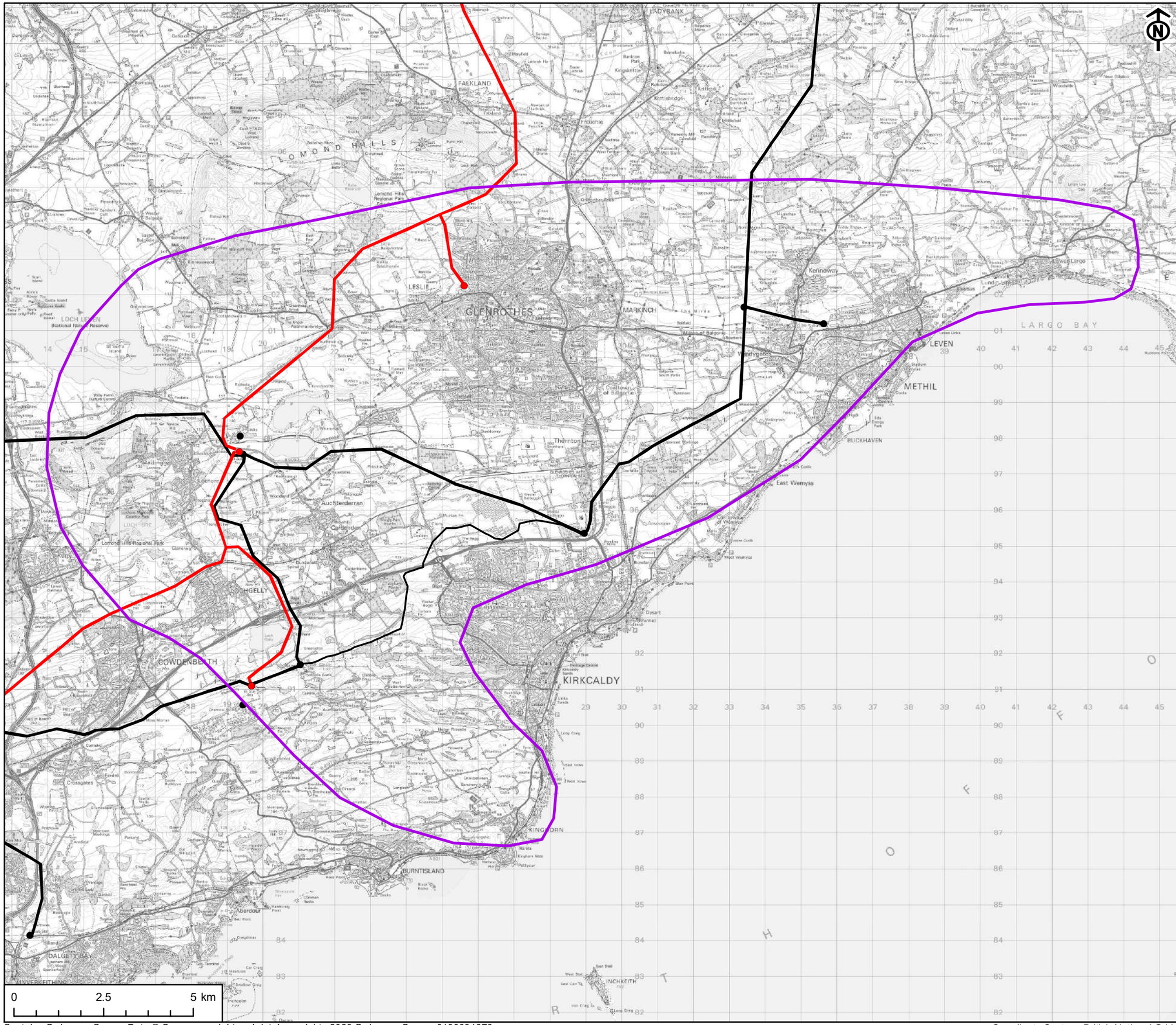
broadly south and east from Westfield Substation enabling direct routes from the Westfield area towards the Firth of Forth encompassing the coastline between Silver Sands Bay in the south and Largo Bay where landfalls could reasonably be located.

A constraints mapping exercise was undertaken to identify relevant environmental, technical and other interests within the study area. This includes environmental constraints such as designated sites, settlement including towns, villages and individual properties, technical constraints such as other infrastructure or ground conditions as well as planning considerations including planning allocations or designations. Table 3 provides an overview of the constraints information collated to inform the routeing and siting study. A series of thematic constraints plans are provided in Appendix C.

Table 3 Routeing and Siting Constraints and Considerations

Topic/sub-topic	Constraints/considerations
Environmental constraints and considerations	
Ecology and Ornithology	Special Protections Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs) and Wildlife Sites
Cultural Heritage and Archaeology	Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Conservation Areas
Landscape	Local Landscape Areas, landscape character and Registered Parks and Gardens
Settlements	Towns, villages and other residential dwellings
Recreation	Country Parks, Regional Parks, Core Paths and other open space or amenity areas
Land use	Notable land uses including agricultural land and other major development including notable planning applications
Woodland	Ancient Woodland Inventory sites, native woodland and commercial forestry
Water Environment	Flood risk areas and major waterbodies
Technical constraints and considerations	
Other infrastructure	Other infrastructure including roads and railway line as well as existing transmission and distribution overhead lines and gas pipelines
Ground Conditions	Underlying geology including historic coal mining activities
Topography and landform	Slope, gradient and elevation

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



Scale @ A3 1:1,000,000

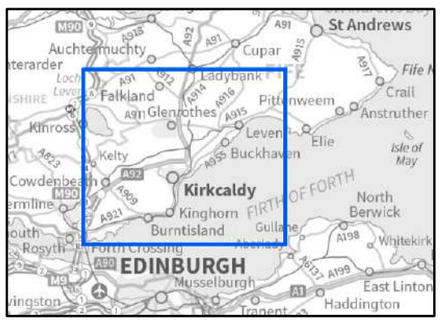
Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Study Area
- Substation Location
  - 132 kV
  - 275 kV
- SPT Network
  - Existing 132kV
  - Existing 275kV



TITLE
Figure 8
Routeing and Siting Study Area

REFERENCE
EL4_20240312_RR_8_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

04.
Landfall Site Selection

4. Landfall Site Selection

4.1 Landfall Siting Parameters

Landfall siting parameters have been established to inform the identification and appraisal of alternative landfall sites. The installation method at the landfall will be influenced by a range of site-specific factors so site selection requires a degree of flexibility. The parameters that have been used to inform the identification of potential landfall locations are:

- Temporary construction area: A working area of up to 100m by 100m will be required to accommodate construction facilities and laydown space necessary to enable installation. The exact area will depend on the installation method (i.e. open cut or trenchless), however, this is considered to be representative of a realistic worst case.
- Transition Joint Pit: The transition joint pit (TJP) is where the subsea and underground cables are jointed together. It typically comprises a rectangular area with a concrete base which is buried below ground level. The exact area is subject to detailed design but will be up to 50m2 which can be accommodated within the temporary construction area.
- Landfall installation method: The exact method of installation will depend on the location of the landfall. In identifying and assessing landfall options consideration has been given to open cut and trenchless methods such as Horizontal Directional Drilling ((HDD), however, where the constraints indicate one method is more feasible or preferable this is highlighted.

4.2 Identification and Assessment of Alternative Landfall Sites

For the purposes of landfall site selection, a landfall siting study area (illustrated in Figure 9) was established comprising approximately 30km of coastline from east of Aberdour/Silver Sands Bay to west of Lower Largo/Largo Bay. A two-stage approach was taken to identifying alternative landfall sites. The coastline was characterised into areas according to the nature of constraints or opportunities present and potential for landfall sites. Areas with no or limited potential for landfalls, as well as onwards underground cable routes were discounted and areas with potential for landfalls and onwards underground cable routes were taken forward. Following this, within those areas identified as having potential for landfall sites, a review was undertaken to identify potential landfall sites.

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

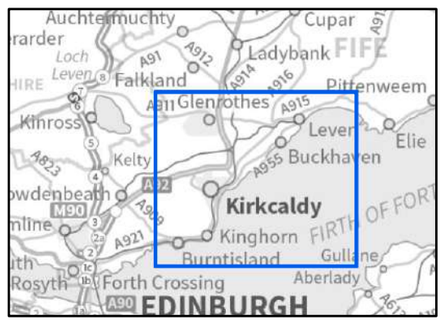
Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
Landfall Siting Study Area



TITLE
Figure 9
Landfall Siting Study Area

REFERENCE
EL4_20240311_RR_9_v2

SHEET NUMBER
1 of 1

DATE
11/03/24

4.3 Landfall Study Area Characterisation

The following sections describe the key constraints and other considerations present within the landfall siting study area. These are also illustrated in Figure 10.

Ecology and Ornithology

All of the coastline is adjacent to or abuts the Outer Firth of Forth and St Andrews Bay Complex Special Protection Area (SPA) (designated for breeding and non-breeding interests), which extends from inshore waters out over the Firth of Forth.

The majority of the coastline within the study area forms part of the Firth of Forth SPA, Site of Special Scientific Interest (SSSI) and Ramsar Site (designated for non-breeding interests), however, the designation is not continuously present with some small sections at Kirkcaldy, Methil and Buckhaven not subject to designation. Where the SPA/SSSI/Ramsar is present it typically occupies narrow sections of the coastline approximately 100-200m wide.

While it would be preferable to avoid ecological designations, the extent of the Firth of Forth SPA/SSSI/ Ramsar is such that this is not feasible. Where landfalls require to cross the Firth of Forth SPA/SSSI/Ramsar, it is expected that trenchless methods could be utilised such as Horizontal Directional Drilling (HDD) in order to reduce potential disturbance. Consideration may also need to be given to seasonal working restrictions, however, this would be subject to further design and assessment.

Part of the study area to the north of Kinghorn comprises a designated seal haul-out area. Seal haul out areas are designated under the Marine (Scotland) Act and provide protected areas on land where seals come ashore to rest, moult or breed. Similar to the above, works in such areas may require to be subject to seasonal working restrictions.

Cultural Heritage and Archaeology

There are a small number of historic environment considerations present along the coastline, most notably:

- Seafield Tower scheduled monument to the immediate south of Kirkcaldy on the section of coastline between Kinghorn and Kirkcaldy.
- Wemyss Castle Garden and Designed Landscape occupying a significant area to the south or west East Wemyss, parts of the site extend up to and directly abut the coastline.
- MacDuff's Castle and Dovecot, a scheduled monument comprising a number of small areas between East Wemyss and Buckhaven.

Historic environment constraints are not considered to significantly constrain the identification of potential landfalls. The only exception is the Wemyss Castle Garden and Designed Landscape which directly abuts or is immediately inland of approximately 2.5-3km of the coastline. This section of the coastline is not considered to be suitable for potential landfalls.

Landscape

There are no statutory designated landscapes, however, there are two Local Landscape Areas (LLA) designated through the adopted Fife Local Development Plan. These comprise the Cullaloe Hills and Coast LLA which takes in parts of the coastline between Aberdour and Burntisland, Burntisland and Kinghorn and Kinghorn and Kirkcaldy and the West Wemyss Coast LLA, which takes in the coastline between Kirkcaldy and East Wemyss. Landscape designations are not considered to be a significant constraint on the identification of potential landfalls as they do not require permanent above ground infrastructure

Settlement

A significant proportion of the coastline is well-developed with settlements or other built development present. These areas include (from west to east) Aberdour, Burntisland, Kinghorn, Kirkcaldy, East Wemyss, Buckhaven, Methil, Leven and Lower Largo. Notwithstanding the potential for temporary disturbance during installation of the landfall and onwards underground cable, it is preferable to avoid significant settlements along the coastline, as they prevent or significantly constrain onwards underground cable routeing to potential converter station sites. As a result, sections of the study area, in which moderate and large settlements extend up to and along the coastline, are not considered to be suitable for potential landfalls.

Recreation

To the north of the study area, north of Leven, there is a golf course that directly abuts the coastline; Lundin Golf Club. This extends south to north for just over 2km. The golf course is not considered to prevent potential landfalls in this area, but would require consideration of trenchless installation methods such as HDD which prevent impacts on the course itself as well as users of it.

Other tourism and recreational considerations are present throughout the study area including coastal and other footpaths, holiday parks and beaches. This includes the Fife Coastal Path, which is present either adjacent to the coast or inland of it, within settlements for the entirety of the study area, as well as other Core Paths which are located just inland. Holiday parks are located to the south at Pettycur/Kinghorn and to the north at Leven. These are typically extensions to settlement and should be avoided. Bathing waters are identified by SEPA along the coast including from (south to north) at Kinghorn (Pettycur), Kinghorn (Harbour Beach), Kirkcaldy (Seafield) Leven and Lower Largo. None of these constraints are considered to prevent landfalls but may influence the method and/or timing of installation.

Other Infrastructure

The Edinburgh-Aberdeen Railway Line runs south to north and broadly parallels a large part of the coastline in south of the study area. From east of Aberdour/Silver Sands Bay the railway line follows the coastline until it reaches Kirkcaldy and begins to move further inland. The railway line does not pose a major constraint but would influence installation methods. Due to its proximity to the coast it is assumed that any trenchless crossing such as HDD would be required to cross the railway line and extend out to inshore waters. This may be a

limiting factor on steeper, more elevated slopes and where the railway line is slightly further inland.

Physical Environment

Topography along the coastline is varied with a mix of steep slopes and rocky or sandy beaches present. Steeper slopes are typically present to the south of the study area for example at Silver Sands Bay where land rises up very quickly from the railway line (approximately 40% slope) whereas to the north of the study area west of Lower Largo slopes are more gentle (approximately 5% slope). Making landfall on sections of the coastline with gentle slopes is preferable in engineering terms, however, given the variable nature of the coastline and other factors influencing landfall selection physical environment constraints are not considered to prevent landfalls.

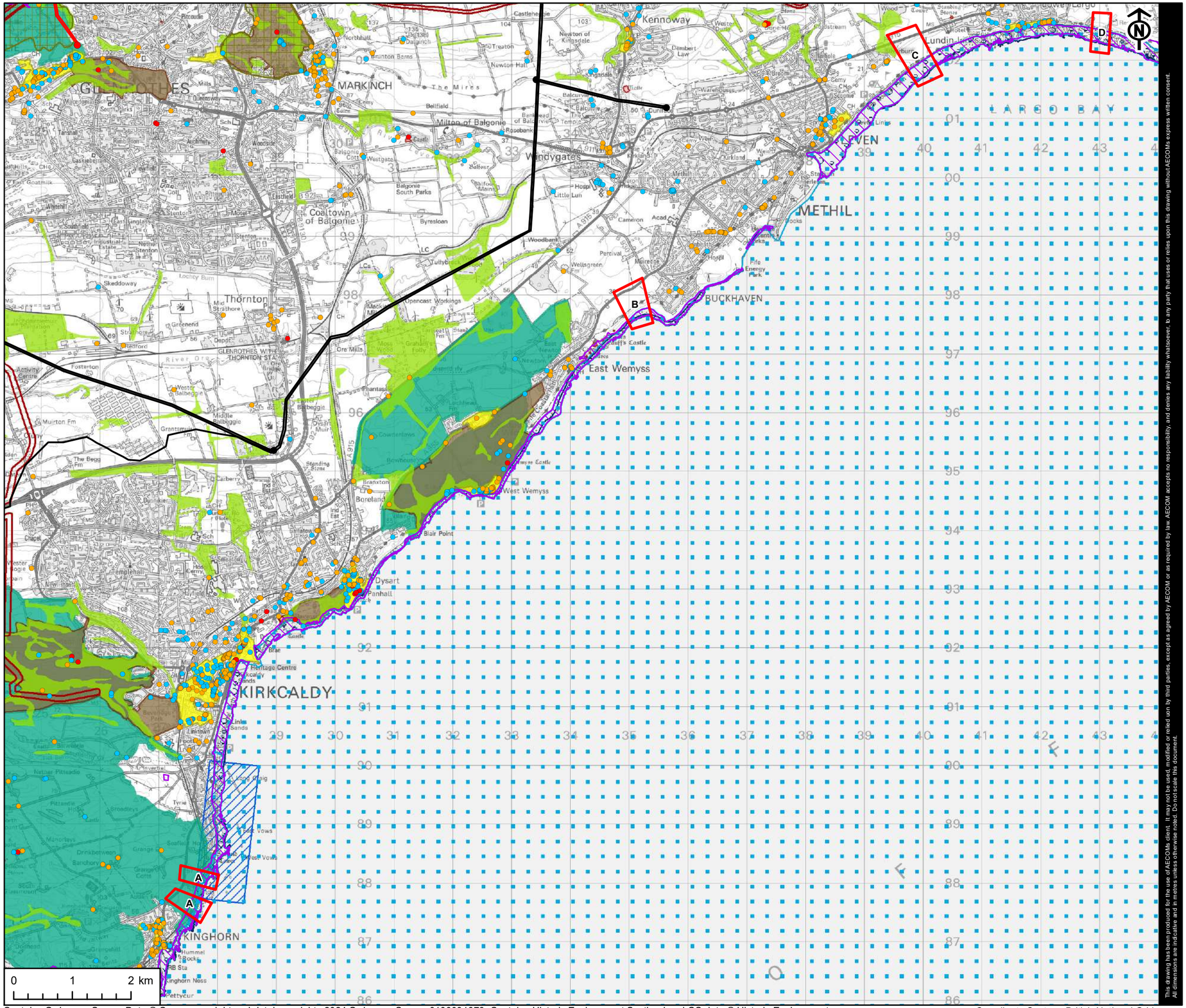
Part of the coastline is designated as a Regionally Important Geological Site (RIGS). The Aben-Seafield RIGS comprises the coastal cliffs and outcrops in the nearshore area and extends for approximately 2km from Kinghorn to Kirkcaldy.

Summary of Coastline Characterisation

Within the landfall study area four sections of the coastline were identified as not providing opportunities for suitable landfalls. These are illustrated in Figure 10 and comprise Silver Sands Bay to north of Kinghorn, Seafield Tower to north of East Wemyss, south of Buckhaven to north of Leven and west of Lundin Links to east of Lower Largo. The majority of these areas were not considered to be suitable due to the presence of settlements and/or other built development immediately on the coastline which limits both landfall opportunities and onward underground cable routeing.

Four sections of the coastline, also illustrated in Figure 10, comprising north of Kinghorn to Seafield Tower, north of East Wemyss to south of Buckhaven, north of Leven to west of Lundin Links and east of Lower Largo to Ruddons Point were identified as being suitable for landfall sites. These areas are typically less well-developed providing opportunities for subsea cables to come ashore as well as enabling onward underground cable routeing.

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



Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Landfall Option Site
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- Ancient Woodland
- Fife Local Landscape Area
- Regional Park
- Scheduled Monument
- Garden and Designed Landscape
- Conservation Area
- Hazard Pipe Consultation Zone
- Designated Haul Out Site for Seals

Substation Location
- 132 kV
- 275 kV

SPT Network
- Existing 132kV
- Existing 275kV

TITLE
Figure 10
Landfall Study Area

REFERENCE
EL4_20240312_RR_10_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

4.4 Potential Landfall Sites

Based on the coastline review four potential landfall sites were identified. As the landfall is the interface between the terrestrial and marine elements of the Project, landfall siting has considered both terrestrial and marine constraints in so far as they influence the feasibility of landfalls. The RCD sets out key marine constraints or considerations that have influenced the identification and assessment of potential landfalls but does not consider subsea cable routes.

Option A – Kinghorn (see Figure 11)

Landfall A is located on agricultural land between the settlements of Kinghorn to the south and Kirkcaldy to the north. The A921 and the Edinburgh-Aberdeen Railway line broadly parallel the coastline located approximately 420m and 180m inland respectively. The Fife Coastal Path is located to the east of the railway line also closely following the coastline. The coastline is steeper in this section of the study area formed by rocky, vegetated cliffs with a very narrow foreshore present in places. The cliffs in this section form part of the Abden-Seafield Regionally Important Geological Site (RIGS). From the railway line, which generally follows the 30m contour, the elevation reduces to 0mAOD/sea-level over approximately 70-80m. While steeper sections of the coastline can present engineering constraints, they do not prevent cable

The Firth of Forth SPA/SSSI/Ramsar is present in this section of the coastline but is narrower, extending across approximately 120-200m of the cliff and foreshore area mainly east of the railway line. As noted above the Firth of SPA is designated for non-breeding interests so works at the landfall in the winter period may be subject to seasonal working restrictions. The rocky foreshore area at Landfall A is partly overlapped by a designated seal haul out site. This can be avoided by micro-siting the landfall to the south of the area identified, however, works in the vicinity of the haul out may also result in seasonal working restrictions depending on the time of the year. The Outer Firth of Forth and St Andrews Bay Complex SPA directly abuts the coastline and could also influence the timing of subsea cable installation and in turn the timing of landfall works. Compared to other options, Landfall A requires longer subsea cable routes through the Outer Firth of Forth SPA.

Due to the constraints and topography, it is assumed that trenchless methods (i.e. HDD) would be required for this landfall. A temporary working area would require to be set up as a minimum west of the railway line with the HDD required to cross the railway line, coastal path and cliffs. It could also be set up to the west of the A921 crossing the road as well as the railway line, coastal path and cliffs as part of a single trenchless crossing. Depending on micro-siting, the landfall working area would require to be sufficiently set back from the railway line to achieve the necessary vertical clearance when crossing it. Given the proximity of the railway line to the coastline and the narrow foreshore area, subject to ground conditions, this is considered to be technically feasible.

The A921 or Linton Court could provide relatively direct access to potential working areas, however, some upgrades may be required and the latter is unlikely to be suitable for larger construction vehicles. Subject to where the landfall setup is planned a temporary access or bellmouth from the A921 would be required, however, this would also form part of the working width for any onwards underground cable route.

Subsea cable routes approaching Landfall A require a longer route through the Firth of Forth including a section through an area of high shipping density identified by Forth Ports as the area used by pilots for vessel manoeuvres. While this does not prevent a landfall in this location it may require additional mitigation measures to coordinate installation works and reduce impacts on shipping activities.

Option B – Buckhaven (see Figure 12)

Landfall B is located on agricultural land between the settlements of East Weymss and Buckhaven. The A955 runs broadly south west to north east between the settlements. Closer to the coast the Fife Coastal Path closely follows the coastline and beyond this foreshore is formed by a narrow rocky/sandy beach. The coastline is steeper in this section sloping up from the beach/foreshore area to approximately 30mAOD over a short distance. Slopes are estimated to be around 20-30%.

The Firth of Forth SPA/SSSI/Ramsar is present in this section of the coastline but is narrower extending across approximately 100-125m of the foreshore area. As noted above the Firth of SPA is designated for non-breeding interests so works at the landfall in the winter period may be subject to seasonal working restrictions. As with all landfalls, the Outer Firth of Forth and St Andrews Bay Complex SPA directly abuts the coastline and could also influence the timing of subsea cable installation and in turn the timing of landfall works. Compared to other options, Landfall B requires longer subsea cable routes through the Outer Firth of Forth SPA.

Due to the constraints and topography, it is assumed that trenchless methods would be required for this landfall. Assuming HDD, it would be feasible for this to be set up to the south or east of the A955 and seek to maximise the seaward distance of HDD. The A955 provides relatively direct access to potential working areas, however, a temporary access or bellmouth turning into the field south or east of the road would be required. The HDD area could be located approximately 200m south or east of the track closer to the coastline in order to maximise HDD distance, however, this would bring it in closer proximity to the Fife Coastal Path with potential for temporary disturbance during works.

Subsea cable routes approaching Landfall B are constrained by the presence of a number of anchorages as well as an area identified as ‘foul ground’ which is understood to contain unexploded ordnance (UXO) as well as spoil and construction waste. The number and distribution of constraints approaching the Buckhaven area affect the feasibility of landfalls within this section of the coast.

Option C – Lower Largo (west) (see Figure 13)

Landfall Option C comprises an approximately 400-500m wide section between Silverburn Park and the edge of the settlement of Lundin Links. The topography in this area is very gently sloping north to south. The nature and extent of the constraints present mean that trenchless methods would be required to construct the landfall. Assuming HDD, this would require HDD setup north of A915/Largo Road and with a trenchless crossing of the golf course and Firth of Forth SPA/SSSI/Ramsar. Subject to siting this would require a trenchless crossing in the order of 750m north to south spanning the Firth of Forth SPA/SSSI/Ramsar and Lundin Links Golf Course. While this is technically feasible it is in the upper range of HDD lengths.

The Firth of Forth SPA/SSSI/Ramsar is present on the foreshore area extending across the bay and inland for approximately 200-250m. As noted above the Firth of SPA is designated for non-breeding interests so works at the landfall in the winter period may be subject to seasonal working restrictions. The Outer Firth of Forth and St Andrews Bay Complex SPA directly abuts the coastline and could also influence the timing of subsea cable installation and in turn the timing of landfall works. Compared to other options, Landfall C requires shorter subsea cable routes through the Outer Firth of Forth SPA.

Lundin Links Golf Course extends inland from the foreshore area to the A915/Largo Road for approximately 400m. Impacts on the golf course would be avoided by using trenchless methods such as HDD, however, it this requires the landfall working area to be set up much further inland compared to other options requiring a longer HDD. The proximity of the potential working area to the A915 means that it benefits from direct access.

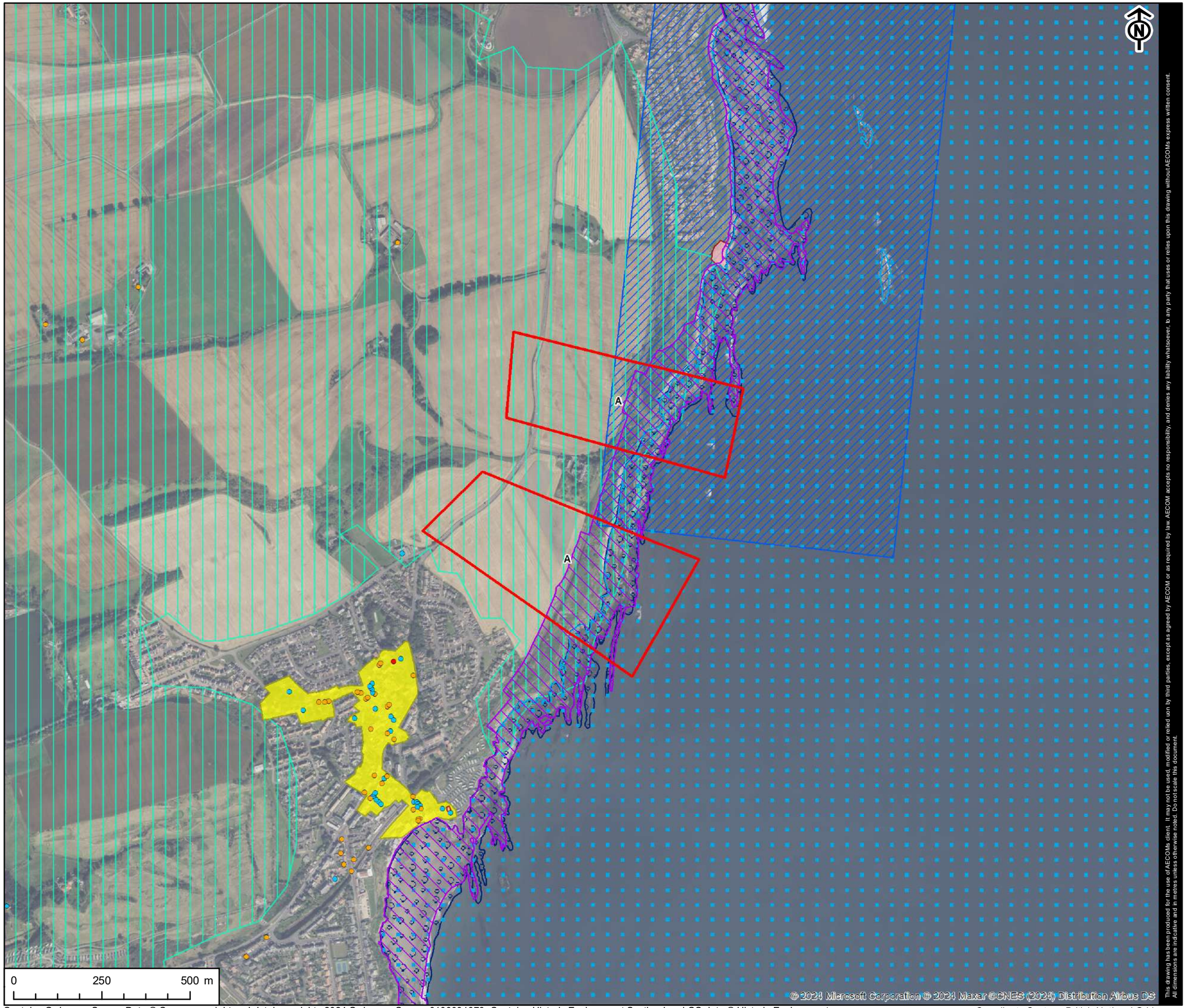
Option D – Lower Largo (east) (see Figure 14)

Landfall Option D is located to the east of Lower Largo on agricultural land and extending southwards to Largo Bay. The immediate vicinity is largely comprised of agricultural land, however, there is a track to the immediate east leading to a reservoir. Land is steeper in this section sloping up from the beach/foreshore area to approximately 20mAOD over a relatively short distance. Slopes are estimated to be around 20%. Opportunities to site further west, closer to Lower Largo are feasible but would be in closer proximity to settlement. Opportunities to site further east towards Rudden Point are also feasible, however, this would increase the overall distance to any converter station siting study area at Westfield without providing any significant benefits to the Project.

The Firth of Forth SPA/SSSI/Ramsar is present across the bay and extends for approximately 200m to the foreshore. As noted for other landfalls, the Firth of SPA is designated for non-breeding interests so works at the landfall in the winter period may be subject to seasonal working restrictions. The Outer Firth of Forth and St Andrews Bay Complex SPA directly abuts the coastline and could also influence the timing of subsea cable installation and in turn the timing of landfall works. Compared to other options, Landfall D requires shorter subsea cable routes through the Outer Firth of Forth SPA. A footpath is also present running west to east at the 'back' of the beach.

It is assumed that trenchless methods would be required for this landfall. It would be technically feasible for this to be set up above the beach to the west of the reservoir and maximise the distance of HDD out to the bay, however, compared to other options this landfall is slightly more constrained with regard to access for construction. Other than a track running to the reservoir this location has limited access, however, given the likely cable routeing requirements, access would require to be via a haul road/cable swathe from the A915 between Lower and Upper Largo.

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



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AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Landfall Option Site
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- Fife Local Landscape Area
- Scheduled Monument
- Conservation Area
- Designated Haul Out Site for Seals

TITLE
Figure 11
Landfall Option A - Kinghorn

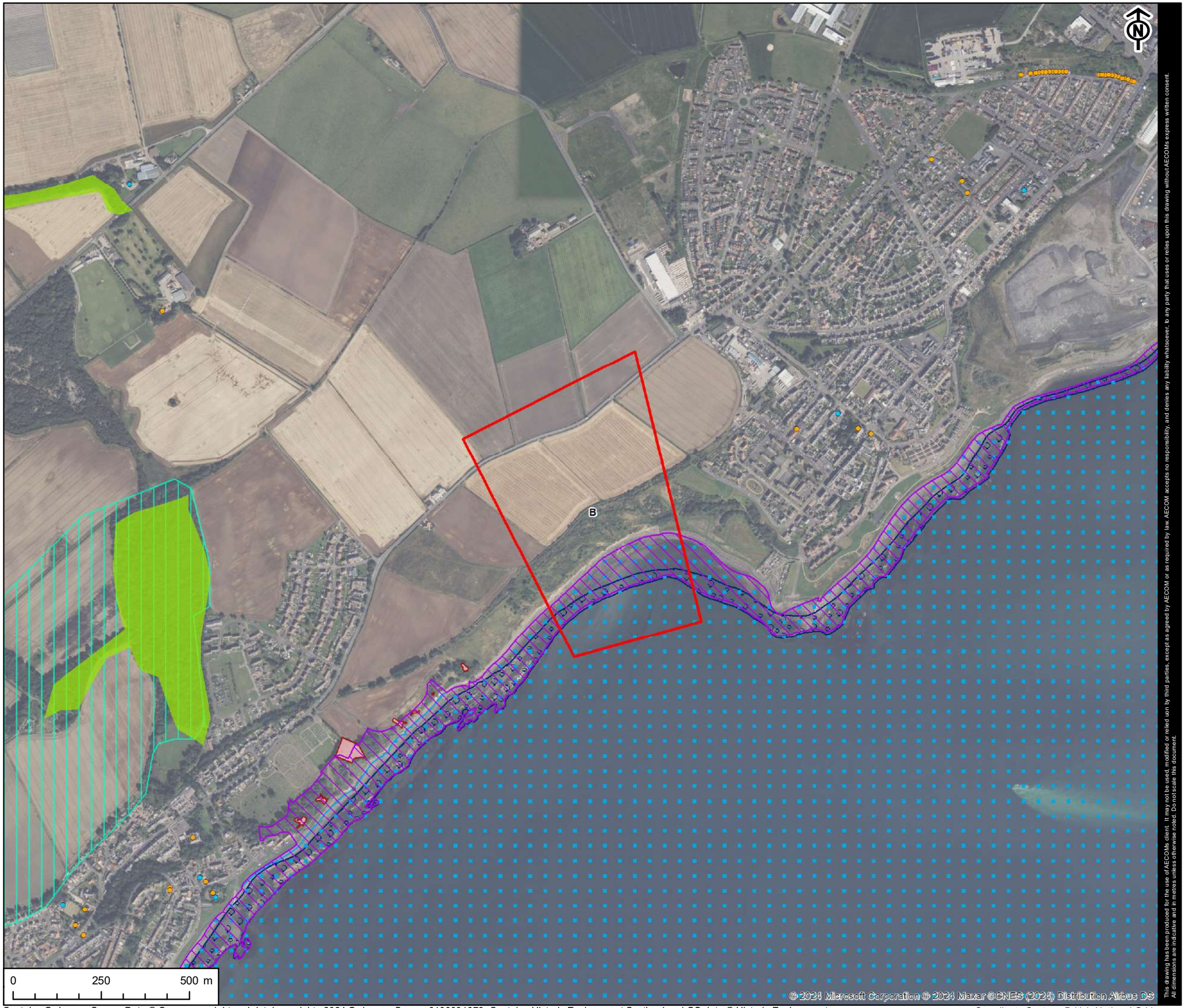
REFERENCE
EL4_20240312_RR_11_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Coordinate System: British National Grid

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



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AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Landfall Option Site
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- Ancient Woodland
- Fife Local Landscape Area
- Scheduled Monument
- Garden and Designed Landscape

TITLE
Figure 12
Landfall Option B - Buckhaven

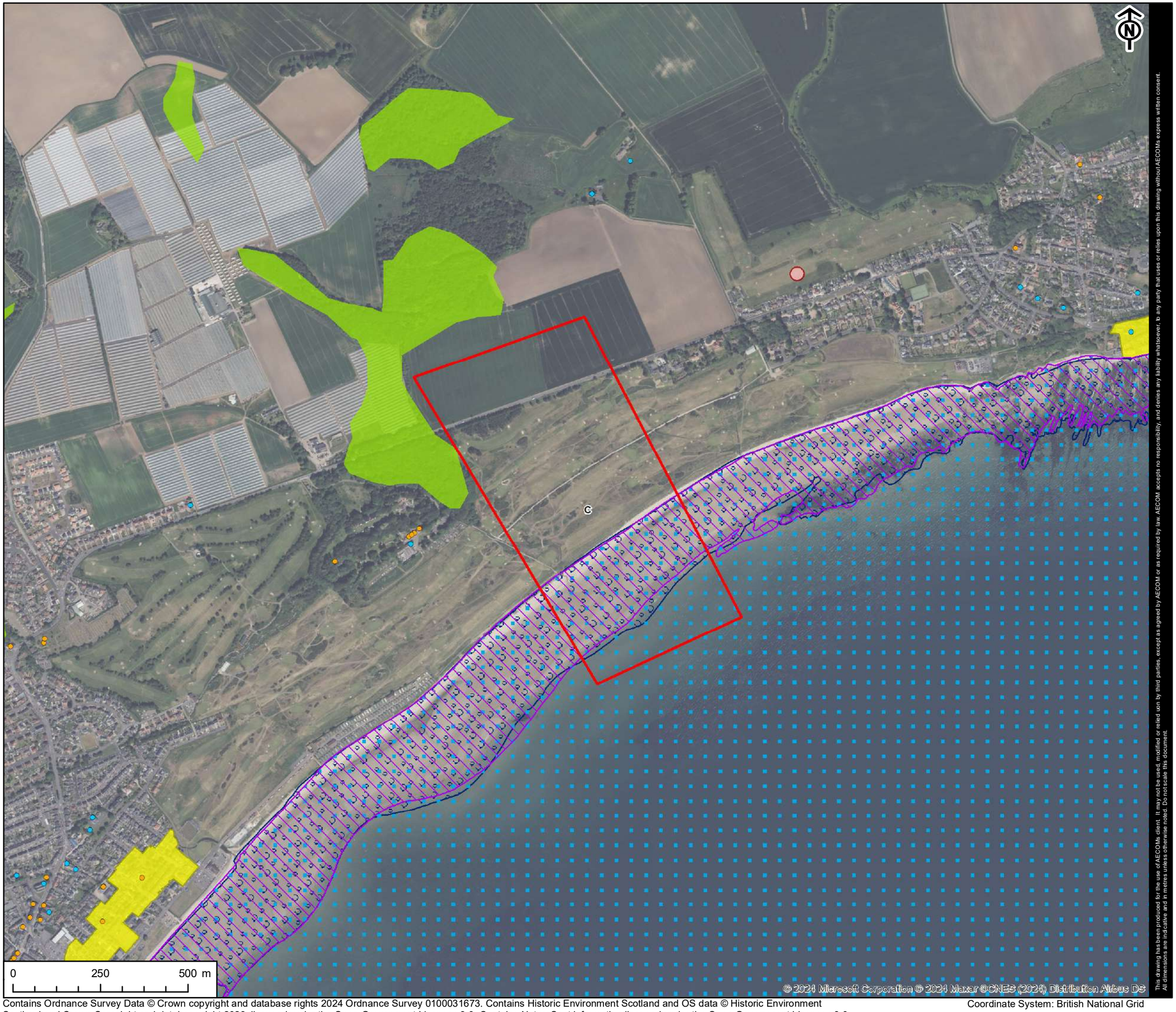
REFERENCE
EL4_20240312_RR_12_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Coordinate System: British National Grid

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



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AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Landfall Option Site
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- Ancient Woodland
- Scheduled Monument
- Conservation Area

TITLE
Figure 13
Landfall Option C - Lower Largo (West)

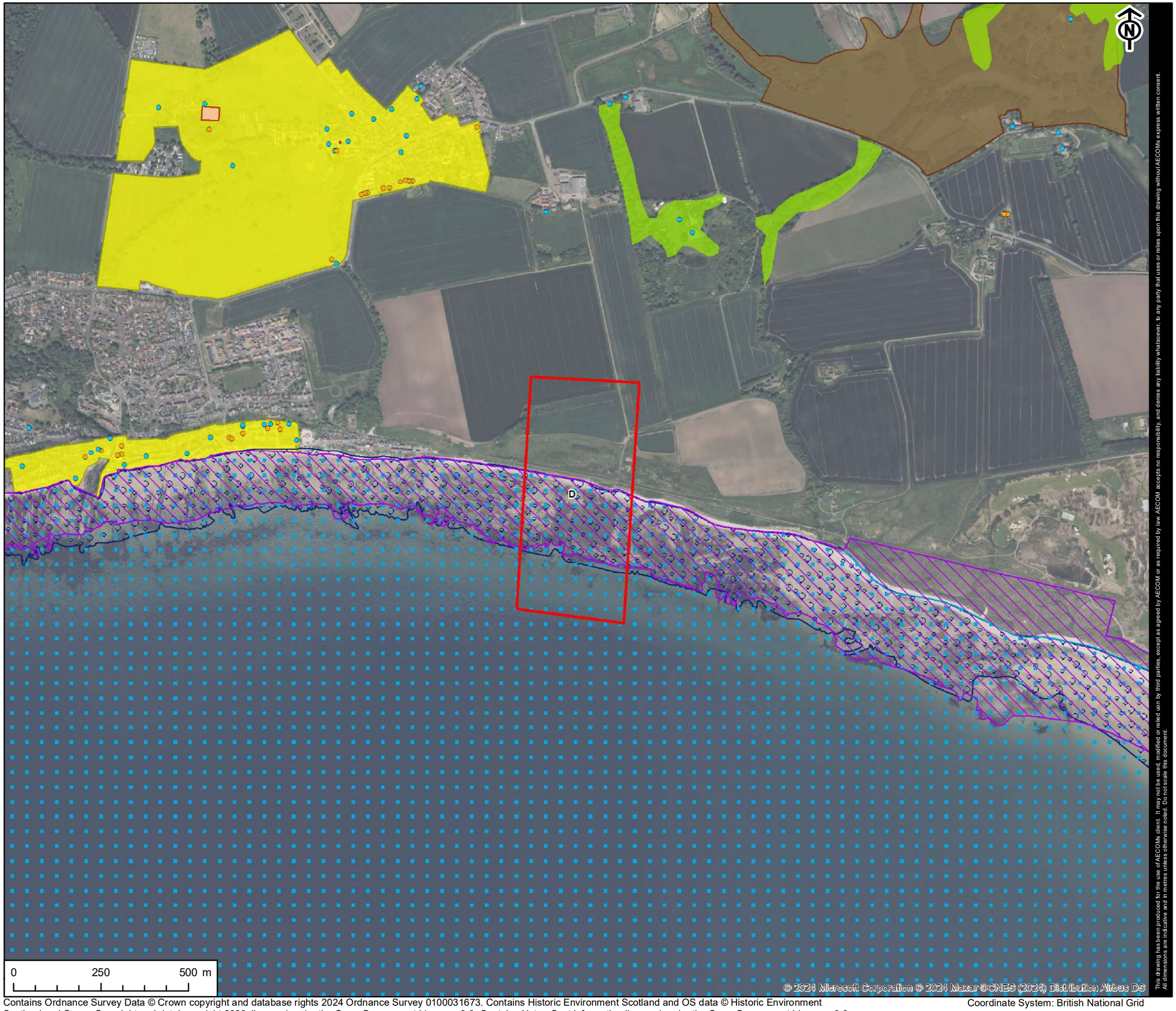
REFERENCE
EL4_20240312_RR_13_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Coordinate System: British National Grid

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



AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Landfall Option Site
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- Ancient Woodland
- Scheduled Monument
- Garden and Designed Landscape
- Conservation Area

TITLE
Figure 14
Landfall Option D - Lower Largo (East)

REFERENCE
EL4_20240312_RR_14_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Scale @ A3 1:10,000

Coordinate System: British National Grid

4.5 Summary of Landfall Siting Appraisal

Table 4 provides a summary of the key factors influencing the feasibility of alternative landfall sites. In general terms it is preferable for a landfall to be located somewhere on the coastline that enables the shortest, most direct route to the converter station. Landfalls A and B are closest to the converter station siting study area enabling more direct routes to Westfield in the order of 10-15km compared to landfalls C and D which are more distant requiring underground cable routes in the order of 25-30km. However, the location of the landfall has to be considered in the context of the Project and balance terrestrial and marine factors including environmental and technical aspects.

Landfalls A and B require longer subsea cable routes including through the Firth of Forth whereas Landfalls C and D require shorter subsea cable routes but longer underground cable routes. The extent of the Firth of Forth SPA and SSSI means that it is common to all four landfalls and therefore does not help to differentiate between them. The Outer Firth of Forth and St Andrews Bay Complex SPA is also common to each landfall requiring subsea cable routes to cross it. Longer subsea routes through the Outer Firth of Forth are required for Landfalls A and B. The presence of the designated sites along the coastline as well as other constraints at each landfall (A – topography and railway line, B – topography, C – golf course and D – topography) means that all landfalls are assumed to be installed using HDD or other trenchless methods.

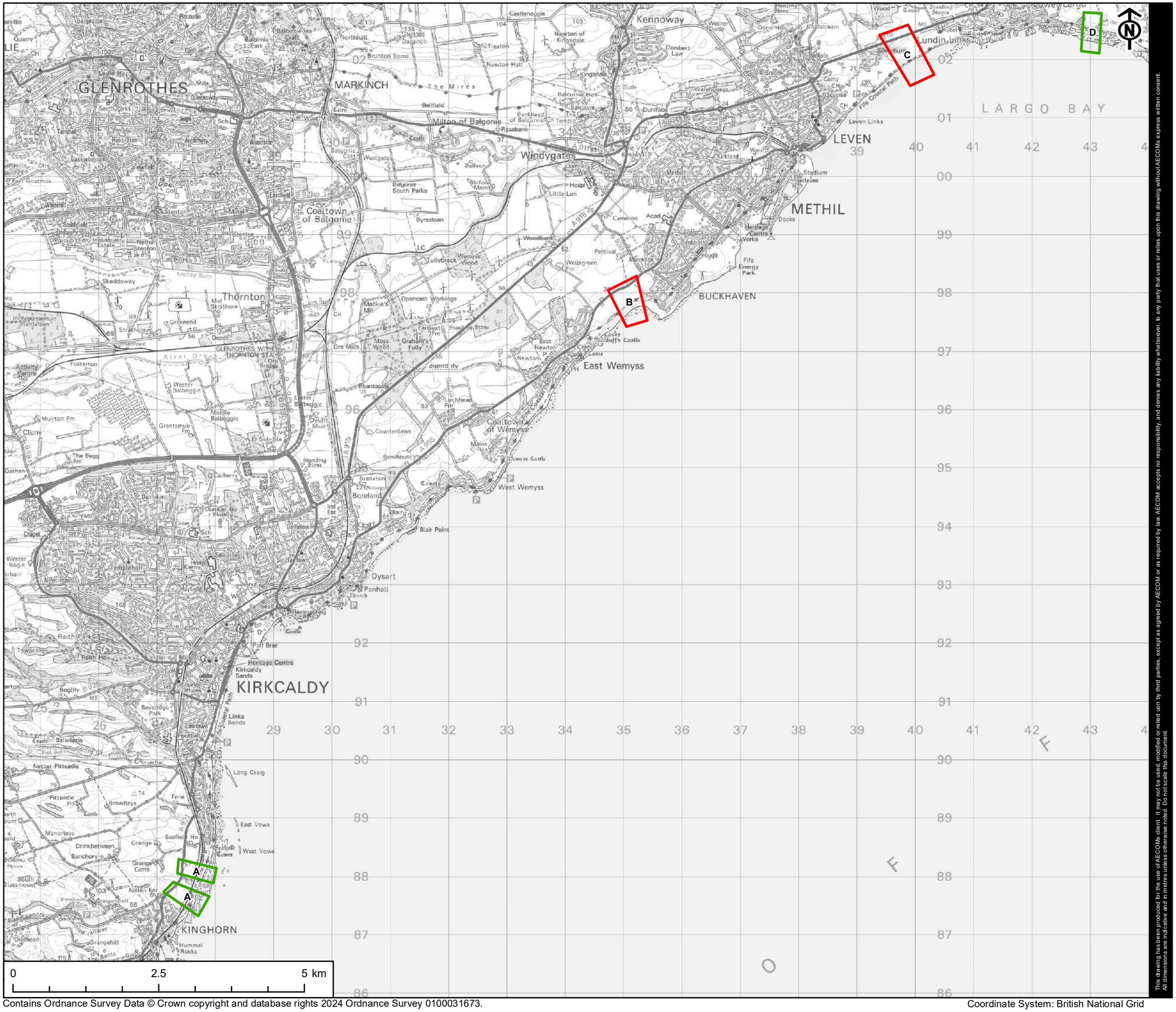
For the purposes of developing the Scottish Onshore Scheme, in particular underground cable routes, it was considered appropriate to shortlist both Landfall A and Landfall D. While they have different advantages in a marine and terrestrial context (i.e. they enables overall consideration of longer subsea cable routes and shorter underground cable routes versus shorter subsea cable routes and longer underground cable routes) they are also considered preferable to Landfalls B and C neither of which provide any environmental or technical benefit. As a result, in section 6 of this Report alternative underground cable routes have been developed from both Landfalls A and D.

Table 4 Summary of Landfall Siting Appraisal

Landfall	Key conclusions	
Landfall Option A Kinghorn	• Relatively wide section of the coast providing some flexibility for micro-siting informed by further site investigation. • Highly accessible via the A921. • Requires to be installed by HDD due to a combination of environmental and technical constraints including the Firth of Forth SPA and SSSI and topography as well as the Edinburgh-Aberdeen Railway Line. • Relatively steep section of the coastline with tall, vegetated cliffs c. 30mAOD as well as a narrow rocky foreshore area below this. • Designated seal haul out sites present to the north of the landfall area, however, opportunities for mitigation through micro-siting, design and timing of installation.	Shortlist

Landfall	Key conclusions	
	• Requires a longer subsea cable route through the Firth of Forth including crossing an area of high density shipping activity. • In geographic terms this landfall enables the shortest, most direct route to the Westfield area.	
Landfall Option B Buckhaven	• Narrow section of the coast with development/settlement to the north and south which limits flexibility for future micro-siting. • Highly accessible via the A955. • Requires to be installed by HDD due to a combination of environmental and technical constraints including the Firth of Forth SPA and SSSI and topography. • Relatively steep section of the coastline with tall, vegetated cliffs c. 30mAOD as well as a narrow rocky foreshore area below this. • Highly constrained marine approach due to anchorages and foul ground which affect the feasibility and directness of routes. • In geographic terms this landfall enables a relatively short direct route to the Westfield area compared to others.	Discount
Landfall Option C Lower Largo West	• Narrow section of the coast with development/settlement to the north and south which limits flexibility for future micro-siting. • Requires to be installed by HDD due to environmental constraints including the Firth of Forth SPA and SSSI and Lundin Links Golf Course. • Compared to other options due to the number and extent of constraints this option requires a longer HDD crossing which is less preferable. • In geographic terms this landfall requires a longer route to the Westfield area, however, this is offset by the reduced length of the subsea cable route.	Discount
Landfall Option D Lower Largo East	• Narrow section of the coast, however, land available to the east and west for future micro-siting purposes. • Requires to be installed by HDD due to environmental constraints including the Firth of Forth SPA and SSSI • Compared to other options due to the number and extent of constraints this option requires a comparatively longer HDD crossing. • In geographic terms this landfall requires a longer route to the Westfield area, however, this is offset by the reduced length of the subsea cable route.	Shortlist
Refer to Appendix D for further comparative appraisal.		

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



Scale @ A3 1:60,000

Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
Landfall Option Site
Shortlisted
Discounted

TITLE
Figure 15
Landfall Siting Appraisal

REFERENCE
EL4_20240312_RR_15_v3

SHEET NUMBER
1 of 1

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05.

Converter Station Site Selection

5. Converter Station Site Selection

5.1 Converter Station Siting Parameters

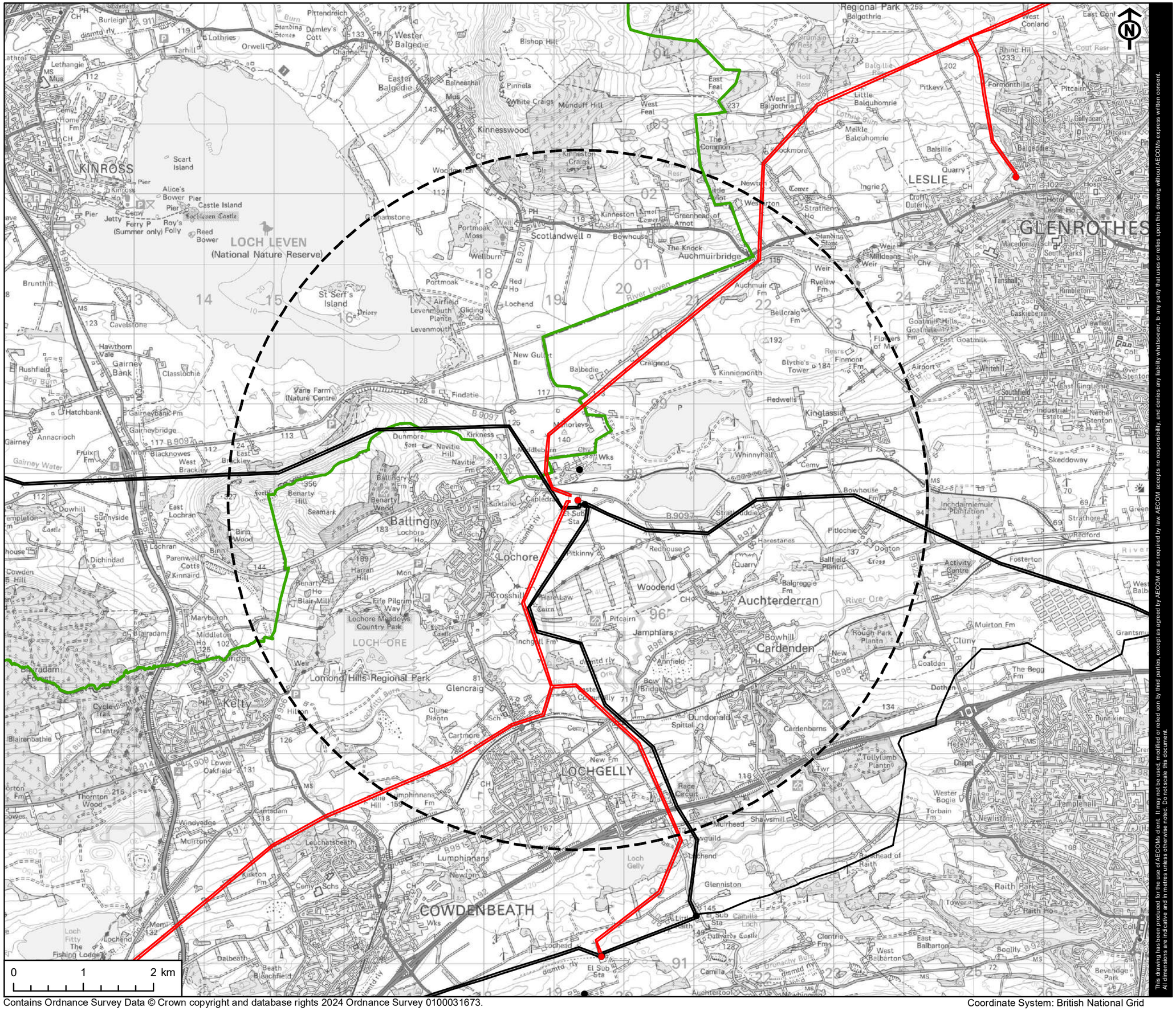
Converter station siting parameters have been established to inform the identification and appraisal of alternative converter station sites. The final detailed design of the converter station will vary by specialist supplier, so a degree of flexibility is required. The parameters that have been used to inform the identification of potential converter station site are:

- Operational footprint: For the purposes of the study, it has been assumed that any converter station would utilise VSC technology requiring an operational area of up to 250m by 350m (8.75ha).
- Scale and massing: The maximum height of buildings within the converter station site will be no greater than 28.5m. No assumption has been regarding the number of buildings and whether some equipment is enclosed within buildings or located outdoors.
- Temporary construction area: A temporary working area in the order of up to 250m by 200m (5ha) will be required to accommodate temporary construction facilities including offices, welfare, storage and laydown.
- Mitigation land: The requirement for land for mitigation, for example landscape planting, drainage, biodiversity net gain or compensatory planting will be site-specific. As appropriate to alternatives sites, potential mitigation requirements have been highlighted.

5.2 Identification and Assessment of Alternative Converter Station Sites

For the purposes of converter station site selection, a converter station siting study area (illustrated in Figure 16) was established extending out 5km in all directions from the point of connection on the NETS at Westfield Substation. The underlying premise for this is that at distances greater than 5km the converter station would require additional specialist equipment to make up for power losses incurred during the transmission of electricity which would require an increase in its footprint. The majority of the converter station siting study area lies within Fife Council's administrative area, however, part of the area to the north lies within Perth and Kinross.

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



Coordinate System: British National Grid

AECOM

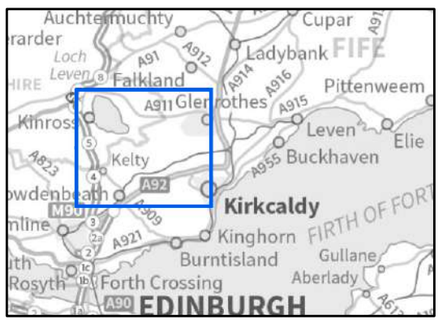
PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Converter Station Siting Study Area
- Local Authority Boundary

Substation Location
- 132 kV
- 275 kV

SPT Network
- Existing 132kV
- Existing 275kV



TITLE
Figure 16
Converter Station Siting Study Area

REFERENCE
EL4_20240312_RR_16_v3

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1 of 1

DATE
12/03/24

5.3 Converter Station Study Area Characterisation

The following sections describe the key constraints and other considerations present within the converter station siting study area. These are also illustrated in Figure 17.

Ecology and Ornithology

The Loch Leven Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) (designated for non-breeding interests) lies to the north west of Westfield Substation and covers a large area extending partly into the study area. While the designation is avoidable, consideration may also need to be given to adjacent fields which could be used by wintering birds associated with the SPA. There are no other statutory ecological designations within the study area, however, there are a small number of local wildlife sites designated through the Fife Local Development Plan. This includes Ballingry Meadow to the west of Westfield, Orebank Marsh to the south of Westfield and Benarty Hill to the far west of the study area.

Cultural Heritage and Archaeology

There are a number of historic environment considerations present within the converter station study area including scheduled monuments, listed buildings and a conservation area. There are seven scheduled monuments present including:

- Clune Craig approximately 2.8km to the south/south west of Westfield
- Loch Ore Castle approximately 2.3km to the south west of Westfield
- Benarty Hill Fort approximately 4km to the west of Westfield
- St Serf's Priory approximately 4km to the north west of Westfield

The scheduled monuments are all relatively small-scale and can be avoided through site selection, however, there is the potential for setting impacts to occur subject to site selection.

Listed buildings (predominantly grade B and C) are present throughout the converter station siting study area. The majority of listed buildings coincide with settlements, however, there are scattered individual listed buildings scattered throughout more rural areas comprising individual properties and farmhouses. The listed buildings are avoidable through site selection, however, there is the potential for setting impacts to occur.

There is one conservation area within the converter station siting study area. The Scotlandwell conservation area is approximately 4km north of Westfield within the administrative area of Perth and Kinross. The conservation area lies to the immediate north of the village of Scotlandwell.

Landscape

There are no statutory designated landscapes, however, there are two Local Landscape Areas (LLA). The first, Loch Leven and Lomond Hills LLA lies to the north west of Westfield partly extending into the converter station siting study area is designated through the adopted Perth and Kinross Local Development Plan. The second is the Loch Ore and Benarty LLA which lies to the west of the converter station siting study area and is designated through the Fife Local Development Plan. While these are not statutory

designated landscapes, converter station siting should avoid these areas as much as possible.

Woodland

There are pockets of woodland which is designated as Ancient Woodland throughout the converter station siting study area. The majority of these sites are classed as being 'long established of plantation origin', however, there are some small areas classed as 'ancient of semi-natural origin'. The Native Woodland Survey of Scotland identifies additional areas of woodland of mixed types throughout the study area. Woodland areas should be avoided in identifying potential converter station sites but may also provide opportunities for screening.

Settlement

Settlement pattern within the converter station siting study area is variable. Larger settlements comprising Cardenden, Lochgelly and Ballingry are present to the south east, south and west of Westfield, however, to the north and east the study area is more rural with individual properties, such as farmhouses or small cluster of properties coalescing along roads. Areas in the immediate vicinity of settlements are not considered suitable for converter station siting due to the potential for amenity impacts such as noise and visual impacts. Where settlements or scattered rural properties cannot be avoided, mitigation including acoustic mitigation and landscape planting would be required to reduce impacts.

Recreation

There is a small number of recreational interests within the converter station siting study area which are avoidable. These include Lochgelly Raceway to the south of Westfield, the Scottish Glider Centre at Portmoak Airfield to the north west of Westfield as well as two golf courses: Lochgelly Golf Club and Lochore Meadows Golf Course to the south and south west of Westfield respectively. Parts of the Lomond Hills Regional Park lie within the study area, this includes a significant area to the west of Ballingry and Lochgelly as well as a smaller area to the north/north west of the study area extending to Auchmuirbridge. There is also a large network of core paths present within the south of the converter station siting study area with a number of paths typically around and connecting settlements, however, to the north of Westfield there are fewer paths present. Converter station siting should take account of the location of recreational interests and the potential for converter station sites to impact on them or users of them, for example in close proximity to a core path the converter station may impact on the amenity of users.

Other Infrastructure

The Fife Circle Railway line runs broadly west to east through the south of converter station siting study area and would require to be avoided. Other notable infrastructure within the study area includes existing 132kV and 275kV overhead lines that are routed through the study area via Westfield Substation as well as a number of gas pipelines. These include the Fergus to Mossmorran gas pipeline which is routed north to south to the west of Westfield as well as a number of gas pipelines operated by Scottish Gas Networks (SGN). Converter station siting should take account of the proximity to other infrastructure and the potential to impact on it.

To the immediate north of Westfield lies the Westfield Restoration Project. The former coal mining site is subject to planning permission for mixed uses including industrial, commercial and energy related development. The planning permission includes areas for energy from waste, energy storage and solar energy all of which are at different stages of planning or construction.

Physical Environment Considerations

Large parts of the converter station study area have been used for coal mining and related activity. The Coal Authority Interactive Map indicates that large parts of the converter station study area, particularly to the south lie within a Development High Risk Area which highlights the potential for ground-risks related to historic coal mining activity. This could include potential areas of instability or compressible ground as well as the potential for contamination.

SEPA Flood Risk Maps indicate that parts of the converter station siting study area are at high risk of flooding. This includes areas adjacent to the River Ore and around Loch Ore to the south of Westfield as well as larges area to the north of the converter station siting area around the River Leven. As far as possible converter station sites should avoid areas of flood risk in order to avoid the requirement for flood mitigation works such as land raising.

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

Site 1
Site 2
Site 3
Site 4
Site 5
Site 6

0 1 2 km

Scale @ A3 1:40,000

Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY

- Converter Station Siting Study Area
- Converter Station Option Site
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- National Nature Reserve
- Ancient Woodland
- Fife Local Landscape Area
- Country Park
- Regional Park
- Scheduled Monument
- Garden and Designed Landscape
- Conservation Area
- Hazard Pipe Consultation Zone
- Westfield Restoration Site Boundary
- Employment Area
- Safeguarded Employment Area

Substation Location

- 132 kV
- 275 kV

SPT Network

- Existing 132kV
- Existing 275kV

TITLE
Figure 17
Converter Station Study Area

REFERENCE
EL4_20240312_RR_17_v3

SHEET NUMBER
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5.4 Potential Converter Station Sites

Converter Station Site 1

Converter Station Site 1 is illustrated on Figure 18. It is located approximately 600m north of Westfield and occupies an area of approximately 8.5ha. While the Site is relatively close to Westfield it is likely that constraints in the intervening area would increase the length of the AC connection required. Site 1 is located on agricultural land to the immediate north and west of the Westfield Restoration Project. The site could be access via a new road from the B9097 or via an extension to the access to the existing Westfield Biomass Plant. The site extends across the slopes of an unnamed hill with relatively gentle gradient, however, earthworks would be required to establish a platform for a converter station. A converter station in this location would be seen in the context of other energy-related development including the existing Biomass Plant and the wider Westfield Restoration Project. There are no environmental constraints such as designations which would be impacted by the development of the site. With the exception of a farm/farmhouse approximately 130m to the north which could be impacted, settlement and properties are generally distant to the site. The proximity of the farm/farmhouse would require mitigation with regard to potential amenity impacts including visual and noise impacts. The Site is located outside of but immediately adjacent to the Development High Risk Area identified by the Coal Authority. The key constraint at Site 1 is the presence of a gas pipeline running south west to north east to the east of Site 1. It would not be feasible to construct a converter station above the gas pipeline and avoiding it reduces the extent of developable land available. While there is additional land to the west, this is bounded by an existing 275kV overhead line routed north to south towards Westfield. The locations of the overhead line and gas pipeline as well as required separation distances, would prevent development of a converter station in this location.

Converter Station Site 2

Converter Station Site 2 is illustrated on Figure 18. It is located approximately 330m north of Westfield on vacant land which was previously the Westfield Development Centre, a former gasification site. The Site occupies an area of hardstanding approximately 6.5ha in size, however, some additional land comprising vacant hardstanding and woodland is located to the west. Given the site's former use there is the potential for some contaminated land to be present and remediation works could be required. Site 2 is located to the east of and would be seen in the context of Westfield Energy Recovery Facility and the wider restoration. The Site is located within an area identified within the Fife Local Development Plan as a Safeguarded Employment Area. There are no environmental constraints such as designations which would be impacted by the development of the site. Similarly, there are no settlement related constraints in the immediate vicinity of the site; the nearest property is a farm/farmhouse approximately 325m to the north. The Site is located within the Development High Risk Area identified by the Coal Authority, while this does not prevent development it does indicate ground conditions may pose a risk. A gas pipeline is routed across the north west corner of the site which cannot be constructed above and limits the developable area within the site. While there is additional land to the west of Site 2, this would require the Lochty Burn to be diverted or culverted for land gain.

Converter Station Site 3

Converter Station Site 3 is illustrated in Figure 18. It comprises 35ha of agricultural land to the immediate east of Westfield which has recently been acquired by FLS for tree planting. The Site could be accessed by establishing a new junction on the B9097 to the immediate north or by utilising the unnamed access to the north/west of the Site. Its proximity to Westfield minimises the AC connection requirements while also locating the converter station next to existing development with similar characteristics. There are no environmental constraints such as designations which would be impacted by the development of the Site. There is a small cluster of properties approximately 200-250m south of the Site increasing the potential for amenity related impacts including noise and visual. The scale of the Site provides opportunities for mitigation the through the design of the converter station layout and acoustic mitigation as well as landscape planting. The Site is located within the Development High Risk Area identified by the Coal Authority, while this does not prevent development it does indicate ground conditions may pose a risk. There is an existing 132kV overhead line routed through the Site and into Westfield which would require to be undergrounded or diverted to make space for the converter station, however, this is considered to be feasible with opportunities to underground the line along the field boundary.

Converter Station Site 4

Converter Station Site 4 is illustrated in Figure 18. It occupies approximately 12ha of agricultural land lying 1.75km east of Westfield. It is bounded to the north/north east by the B9097 and to the south by the B921. The Site is in relative proximity to Harestanes Farm a category B listed building so a converter station in this location may give rise to setting impacts. There are no other environmental constraints such as designations which would be impacted by the development of the Site. In addition to Harestanes which is located approximately 200m to the east of the Site, there are properties are Redhouse (approximately 340m to the west) and Woodend, a small village (approximately 400m to the south west). The proximity of the Site to properties and settlement increases the potential for amenity related impacts such as noise and visual impacts. There is some scope for mitigation through design, however, this is limited by other constraints within or adjacent to the Site. While there is energy infrastructure in the wider area, Site 4 is more distant to it and would be more prominent in the landscape. An existing 132kV overhead line crosses the northern part of the Site and would require to be avoided pushing the converter station to the south of the Site. The Site also partly lies within a Development High Risk Area identified by the Coal Authority, while this does not prevent development it does indicate ground conditions may pose a risk.

Converter Station Site 5

Converter Station Site 5 is illustrated in Figure 18. It is located to the north east of Westfield occupying approximately 20ha of agricultural land. The Site is located to the east of the former Westfield opencast coal site meaning any AC connection would require to be routed around this either north and west (approximately 5km) or east and south (approximately 5km) of the former coal site in order to connect at Westfield Substation. The Site is access via a minor road that runs broadly south to north between the B921 east of Kinglassie and the A911 at Auchmuirbridge. The Site lies to the north of Blythe's Tower a category B listed building

so a converter station in this location may result in setting impacts. There are no other environmental constraints such as designations which would be impacted by the development of the Site. There are a number of scattered farmhouses and other rural properties within approximately 500m of the Site. It also occupies a relatively prominent position with the outskirts of Glenrothes to the east and Kinglassie to the south. There is no similar energy or industrial infrastructure in this area which reduces opportunities to integrate a converter station in this location. Mitigation would be required to integrate a converter station in this location into the landscape and reduce its visual prominence.

Converter Station Site 6

Converter Station Site 6 is illustrated in Figure 18. It is located approximately 2.5km to the north of Westfield occupying approximately 65ha of agricultural land north of the River Leven. Not all of this area would be required, however, it illustrates that there is substantial space to develop the converter station in this location. The Site is located to the north of Westfield requiring an AC connection in the order of 2.5km. There is currently no direct access to the Site, however, the B920 and A911 lie to the west and north respectively. A new 400-500m long access road would require to be established. There are a number of listed buildings as well as a Conservation Area within the vicinity of the Site with the potential for setting impacts to occur on a number of designated assets. There are no other environmental constraints such as designations which would be directly impacted by the development of the Site. The Loch Leven Special Protection Area (SPA) lies approximately 1.5km to the west and should not be affected, however, there is the potential for its qualifying species to utilise land within or near to Site 6. Scotlandwell village, a number of scattered farmhouses and other rural properties lie to the north and west of the Site within approximately 500m. Due to the flat open landscape with limited vegetation in the foreground or background a converter station on this Site would be visually prominent. The size of the Site provides opportunities for landscape mitigation. The Site lies in an area identified by SEPA Flood Risk Maps as being at a high risk of flooding. Measures such as land raising would be required to protect the converter station, however, this would also result in the loss of flood storage capacity and require equivalent compensation to be provided.

5.5 Summary of Converter Station Siting Appraisal

Table 5 provides a summary of the key factors influencing the feasibility of alternative converter station sites. In general terms it is preferable for a converter station to be located as close to the point of connection as possible in order to co-locate infrastructure which has similar characteristics and reduce the length of the AC connection required. Converter Station Sites 4, 5 and 6 are the most distant from the point of connection at Westfield. In combination with this distance there are other factors which make these sites less preferable and result in them being discounted. This includes proximity to listed buildings and the potential for setting impacts, proximity to residential properties and potential for amenity impacts as well as in the case of Site 6 the risk of flooding. While there may be opportunities to reduce some of these effects to some extent through mitigation and design, alternative sites (Sites 1, 2 and 3) are not affected by the issues to the same degree. These sites benefit from being located closer to the point of connection at Westfield as well as existing and planned energy infrastructure which is similar in scale and appearance. The main constraints affecting these options relate to existing utilities (gas pipelines or overhead lines) or watercourse crossing the sites which affect the amount of developable land available.

In the case of Site 1 there is an existing gas pipeline which crosses the site and limits land available for development. While there is some scope to extend or move the Site north or west this would bring it in closer proximity to residential property and/or a 275kv overhead line as well as move it away from the Westfield Restoration project. As a result, Site 1 is not considered to be suitable and has been discounted.

Site 2 overlies the former Westfield Development Centre and provides an opportunity to re-purpose brownfield land, however the size of the Site and land available to be developed is limited by the gas pipeline to the north west of the Site and the Lochty Burn to the south/south west of the Site. These combine to limit the area available for development and would not accommodate a converter station footprint of 8-9ha. The Site is designated through the Fife Local Development Plan as a safeguarded employment area and while a converter station would provide some employment this is predominantly short term and associated with construction. Therefore, there is a risk development of the Site would be contrary to policy. Overall Site 2 is not considered to be preferable and has been discounted.

Site 3 is located on agricultural land immediately adjacent to the Westfield. This proximity is a key benefit providing both a short AC connection to the substation as well as ensuring electrical infrastructure is located in area of similar infrastructure including Westfield Substation as well as wider energy-related infrastructure to the north. The main constraints on the Site relate to existing 132kV overhead line and potential risks related to ground conditions associated with historic mining activity. However, both of these constraints can be addressed: the existing overhead line is owned by SPT it is considered that this could be undergrounded and incorporated into the design of a converter station on the Site while ground risks can be confirmed through site investigation and addressed through design if appropriate. Residential properties lie to the south of the Site with the potential for amenity related impacts however, the land available for development within Site 3 provides opportunities to mitigate potential impacts through site design and mitigation including acoustic mitigation to prevent noise-related impacts and landscape planting to reduce visual amenity related impacts. Overall Site 3 is considered to be preferable as it provides

opportunities to integrate the converter station with existing electricity and other energy infrastructure while avoiding or reducing impacts on the environment and people.

Table 5 Summary of Converter Station Siting Appraisal

Converter station	Key conclusions	
Converter Station Option 1	• No significant environmental constraints • Proximity to existing and planning energy infrastructure of similar character and scale enables some integration • Proximity to farm/farmhouse and potential amenity impacts • Existing gas pipeline to the east limits developable land • Existing 275kV overhead line to the west limits opportunity to extend the Site and increase developable land	Discount
Converter Station Option 2	• No significant environmental constraints • Coincides with safeguarded employment area identified within the Fife Local Development Plan • Proximity to existing and planning energy infrastructure of similar character and scale enables some integration • Within Development High Risk Area identified by the Coal Authority • Existing gas pipeline to the north west limits developable land to less than the converter station footprint • Existing watercourse (Lochty Burn) to the south limits opportunity to extend the Site and increase developable land	Discount
Converter Station Option 3	• No significant environmental constraints • Proximity to Westfield reduces AC connection requirements and provides opportunity to integrate with existing development • Proximity to small cluster of properties and potential amenity impacts, however, scope for mitigation • Within Development High Risk Area identified by the Coal Authority • Requirement to underground and divert existing 132kV overhead line	Preferred
Converter Station Option 4	• Potential setting impacts on category B listed building, Harestanes Farm • Greater proximity to individual properties and settlement relative to other options and potential for amenity impacts • No similar scale energy or industrial infrastructure in the vicinity of the site • Partly within Development High Risk Area identified by the Coal Authority	Discount

Converter station	Key conclusions	
	• Existing 132kV overhead line to the north limits developable land and requires converter station to be located within the south of the site closer to settlement	
Converter Station Option 5	• Potential setting impacts on category B listed building, Blythe Tower • Requires a long-distance AC connection compared to other options • Located in a prominent location with potential for amenity impacts on nearby settlements and properties • No similar scale energy or industrial infrastructure in the vicinity of the site	Discount
Converter Station Option 6	• Subject to siting there are a number of listed buildings within the vicinity which could experience setting impacts • No similar scale energy or industrial infrastructure in the vicinity of the site • Flat, open landscape increasing prominence of the converter station in views • Number of individual properties to the west as well as a village to the north with potential for amenity impacts • Requires a long-distance AC connection compared to other options • Located within an area of high flood risk, while development may be possible land raising and flood storage compensation would be required	Discount
Refer to Appendix E for further comparative appraisal.		

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

Site 1
Site 2
Site 3
Site 4
Site 5
Site 6

Scale @ A3 1:25,000

0 1 2 km

Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
Converter Station Option Site
Preferred
Discounted

TITLE
Figure 18
Converter Station Siting Appraisal

REFERENCE
EL4_20240312_RR_18_v3

SHEET NUMBER
1 of 1

DATE
12/03/24

06.
Underground DC Cable Routeing

6. Underground DC Cable Routeing

6.1 Underground DC Cable Routeing Parameters

Underground cable routeing parameters have been established to inform the identification and appraisal of alternative cable route corridors within which the detailed route design could be developed. The installation methods along the route will be influenced by a range a factors and constraints including the nature of land being traversed and any natural or man-made features or obstacles that require to be crossed. The parameters that have been used to inform the identification of underground cable routes are:

- Temporary working width: A temporary working width approximately 40m wide will be required to enable DC cable installation. The exact width may respond to site specific constraints as well as installation methods used but will include sufficient space for the cable trench, haul road, drainage and topsoil and subsoil storage.
- Cable installation method: The exact method of installation will depend on factors like land use, the presence of natural or man-made features or obstacles as well as environmental constraints. While the main method of installation is likely to be open cut trenching, in identifying and assessing route options constraints or other considerations which may require trenchless methods such as HDD, have been highlighted.

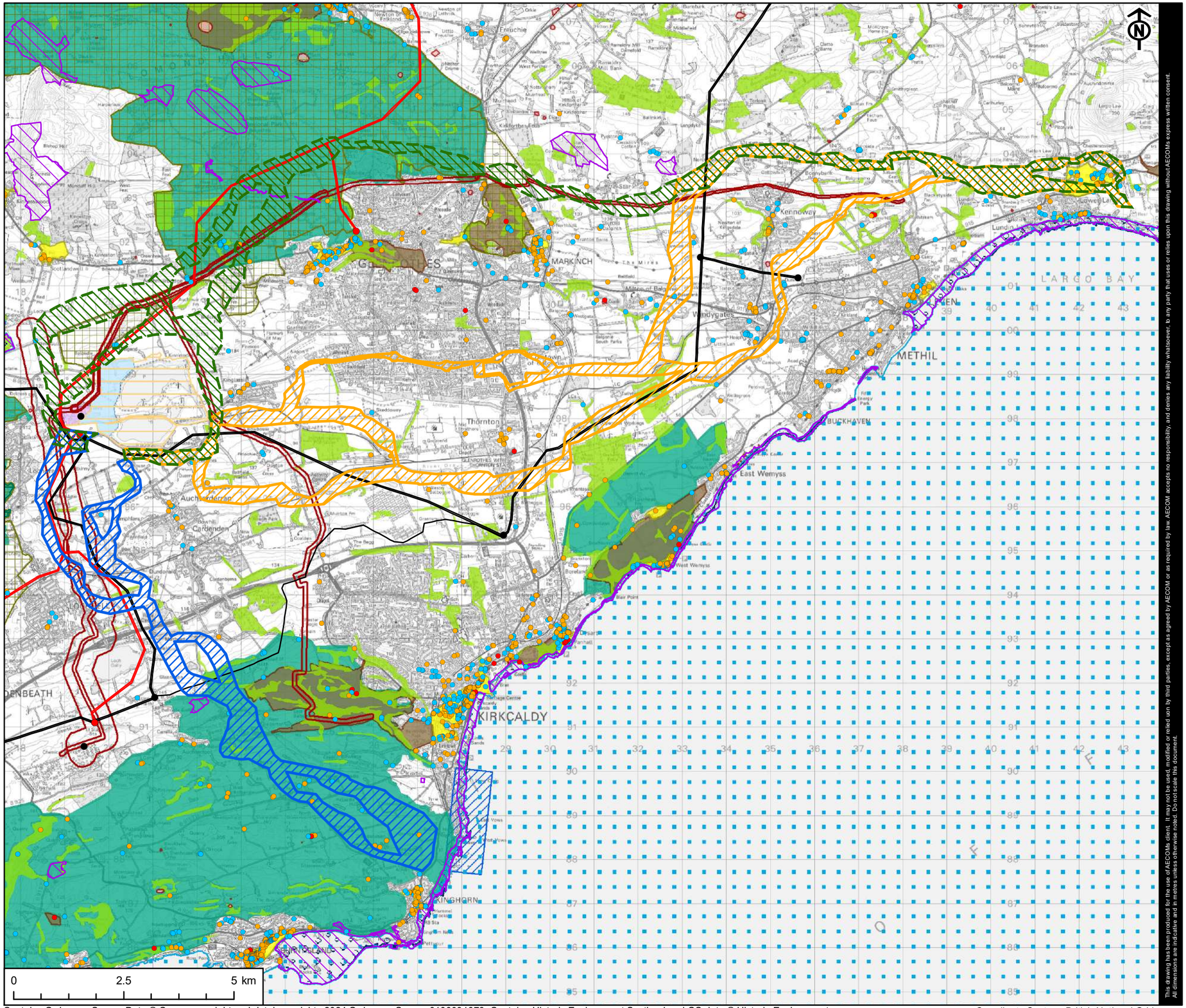
6.2 Identification and assessment of alternative cable routes

Underground cable routes have been identified based on the shortlisted landfalls (landfalls A and D) as well as the shortlisted converter station site (site 3). Underground cable route options have been developed to be as direct as possible between the landfall and converter station while taking account of environmental and technical constraints and considerations, either avoiding or reducing impacts on the environment and people through careful route selection and/or choice of installation method.

Three potential route corridors have been identified and are appraised in subsequent sections. These are also illustrated in Figure 19:

- Blue route corridor – from landfall A north of Kinghorn to converter station site 3 east of Westfield Substation
- Orange route corridor – from landfall D east of Lower Largo to converter station site 3 east of Westfield Substation (routeing to the south of Glenrothes)
- Green route corridor – from landfall D east of Lower Largo to converter station site 3 east of Westfield Substation (routeing to the north of Glenrothes)

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



Scale @ A3 1:80,000

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY

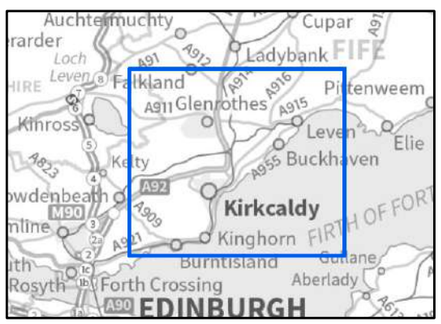
- Underground Cable Route Option - Blue
- Underground Cable Route Option - Orange
- Underground Cable Route Option - Green
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Site of Special Scientific Interest
- Special Protection Area
- Ramsar
- National Nature Reserve
- Ancient Woodland
- Fife Local Landscape Area
- Country Park
- Regional Park
- Scheduled Monument
- Garden and Designed Landscape
- Conservation Area
- Hazard Pipe Consultation Zone
- Westfield Restoration Site Boundary
- Employment Area
- Safeguarded Employment Area
- Designated Haul Out Site for Seals

Substation Location

- 132 kV
- 275 kV

SPT Network

- Existing 132kV
- Existing 275kV



TITLE
Figure 19
Underground Cable Route Options

REFERENCE
EL4_20240312_RR_19_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Coordinate System: British National Grid

6.3 Blue Route Corridor – Landfall A to Converter Station Site 3

The Blue Route Corridor (see Figure 19) measures approximately 14km from Landfall A to the north of Kinghorn to Converter Station Site 3 to the east of Westfield following a north-western or northern route. It is located predominantly within agricultural land comprising both arable and grazing land. The Route Corridor has been designed to avoid environmental and technical constraints as much as possible, however, there are some constraints which are crossed by and/or located within the Corridor.

Moving inland from the landfall, there are no statutory ecological designations within the Blue Route Corridor. Camilla Loch SSSI lies to the west of the Corridor. While it does not appear to be hydraulically linked to the Corridor effective mitigation and working practices including pollution prevention and control measures would be required to prevent impacts on it. Similarly, there are no Local Wildlife Sites designated through the Fife Local Development Plan within the Corridor, however, there is a small number in the vicinity including Balwearie Braes Wildlife Site to the east and Auchtertool Linn Wildlife Site to the west.

The Cullaloe Hills and Coast Local LLA is crossed the Blue Route Corridor. This site is designated through the Fife Local Development Plan and requires to be crossed by approximately 7km of underground cable route subject to route design. Long term impacts on the LLA should be limited as the cable route does not require above ground infrastructure. Within the Route Corridor, key landscape features or those which are difficult to reinstate such as woodland should be avoided through a combination of route design and installation method (i.e. use of trenchless methods).

With the exception of Kilrie House Gate Lodge (a grade C listed building), the Blue Route Corridor largely avoids sites or features of archaeological or heritage interest. Kilrie House occupies a small area within the Route Corridor and is considered to be avoidable in designing the detailed route, however, it is located at a pinch point on the B9157 where the road, woodland and residential properties are present. Potential setting impacts could occur, however, these would be temporary and limited to the construction period only. There are a number of other listed buildings in the immediate vicinity of the Route Corridor which may also experience temporary setting impacts subject to final route design.

The southern part of the Blue Route Corridor (south of the A92) is less well developed and mainly agricultural in character. There are a small number individual residential properties and small clusters of properties scattered throughout the wider area as well as a small number of properties within the corridor which would need to be avoided in developing the route design. North of the A92 there are small and moderately sized settlements to the west and east of the Corridor including Lochgelly, Cardenden and Auchterderran as well as some scattered individual properties. Settlement and properties have largely been avoided so impacts on people and amenity should be reduced, however, there is the potential for some temporary disturbance during cable installation.

Small pockets of woodland are present throughout the Blue Route Corridor. These largely comprise small areas of native woodland identified by the Native Woodland Survey of Scotland as lowland mixed deciduous woodland. A small part of an Ancient Woodland Inventory site extends into the corridor east of Gleniston and could be impacted subject to

final route design and choice of installation methods. Moving north there are no other woodland sites identified as Ancient Woodland Inventory sites within the Route Corridor, however, there are a small number on its margins particularly between the A92 and Converter Station Site 3. Impacts on woodland are largely avoided by the Corridor, however, in some sections undesignated woodland or hedgerow removal may be required.

The southern part of the Blue Route Corridor as far as the A92 is outside of areas identified by the Coal Authority as being at High Risk due to previous coal mining activity. From the A92 to converter station site 3 the majority of the land is identified as a High Risk area. Generally, the depth of cable installation should be shallow enough to avoid interacting with High Risk areas, however, where the cable requires to be installed by trenchless methods such as HDD the increase in the depth of installation may result in increased risks. In the section crossing the High Risk area there is a small number of crossings that may require trenchless methods including. The precise risk posed as well as any mitigation required would require to be confirmed by site investigation.

Subject to the final route design the Blue Route Corridor requires up to 20 crossings of roads, railways and watercourses. Notable crossings include the Edinburgh-Aberdeen railway line (at the landfall), the Fife Circle Line railway, two A-roads (A921 and A92) and the River Ore. Impacts on these features can be avoided by the use of trenchless methods such as HDD, however, an increased number of crossings can increase engineering complexity relative to route options with fewer crossings. In addition to major transport corridors, other notable existing or proposed infrastructure or development within or close to the Route Corridor includes:

- An existing three-turbine wind energy development. While this is avoidable there may be a requirement to cross underground cables associated with the development.
- A proposed solar energy development, Gleniston Solar Farm, which may require to be partially crossed on its eastern boundary or deviated around to the east of it.
- Existing underground gas pipelines from Mossmorran to Westfield including their hazard consultation zones.
- Lochgelly Raceway which lies to the immediate west of the Route Corridor where it crosses the A92.

6.4 Orange Route Corridor – Landfall D to Converter Station Site 3 (south)

The Orange Route Corridor (see Figure 19) is approximately 29km from Landfall D to the east Lower Largo to Converter Station Site 3 to the east of Westfield following a south western or western route. Due to the length of the Corridor and the nature of the some of the constraints present it comprises some sub-options including to the north or south of Upper Largo, east or west of Kennoway and Windygates and through Glenrothes within the B921 or to the south of Glenrothes. As much as possible the Orange Route Corridor avoids environmental and technical constraints, however, there are some constraints which are in close proximity to the Corridor or require to be crossed by it.

Moving inland from the landfall, there are no statutory ecological designations within or near to the Orange Route Corridor. Subject to routeing there are Local Wildlife Sites designated

through the Fife Local Development Plan within the Corridor, including Keil's Den Wildlife Site to the west of Upper Largo, the Kennoway Den Wildlife Site to the west of Kennoway and the Windygates-Kennoway Wildlife Site to east of Windygates. Where these sites cannot be avoided through detailed route design consideration should be given to alternative installation methods to reduce impacts for example minimising the construction footprint and/or utilising trenchless installation methods such as HDD.

The Orange Route Corridor largely avoids sites or features of archaeological or heritage interest with the exception of at Upper Largo where the southern sub-option crosses land within the Upper Largo Conservation Area. This area is understood to be the grounds of Largo House the remains of which lie to the north of the Corridor and comprise a series of listed buildings and a scheduled monument (Sir Andrew Wood's Tower). Physical impacts on these sites could be avoided, however, there is the potential setting impacts to occur during installation, the magnitude of which would depend on the installation method used. There are a number of other listed buildings and one scheduled monument (Maiden Castle) in the vicinity of the Orange Route Corridor which may also experience temporary setting impacts during the installation period subject to final route design.

There are a number of settlements and properties in the vicinity of the Orange Route Corridor in which people may experience amenity related impacts during cable installation. Subject to route selection this includes Upper and Lower Largo, Lundin Links, Kennoway, Methil and Glenrothes all of which lie in the vicinity of the Corridor with potential for disturbance and amenity related impacts. There are two sub-options in which proximity to settlement creates pinch points where such impacts may be more notable; firstly the sub-option to the east of Kennoway and Windygates and north-west of Methil where a cable route would be required to cross the railway line and River Leven and secondly the sub-option through Glenrothes which would be installed within the B921. Due to the length of the route and proximity to settlement this option is considered to have greater potential for impacts on people albeit limited to the installation period only.

Small areas of woodland are present throughout and adjacent to the Orange Route Corridor. These largely comprise areas of native woodland identified by the Native Woodland Survey of Scotland as lowland mixed deciduous woodland. Ancient Woodland Inventory sites are largely avoided and located outside of the Corridor, however, some Wemyss Wood requires to be crossed in the land between the A911 and the A915 where the Corridor splits to a sub-option through Glenrothes and a sub-option south of Glenrothes. The latter sub-option (south of Glenrothes) also requires crossing a small area of Ancient Woodland known as Graham's Folly. In order to mitigate impacts on Ancient Woodland these areas should be crossed using trenchless methods such as HDD. In addition to this, woodland and individual trees which are subject to Tree Preservation Orders (TPOs) are present in the vicinity of the Orange Route Corridor around Upper and Lower Largo, west of Kennoway and north of Cluny. Direct impacts on these TPO sites have been avoided through route selection as far as possible, however, the sub-option to the north of Upper Largo may require to cross woodland protected by TPO in which case trenchless methods should be utilised. Outwith the above, in some areas undesignated woodland or hedgerow removal may be required as part of construction.

Subject to route design, in particular the Glenrothes B921 or Glenrothes south sub-option the Orange Route Corridor requires to traverse a large area identified by the Coal Authority as

being at High Risk due to previous coal mining activity. Generally, the depth of cable installation should be shallow enough to avoid interacting with High Risk areas, however, where the cable requires to be installed by trenchless methods such as HDD the increase in the depth of installation may result in increased risks of impacts. In the section crossing the High Risk area there are a number of crossings including roads, railways and watercourses. The precise risk as well as any mitigation required would require to be confirmed by site investigation.

Subject to the final route design the Orange Route Corridor requires more than 20 crossings of roads, railways and watercourses. Notable crossings include crossings of the Edinburgh-Aberdeen and Fife Circle railways, a crossing of a disused railway line which connects to the former opencast site at Westfield, multiple crossings of A-roads and multiple crossings of watercourses including the River Leven and the River Ore. Impacts on these features can be avoided by the use of trenchless methods such as HDD, however, an increased number of crossings can increase engineering complexity relative to route options with fewer crossings. In addition to major transport corridors, other notable existing or proposed infrastructure or development within or close to the Route Corridor includes:

- Ongoing and proposed development between Windygates and Methil including active travel, rail and commercial development which requires to be crossed
- An existing gas pipeline from Kirkcaldy to Auchmuirbridge including its hazard consultation zone which requires to be crossed by the Route Corridor
- Existing 132kV overhead lines which are paralleled for sections of the Route Corridor and may pose a hazard to construction activities.
- A proposed Battery Energy Storage System (BESS) to the south of Glenrothes-with-Thornton to the immediate south of the Route Corridor.

6.5 Green Route Corridor – Landfall D to Converter Station Site 3 (north)

The Green Route Corridor (see Figure 19) is approximately 30km from Landfall D to the east Lower Largo to Converter Station Site 3 to the east of Westfield following a western then southern route. Due to the length of the Corridor and the nature of the some of the constraints present it comprises some sub-options north-west of Glenrothes as well as east and west of the former opencast site at Westfield towards the converter station site. As much as possible the Green Route Corridor avoids environmental and technical constraints, however, there are some constraints which are in close proximity to the Corridor or require to be crossed by it. The initial sections of the Green Route Corridor as far as north of Kennoway follow the Orange Route Corridor.

Moving inland from the landfall, there are a small number of statutory ecological designations near to the Green Route Corridor including Carriston Reservoir SSSI, Star Moss SSSI, Ballo and Harperleas Reservoirs SSSI and the Loch Leven SPA and SSSI. There are Local Wildlife Sites designated through the Fife Local Development Plan within or close to the Corridor, including Keil's Den Wildlife Site to the west of Upper Largo, Kennoway Den Wildlife Site to the west of Kennoway and Coul Reservoir Wildlife Site/Coul Den Local Nature Reserve within the Lomond Hills Regional Park and Leslie - Strathendry Wildlife Site

to the south of Leslie. With the exception of Keil's Den which would require to be crossed, these sites are largely avoided by the Route Corridor.

The Green Route Corridor is routed to the north of Glenrothes and requires to be routed though the Lomond Hills Regional Park and the Lomond Hills Local Landscape Area (LLA). The Regional Park is not a statutory designation, however, it supports a range of outdoor and recreational activity which could be temporarily impacted by underground cable installation. The LLA is designated through the Fife Local Development Plan. Long term impacts on the Regional Park and the LLA should be limited as the cable route does not require above ground infrastructure. Within the Route Corridor, key landscape features or those which are difficult to reinstate such as woodland as well as key recreational areas should be avoided through a combination of route design and installation method (i.e. use of trenchless methods).

The Green Route Corridor largely avoids sites or features of archaeological or heritage interest with the exception of at Upper Largo where the southern sub-option crosses land within the Upper Largo Conservation Area. This area is understood to be the grounds of Largo House the remains of which lie to the north of the Corridor and comprise a series of listed buildings and a scheduled monument (Sir Andrew Wood's Tower). Physical impacts on these sites could be avoided, however, there is the potential setting impacts to occur during installation, the magnitude of which would depend on the installation method used. There are a number of other listed buildings in the vicinity of the Green Route Corridor which may also experience temporary setting impacts during the installation period subject to final route design. There is a Garden and Designed Landscape to the north east of Glenrothes at Balbirnie, however, this is avoided by the Route Corridor.

There are a number of settlements and properties in the vicinity of the Green Route Corridor in which people may experience amenity related impacts during cable installation. Subject to route selection this includes Upper and Lower Largo, Lundin Links, Kennoway, Star, Glenrothes, Leslie and Kinglassie all of which lie in the vicinity of the Corridor with potential for disturbance and amenity related impacts. There are also a number of scattered individual properties or groups of properties present in more rural areas of the Route Corridor, particularly north of Glenrothes where the Route Corridor crosses the Lomond Hills Regional Park and in the Westfield area.

Small areas of woodland are present throughout and adjacent to the Green Route Corridor. These include areas of native woodland identified by the Native Woodland Survey of Scotland as lowland mixed deciduous woodland. Ancient Woodland Inventory sites are largely avoided and located outside of the Corridor. In addition to this, woodland and individual trees which are subject to Tree Preservation Orders (TPOs) are present in the vicinity of the Route Corridor around Upper and Lower Largo, west of Kennoway and north east of Glenrothes coinciding with Balbirnie House Garden and Designed Landscape. Direct impacts on these TPO sites have been avoided through route selection as far as possible, however, the sub-option to the north of Upper Largo may require to cross woodland protected by TPO in which case trenchless methods should be utilised. In addition to the above, in some areas undesignated woodland or hedgerow removal may be required as part of construction.

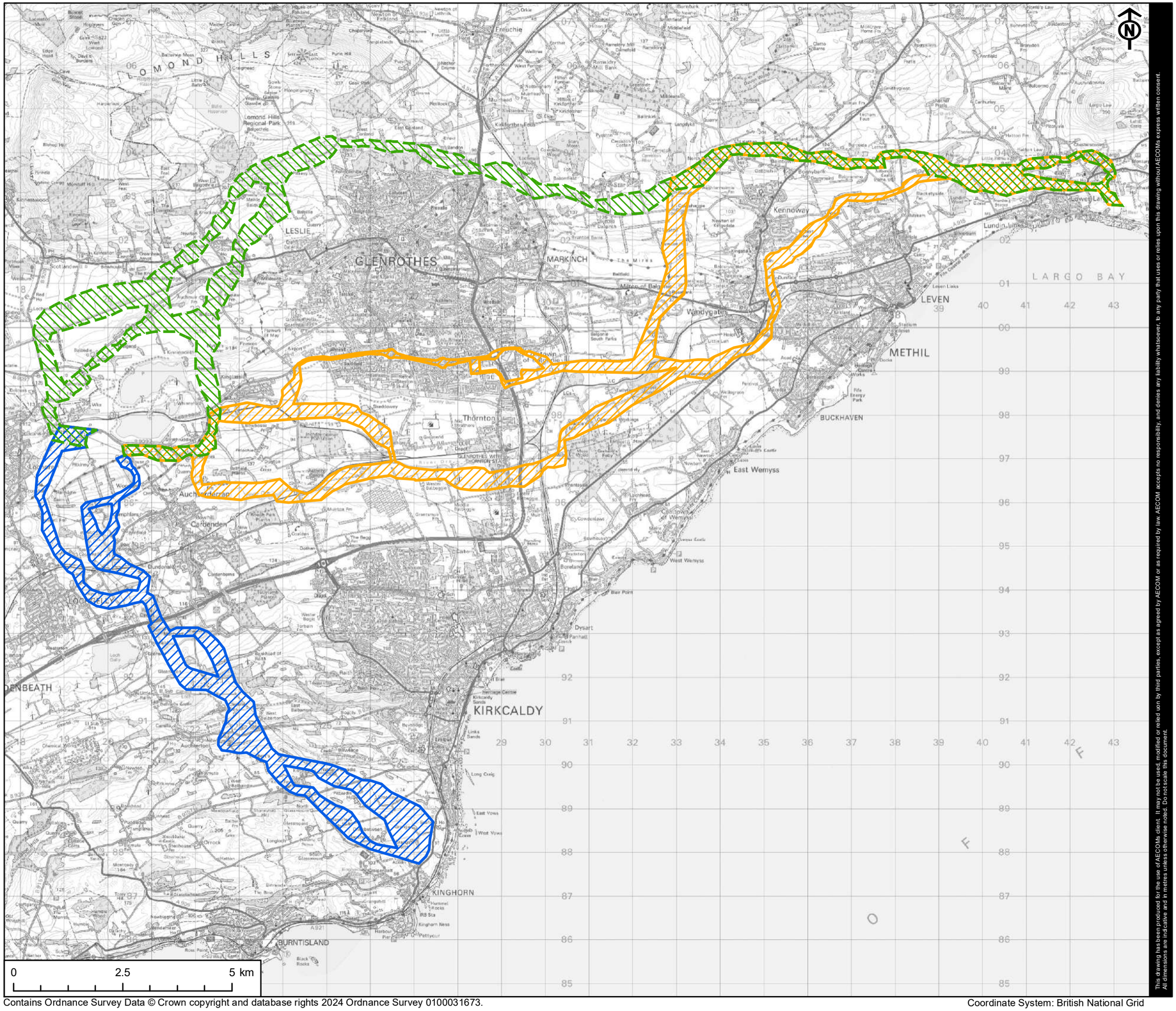
With exception of some small areas between Lower Largo and north of Kennoway and closer to Westfield the Green Route Corridor largely avoids areas identified by the Coal Authority

as being at High Risk due to previous coal mining activity. Generally, the depth of cable installation should be shallow enough to avoid interacting with High Risk areas, however, where the cable requires to be installed by trenchless methods such as HDD the increase in the depth of installation may result in increased risks of impacts. This would require to be confirmed by site investigation.

Subject to the final route design the Green Route Corridor requires more than 20 crossings of roads, railways and watercourses. Notable crossings include a crossing of the Fife Circle Line, subject to utilising the eastern Westfield sub-option a crossing of a disused railway line which connects to the former opencast site, multiple crossings of A-roads and multiple crossings of watercourses including the River Leven. Impacts on these features can be avoided by the use of trenchless methods such as HDD, however, an increased number of crossings can increase engineering complexity relative to route options with fewer crossings. In addition to major transport corridors, other notable existing or proposed infrastructure or development within or close to the Route Corridor includes:

- An existing gas pipeline from north of Leven to Balfarg including its hazard consultation zone which closely follows and is crossed by the Route Corridor.
- An existing gas pipeline from north of Balfarg to Westfield including its hazard consultation zone which closely follows and is crossed by the Route Corridor.
- An existing gas pipeline from Auchmuirbrige to Kirkcaldy including its hazard consultation zone which closely follows the sub-option to the east of Westfield
- An existing gas pipeline from Mossmoran to St Fergus including its hazard consultation zone which closely follows the sub-option to the west of Westfield
- Existing 132 and 275kV kV overhead lines which are followed or require to be crossed by sections of the Route Corridor

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



Scale @ A3 1:80,000

Coordinate System: British National Grid

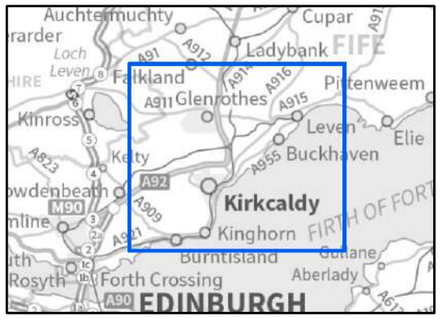
AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY

- Underground Cable Route - Shortlisted Option
- Underground Cable Route - Shortlisted Option
- Underground Cable Route - Discounted Option



TITLE
Figure 20
Underground Cable Route Appraisal

REFERENCE
EL4_20240312_RR_20_v3

SHEET NUMBER
1 of 1

DATE
12/03/24

6.6 Summary of Routeing Appraisal

All things being equal a shorter underground cable route would be preferable to a longer cable route, however, this has to be balanced in the overall context of the Project. In this instance the Blue Route Corridor provides a shorter underground cable route compared to the Orange or Green Route Corridors, however, the former requires a longer subsea cable route compared to the latter meaning that the total distance onshore and offshore remains broadly the same for all options.

The Blue Route Corridor enables a direct route to converter station site 3 from Landfall A while both the Orange and Green Route Corridors enable routes from Landfall D east of Lower Largo to converter station site 3. The Green Route Corridor is routed to the north of Glenrothes and would require a significant section in the Lomond Hills Regional Park and Local Landscape Area. While impacts would typically be temporary, it is preferable to avoid crossing a more sensitive environmental area such as the Park where possible. In addition to this Green Route Corridor is constrained in the Westfield area as approaching it from the north, east or west of the former open case site would result in proximity to and/or crossings of multiple gas pipelines. While this is technically feasible it is preferable to avoid such constraints where possible. Overall, when considering a longer underground cable route from Landfall D, the Orange Route Corridor is considered to be preferable to the Green Route Corridor.

There are a small number of sub-options along the Orange Route Corridor which have been considered:

- North or south of Upper Largo: these sub-options both require crossing environmental interests. The southern option requires to cross parkland which is part of the Upper Largo Conservation Area. The northern option requires to cross woodland which is protected by TPO as well as a watercourse. The northern option would require to be installed using trenchless methods. The southern sub-option would also likely require trenchless methods because of the A road and watercourse which lie to the immediate east of the Conservation Area.
- East or west of Kennoway and Windygates: Routeing to the east of Kennoway and Windygates on the margins of settlement is considered to be highly technically constrained due to a combination of the number of crossings (road, rail and the River Leven) as well as proximity to settlement and proposed developments. While routeing to the west of Kennoway requires a slightly longer route as well as a crossing of a gas pipeline the route is mainly through agricultural land and is therefore considered to be preferable.
- Through Glenrothes following the B921 or to the south of Glenrothes: Routeing through Glenrothes on the B921 has some benefits. While it requires routeing within an urban area, the road and roadside verge are considered to be wide enough to provide opportunities to install underground cables and reduce impacts on people travelling on the road. The main constraint on this is sub-option is where the route meets the B921. Due to development coalescing along the road it limits opportunities for the Route Corridor to meet the B921 to where it joins the B9130. The sub-option to the south of Glenrothes is mainly within open countryside or agricultural land. There are some environmental constraints, mainly a requirement to cross Ancient Woodland, however,

this is considered to be feasible assuming careful micro-routeing and/or trenchless methods. Both sub-options have advantages and disadvantages but these are not considered to be so significant as to make one sub-option preferable to the other.

The Blue Route Corridor enables a short and direct route from the landfall to converter station site 3 compared to the Orange and Green Routes and largely avoids significant environmental constraints such as designated sites. There are some notable pinch points on the route including the proposed Gleniston Solar Farm and dispersed settlement and residential properties, however, overall these are not considered to prevent the development of a technically feasible underground cable route within the Corridor. As a result both the Blue and Orange Routes were shortlisted for consideration.

Table 6. Summary of DC Underground Cable Routeing Appraisal

Route Corridor	Key conclusions	
Blue Route Corridor	• Enables a relatively short and direct route approximately 14km from Landfall A to Converter Station 3 • With the exception of a small number of listed buildings, the Route Corridor avoids statutory environmental designations. In developing a detailed route within the Route Corridor impacts on the listed buildings are avoidable and would be limited to temporary setting impacts during installation. • There are a small number of environmental designations in the vicinity of the Route Corridor including Camilla Loch SSSI and Raith Park and Beveridge Park Garden and Designed Landscape, however, these would not be affected by the route. • Part of the Blue Route Corridor crosses the Cullaloe Hills LLA designated through the Fife LDP. Because the cable route is installed underground permanent landscape effects are considered unlikely, however, key landscape features which contribute to the LLA or which are difficult to reinstate such as woodland should be avoided through a combination of route design and installation methods. • There are a number of scattered residential properties or clusters of properties within or immediately adjacent to the Route Corridor. Properties can be avoided, however, subject to proximity there would be some temporary disturbance during installation. • There are a small number of woodlands, including Ancient Woodland Inventory sites within the Route Corridor. These are generally considered to be avoidable in developing a detailed route, however, in some areas these may require trenchless crossings underneath them.	Shortlist

Route Corridor	Key conclusions	
	• The Blue Route Corridor requires a number of road, railway and watercourse crossings including the A92 and Fife Circle Railway Line, however, the total number required is less than for other options. • Existing or proposed infrastructure is largely avoidable, however, it does constrain the Route Corridor including where it overlaps with the proposed Gleniston Solar Farm and where it is in proximity to existing gas pipelines.	
Orange Route Corridor	• Requires a longer 29km route to the south of or partly through Glenrothes from Landfall D to Converter Station 3. • There are no statutory environmental designations within the Route Corridor, however, there are a a number in its vicinity including Carriston Reservoir SSSI Standing Stones of Lundin and Maiden Castle motte, both Scheduled Monuments and a numberer of listed buildings. Potential impacts on statutory designated sites would be limited to temporary setting impacts on archaeological and built heritage designations. • There are a small number of woodlands, including Ancient Woodland Inventory sites within the Route Corridor some of which would be unavoidable in developing a detailed route. In these areas trenchless crossings underneath them would be required to prevent loss of woodland. • The Orange Route Corridor traverses a mix of agricultural land on the fringes of settlements as well as including an option to route through Glenrothes following the B921. Direct impacts on properties can be avoided in developing a detailed route, however, subject to proximity there would be some temporary disturbance during installation. With regard to the sub-option through Glenrothes this woul result in temporary disturbance while works are undertaken in the highway. Because of its length and proximity to more urban areas, the Orange Route Corridor would result in greater disturbance compared to other options. • The Orange Route Corridor requires a larger number of road, railway and watercourse crossings due to its increased length. While these crossings are not considered to prevent a route within the Corridor, it does make it more technically complex with particularly	Shortlist

Route Corridor	Key conclusions	
	challenging sections between Methil and Windygates requiring multiple crossings.	
Green Route Corridor	• Requires a longer 30km route to the north of Glenrothes from Landfall D to Converter Station 3. • With the exception of a number of listed buildings, the Route Corridor avoids statutory environmental designations. In developing a detailed route within the Route Corridor impacts on the listed buildings are avoidable and would be limited to temporary setting impacts during installation. • There are a small number of environmental designations in the vicinity of the Route Corridor including Carriston Reservoir SSSI, Star Moss SSSI, Standing Stones of Lundin Scheduled Monument and Balbirnie Garden and Designed Landscape, however, these would not be affected by the route. • The Green Route Corridor would require to cross the Lomond Hills Regional Park for approximately 8-9km. While it is not a statutory designation, given its regional importance it is preferable to avoid this site where possible making the Orange and Blue Corridors more preferable in this regard. • Part of the Green Route Corridor (which coincides with Lomond Hills Regional Park) crosses the Lomond Hills LLA designated through the Fife LDP. Because the cable route is installed underground permanent landscape effects are considered unlikely, however, however, key landscape features which contribute to the LLA or which are difficult to reinstate such as woodland should be avoided through a combination of route design and installation methods. • The Green Route Corridor largely traverses more characteristically rural areas or is on the fringes of settlements. There are a number of scattered residential properties or clusters of properties within or immediately adjacent to the Route Corridor. These can be avoided in developing a detailed route, however, subject to proximity there would be some temporary disturbance during installation. • The Green Route Corridor requires a larger number of road, railway and watercourse crossings due to its increased length. While these crossings are not considered to prevent a route within the Green Corridor,	Discount

Route Corridor	Key conclusions
	it does make the Green Route Corridor more technically complex than shorter options. • Existing or proposed infrastructure is largely avoidable, however, to the north of Westfield, there are a number of existing overhead lines and gas pipelines which would be in close proximity to and/or crossed by routes within the Corridor increasing its technical complexity.

Refer to Appendix F for further comparative appraisal.

07. The Preferred Option

7. The Preferred Option

7.1 Summary of Options Considered

Overview of Approach

The approach to the identification of the Scottish Onshore Scheme has comprised two key stages; firstly, the identification and assessment of alternative landfall and converter station sites which have established potential 'start' and 'end' points and then secondly the identification and assessment of alternative underground cable routes.

The approach has drawn on that set out by SPEN in its guidance document Major Infrastructure Projects: Approach to Routeing and Environmental Impact Assessment' as well as established routeing and siting practice set out in the Holford and Horlock Rules. This has ensured the iterative consideration of potential impacts on the environment and communities, alongside technical and economic considerations consistent with SPT's statutory duties while seeking to identify a Preferred Option which meets the objective set out in section 3 "*To identify a technically feasible and economically viable Scottish Onshore Scheme connecting to Westfield 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.*"

Landfall Sites

Four landfall sites have been identified and subject to appraisal. This resulted in two landfalls (Landfall A and Landfall D) being shortlisted and two landfalls being discounted (Landfalls B and C). The following summarises some of the key considerations influencing landfall site selection.

Landfall B was discounted due to constraints within the Firth of Forth including foul ground and anchorages which affect the feasibility of subsea cable routes approaching the landfall. Landfall C was discounted due to the requirement for the landfall to be constructed by trenchless methods underneath the Firth of Forth SPA and SSSI as well as Lundin Links Golf Course. The combined extent of these constraints would require a longer trenchless crossing with increased technical complexity compared to other options, so this option was discounted.

Landfalls A and D both provide opportunities for feasible landfalls, however, the former requires a longer subsea cable route through the Firth of Forth with a shorter underground cable route to the Westfield area, while the latter requires a shorter subsea cable route and longer underground cable route. At Landfall A, the coastline is formed by relatively tall rocky cliffs while at Landfall D, the coastline is formed by an open, sandy beach which slopes up towards agricultural fields. Both landfalls require to cross the Firth of Forth SPA and SSSI and therefore require to be constructed using trenchless methods. At Landfall A, the East Coast Railway line runs parallel to the coast and would also require to be crossed using trenchless methods. Landfalls A and D have relative advantages and disadvantages so both were taken forward for further consideration as part of the Scottish Onshore Scheme.

Table 7. Landfall Siting – Key Conclusions

Landfall	Key conclusions
Landfall Option A Kinghorn	**Shortlist.** While there are environmental and technical constraints present at and near to the landfall (Firth of Forth SPA and SSSI, seal ahul out and railway line), potential impacts can be mitigated through the design of the landfall including use of trenchless methods and micro-siting as well as consideration of the timing of works. The landfall provides a technically feasible option and enables shorter, more direct onwards underground routes to the Westfield area.
Landfall Option B Buckhaven	**Discount.** While this landfall has some characteristics in common with Landfall A, there are a number of constraints in the nearshore environment which affect the feasibility of subsea cable routes to it including foul ground and anchorages. Due to the constraint on routes to the landfall this option was discounted.
Landfall Option C Lower Largo West	**Discount.** Due to the combination of constraints present on the coast and extending inland (Firth of Forth SPA and SSSI and Lundin Links Golf Course), Landfall C would require a longer and more technically complex trenchless crossing than other landfalls. Alternative landfalls are less technically complex and no more constrained in environmental terms therefore this landfall was discounted.
Landfall Option D Lower Largo East	**Shorlist.** While this landfall would require the longest onwards underground cable route to the Westfield area, it also requires the shortest subsea cable route. The landfall provides a technically feasible option and the environmental constraints which are present are common to other landfalls.

Converter Station Sites

Six converter station sites have been identified and subject to appraisal. This resulted in one converter station site (Converter Station Site 3) being shortlisted and five sites (Sites 1, 2, 4, 5 and 6) being discounted. The following summarises some of the key considerations influencing converter station site selection.

Converter Station Site 3 was identified as the preferred site as it has a number of advantages over the other sites considered, in particular its proximity to the existing substation which provides opportunities to co-locate infrastructure with similar characteristics with regard to appearance as well as a reduction in the length of AC underground cable required. While Sites 1 and 2 have some similar characteristics these are smaller sites which would provide less flexibility for detailed converter station design and are located slightly further away adjacent to the Westfield Restoration Project requiring longer AC underground cable routes. Sites 4, 5 and 6 are located much further away in more characteristically rural areas or close to the outskirts of settlements or in the setting of listed buildings and were therefore discounted due to greater potential for environmental impacts.

Table 8. Converter Station Siting – Key Conclusions

Converter station	Key conclusions
Converter Station Option 1	**Discount.** While the site is in relative close proximity to Westfield Substation and other similar energy infrastructure, existing gas pipelines and overhead lines limit the extent of land available for development and constrain development of a converter station.
Converter Station Option 2	**Discount.** The site is located in close proximity to Westfield Substation on a former power station site and close to other similar energy infrastructure. The land available for development is highly constrained by a gas pipeline and watercourse and would not accommodate a typical converter station footprint.
Converter Station Option 3	**Preferred.** The site is adjacent to Westfield Substation on agricultural land. The proximity to similar energy infrastructure provides opportunities to integrate the site into its surroundings compared to more distant rural sites. The site is of sufficient size to accommodate a typical converter station with additional space for temporary laydown as well as pemanent mitigation such as landscaping.
Converter Station Option 4	**Discount.** The site is more distant to Westfield Substation and is in greater proximity to a listed building which could experience setting impacts as well as to individual properties and settlement which could result in increased amenity impacts.
Converter Station Option 5	**Discount**. The site is located in a more characteristically rural area remote from Westfield Substation. Its proximity to a listed building as well as settlement increases the potential for setting and amenity impacts respectively.
Converter Station Option 6	**Discount.** The site is located in a more characteristically rural area in closer proximity to settlement. It is located within a flood risk zone and would require land raising or other mitigation to mitigate the risk of flooding.

Underground Cable Routes

Based on the shortlisted landfall and converter station sites, three Route Corridors have been identified and subject to appraisal. This resulted in two Route Corridors (the Blue Route and the Orange Route) being shortlisted and the Green Route Corridor being discounted. The following summarises some of the key considerations influencing route selection between the shortlisted Landfalls A and D and the preferred converter station site, Site 3.

All of the Route Corridors largely avoid statutory nature conservation, archaeological or built heritage designations, however, some are located within the fringes of or immediately outside of the Corridors. Some temporary impacts on the setting of built heritage designations are common to each option but are not considered to prevent cable routes within the Corridors.

The Green Route Corridor crosses the Lomond Hills Regional Park and Local Landscape Area while the Blue Route Corridor crosses the Cullaloe Hills Local Landscape Area. As the cables are buried underground, permanent landscape impacts are not considered to be a

significant constraint on these options, however, impacts on the Regional Park could include disturbance of or disruption to recreational activities. With regard to other areas or sites of environmental value, all of the Corridors have some potential to impact Ancient Woodland Inventory sites, however, there are opportunities to micro-route to avoid these and/or utilise trenchless methods to install cables underneath them.

With the exception of a sub-option of the Orange Route, the Route Corridors have been designed to avoid settlements as much as possible. Some small residential properties or clusters of residential properties are located within or on the fringes of the Corridor, however, these are avoidable in finalising a detailed route alignment. Some disturbance, for example noise, traffic or visual impacts during construction, is unavoidable, however, this would be temporary. The Orange Route Corridor includes a sub-option that is routed through the south of Glenrothes following the B921. The road including its verge is wide enough that cables could be installed within it enabling a more direct route towards the Westfield area. The main constraint on this sub-option is where the Route Corridor meets the road to the east of Glenrothes at Coaltown of Balgonie where there is an increase in the number of residential properties.

All of the Route Corridors require a number of crossings of roads, railways and watercourses. The Blue Route Corridor is shorter so requires fewer crossings compared to the Green an Orange Routes. At this stage no crossings are considered to be unfeasible, however, more technically challenging crossings are present on the Orange Route Corridor to the east of Windygates where routes would require to cross a road, railway and watercourses including the River Leven within a short distance of one another.

The main differences between the Route Corridors relate to their length and the nature of the areas which they cross. All things being equal, longer routes will have greater impacts so it is generally preferable to have a shorter, more direct route. However, this has to be considered in the context of the overall Project as a shorter underground cable route may require a longer subsea cable route or vice versa. In the case of the Project, the Blue Route Corridor (which comprises a shorter underground cable route) requires a slightly longer subsea cable route compared to the Orange and Green Routes. The Blue and Orange Route Corridors were shortlisted while the Green Route was discounted. Compared the to the Orange Route, the Green Route was considered to have potential for greater impacts due to crossing the Lomond Hills north of Glenrothes and was therefore discounted.

Table 9. ~Underground Cable Routeing – Key Conclusions

Route Option	Key conclusions
Blue Route	**Shortlist.** Short direct route largely crossing agricultural land and avoiding statutory designated sites. The route is in proximity to a number of individual properties or clusters or properties to the south of the A92, however, to the north it is routed on the outskirts of small settlements with the potential for temporary impacts on amenity during installation.
Orange Route	**Shortlist.** A long route crossing both agricultural land and potentially through or on the margins of urban areas including Glenrothes. The route avoids statutory designated sites but is in proximity to settlement with the potential for temporary impacts on amenity during installation.

Route Option	Key conclusions
Green Route	**Discount.** A long route largely crossing agricultural land to the north of Glenrothes. While the route avoids statutory designated sites it is required to cross the Lomond Hills Regional Park to the north of Glenrothes which could be otherwise avoided by the Orange or Blue Routes. There is potential for temporary amenity-related impacts for sections of the route where it is in proximity to settlements and scattered individual properties.

Scottish Onshore Scheme – The Preferred Option

In order to identify an overall Preferred Option for the Scottish Onshore Scheme, the three key components (landfall site, underground cable route and converter station site) require to be brought together to establish an end-to-end onshore option. Based on the shortlisted components above there are two end-to-end options (see Figure 21):

- Landfall D to Converter Station Site 3 utilising the Orange Route Corridor
- Landfall A to Converter Station Site 3 utilising the Blue Route Corridor

The landfalls both encounter the same environmental constraints in the form the of the Firth of Forth SPA and SSSI and while seal-haul out areas are present at Landfall A, these can be avoided by siting to the south of the landfall area and through the use and timing of trenchless installation methods. The Preferred Option for the Scottish Onshore Scheme does require a longer subsea cable route through the Outer Firth of Forth and St Andrews Bay Complex SPA compared to the alternative making landfall at Landfall D, however, potential impacts can be mitigated through the timing of installation.

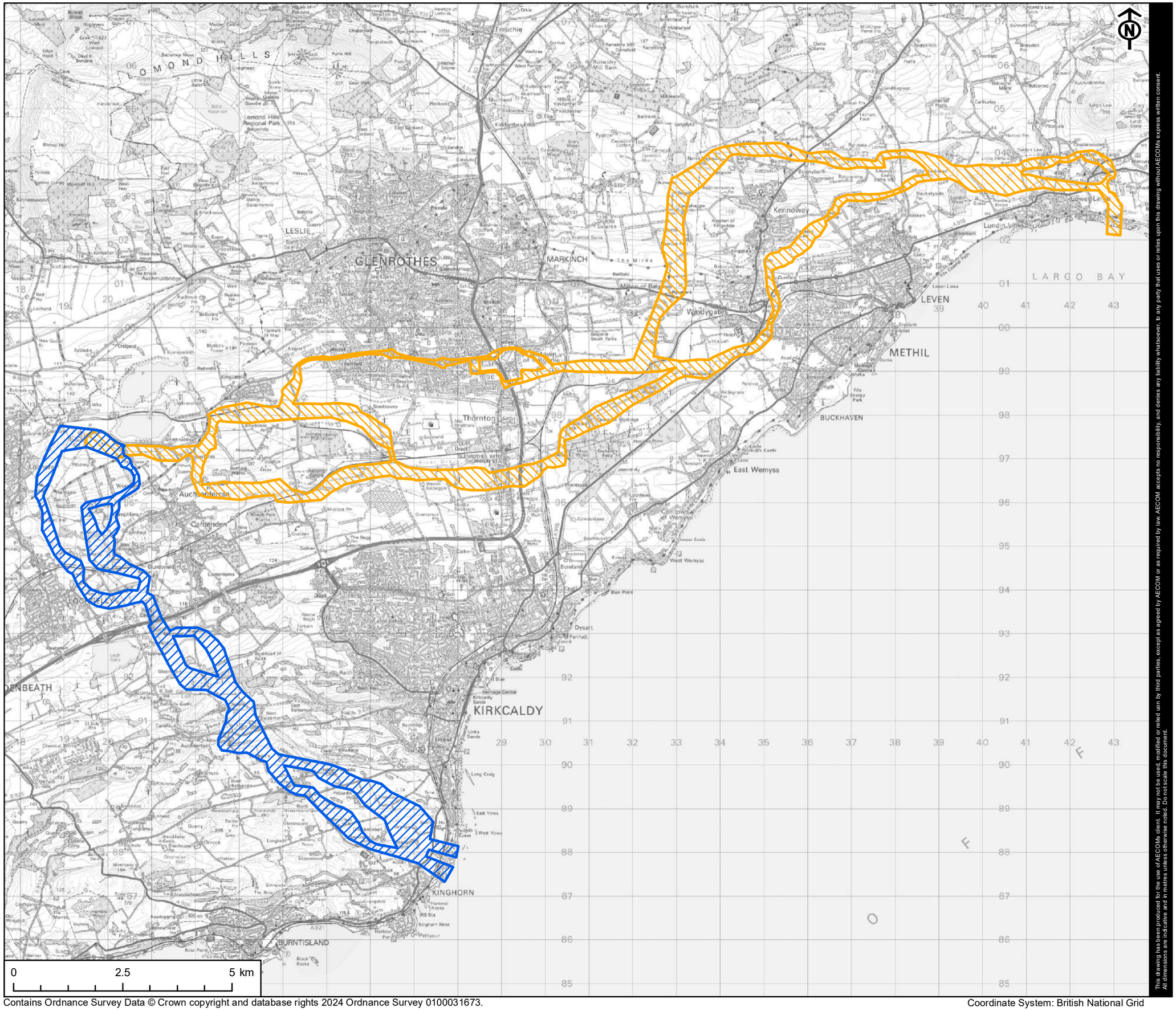
Converter station site 3 is common to both options so is not a material differentiator between them. Both options approach the converter station site from the south or east of Site 3 crossing agricultural land so its location does not materially influence the selection of the Preferred Option.

In relation to the underground cable routes, both end-to-end options have similar types of impacts. Both routes avoid statutory environmental designations once inland of the Firth of Forth SPA and SSSI so the main difference in impact relates to the disturbance caused during installation. The shorter route length is considered to reduce the level of disturbance which could occur as it is largely routed through rural areas to the south the of A92 and on the margins of scattered settlements to the north of the A92. In contrast the longer route (utilising the Orange Route Corridor) is routed closer to larger settlements including sub-options through and south of Glenrothes. As a result, the level of disturbance which would be experienced by local communities is greater for the longer underground cable route than for the Preferred Option. Both options are considered to be technically feasible, however, the longer route (utilising the Orange Route Corridor) is more constrained due to the increased number of road, rail and watercourse crossings it would require.

The Preferred Option is considered to best address the routeing and siting objective set out in Section 3 of this RCD balancing technical feasibility with impacts on the environment and people. Both options are technically feasible, however, the shorter, more direct route is less technically complex as it requires fewer crossings of roads, railways and watercourses

compared to the longer option. Similarly, the shorter, more direct route reduces the impact on the environment and people therefore on balance it is concluded that the shorter end-to-end option from Landfall A to Converter Station Site 3 is preferable. The Preferred Option for the Scottish Onshore Scheme is illustrated in Figure 22.

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



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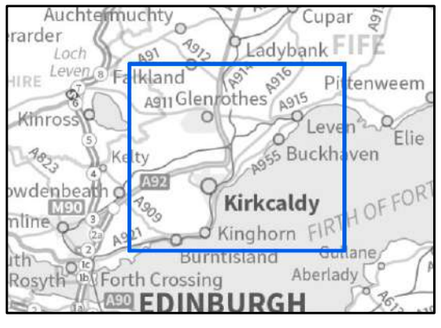
Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
Underground Cable Route - Shortlisted Option
Blue Route
Orange Route



TITLE
Figure 21
Shortlisted End to End Options

REFERENCE
EL4_20240312_RR_21_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

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

Scale @ A3 1:40,000

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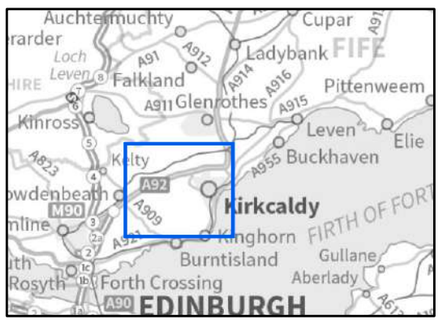
Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
Preferred Option



TITLE
Figure 22
Scottish Onshore Scheme - Preferred Option

REFERENCE
EL4_20240312_RR_22_v3

SHEET NUMBER
1 of 1

DATE
12/03/24

08. Consultation and Next Steps

8. Consultation and Next Steps

8.1 Consultation on the Scottish Onshore Scheme

As set out in section 1 there are three key phases to the development and consenting of the Scottish Onshore Scheme. The current phase is Phase 1 and comprises the routeing and siting study to identify a Preferred Option for the Scottish Onshore Scheme which is described in this Routeing and Siting Consultation Document. Phase 1 concludes with consultation (referred to as Phase 1 Consultation) on the Preferred Option which has been identified in section 7 of this Document.

SPEN will be required to apply to Fife Council for planning permission for the Scottish Onshore Scheme. The Scottish Onshore Scheme will be classed as 'major development' under the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009 and therefore require to be subject to statutory pre-application consultation (PAC). However, prior to this statutory PAC (referred to as Phase 2 Consultation) SPEN is undertaking Phase 1 Consultation. The purpose of this is to seek feedback from stakeholders including statutory consultees, members of the public and other stakeholders regarding the Scottish Onshore Scheme, in particular the Preferred Option. Responses to the Phase 1 Consultation will be evaluated and inform confirmation of a Proposed Option to be taken forward to Phase 2 of the development and consenting of the Scottish Onshore Scheme. It should be noted that following submission of an application for planning permission Fife Council will undertake further statutory consultation on the application.

8.2 Approach to and Objective of Phase 1 Consultation

SPEN attaches great importance to the effect that its works may have on the environment and local communities and is very keen to hear the views of local people to help it inform the development of the Scottish Onshore Scheme and Eastern Green Link 4 in the most effective way.

The overall objective of the consultation process is to ensure that all parties with an interest in the Project have access to accurate and up to date information and are provided with the opportunity to inform SPEN's 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 in order to assist the planning process.

SPEN 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 to share our plans, and this will continue to take place at all levels, both during and outside consultation periods.

8.3 Consultees

As noted in section 3 SPEN has already undertaken targeted stakeholder engagement with Fife Council, NatureScot, Historic Environment Scotland (HES), the Scottish Environment Protection Agency (SEPA), the Coal Authority and Scottish Forestry during this routeing and siting study. This has helped to inform the identification and assessment of options considered within this study.

To ensure that all other residents and other stakeholders potentially affected by the Scottish Onshore are consulted, SPEN has defined a consultation zone which includes all residential and business addresses within 1km of the Preferred Option . 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 operating within the consultation zone; and
- The public in general.

8.4 Phase 1 Consultation Launch and Duration

Phase 1 Consultation will run from Tuesday 23rd April to Thursday 25th April 2024. Prior to the consultation, adverts will appear in local weekly newspapers at least seven days before the first exhibition. A press release will be issued to local media announcing the impending start of the consultation. Information explaining the Project, in particular the Scottish Onshore Scheme. 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.

8.5 Sources of Information about the Consultation

In addition to this Routeing and Siting Consultation Document, a Project Leaflet has been prepared which provides a summary of the Project and how to participate in Phase 1 Consultation. A Project website has also been set up which provides information about the Project and hosts a library of publicly available documents for viewing or downloading: https://www.spenergynetworks.co.uk/pages/eastern_green_link_4.aspx. A consultation feedback form can also be completed or downloaded on the website.

8.6 Providing feedback

There will be a number of ways for people to make comments:

- At one of the in-person consultation events or at consultation webinars;
- Online, using the feedback form on the website;
- By post, using a paper feedback form, or by letter;
- By emailing the feedback form or in the body of an email; or
- By phone to the SPEN Project Consultation Contact Centre.

In-person events

SPEN will hold a 3 one day in-person drop-in events which will be attended by members of the Project team who will be available to answer questions about the Project. .

Online

People will be able to make comments online at https://www.spenergynetworks.co.uk/pages/eastern_green_link_4.aspx using an interactive online version of the feedback form, which will be available until Friday 9th May 2024

Post

A hard-copy feedback form will be available at public exhibitions, for download from the website, by request to Freephone: 0800021 7890 ,or by email to egl4@communityrelations.co.uk. Completed forms must be returned to FREEPOST SPEN EGL4 by Friday 9th May 2024 If returning completed forms by post people are advised to allow up to 7 days for these to be received. It may not be possible to consider forms received after this date.

Email

SPEN will **also accept comments relating to the Phase 1 Consultation by e-mail to** egl4@communityrelations.co.uk by Friday 10th May 2024

Phone

SPEN prefers to receive comments in writing as this helps avoid the risk of misinterpretation. However, where no other means are available, comments can be made via phone call free on Freephone: 0800021 7890 .

8.7 Responding to Feedback

The responses received to the Phase 1 Consultation will be evaluated by SPEN and published in the form of a Consultation Feedback Report. Although SPEN 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 Project, including the availability of the Consultation Feedback Report and confirmation of the Proposed Option. People interested in being kept informed in this way can register on the website or send an email to egl4@communityrelations.co.uk

Appendices

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, then effect of remaining on this route must be considered in terms of the effect of a new route avoiding the area.

(b) Areas of highest amenity value require to be established on a project-by-project basis considering Schedule 9 to The Electricity Act 1989, Scottish Planning Policies, National Planning Policy 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.

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

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

f. 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 land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable mínimum.

   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. 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 Thematic Constraints Plans

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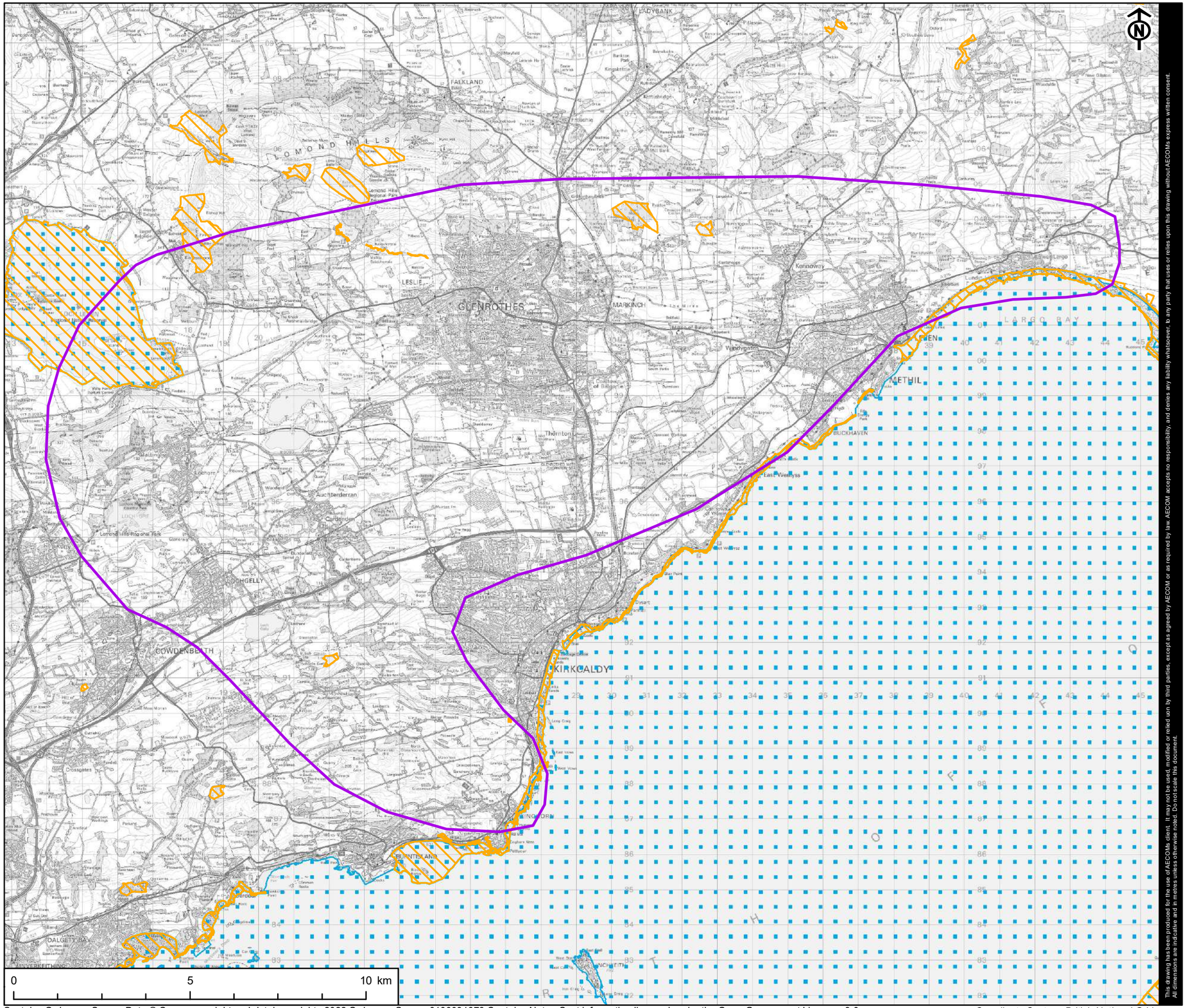

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Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Study Area
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)

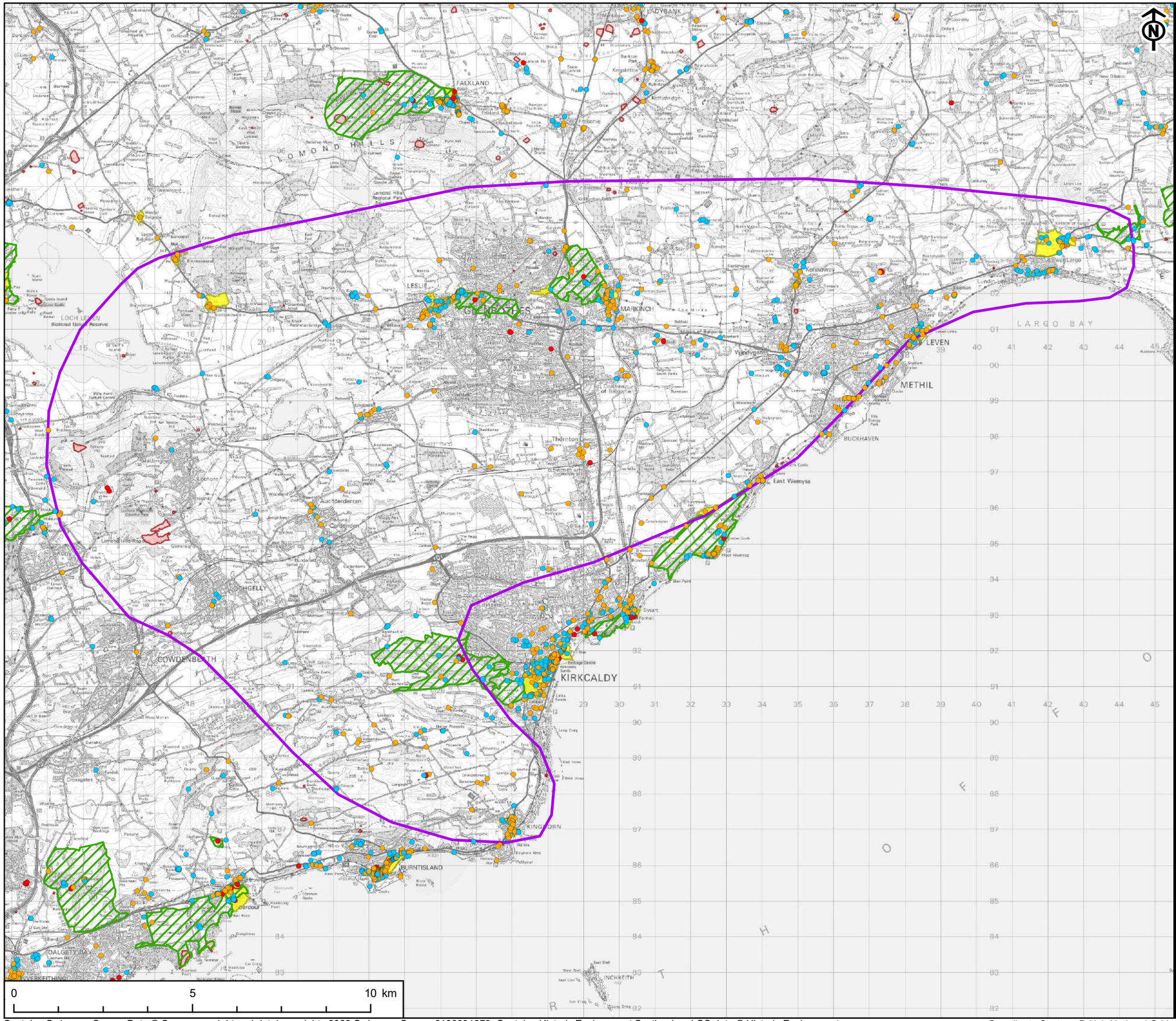
TITLE
Figure D1
Ecology and Nature Conservation

REFERENCE
EL4_20240312_RR_D1_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

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



Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Study Area
- Category A Listed Buidling
- Category B Listed Building
- Category C Listed Building
- Garden / Designed Landscape
- Scheduled Monument
- Conservation Area

TITLE
Figure D2
Cultural Heritage and Archaeology

REFERENCE
EL4_20240312_RR_D2_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

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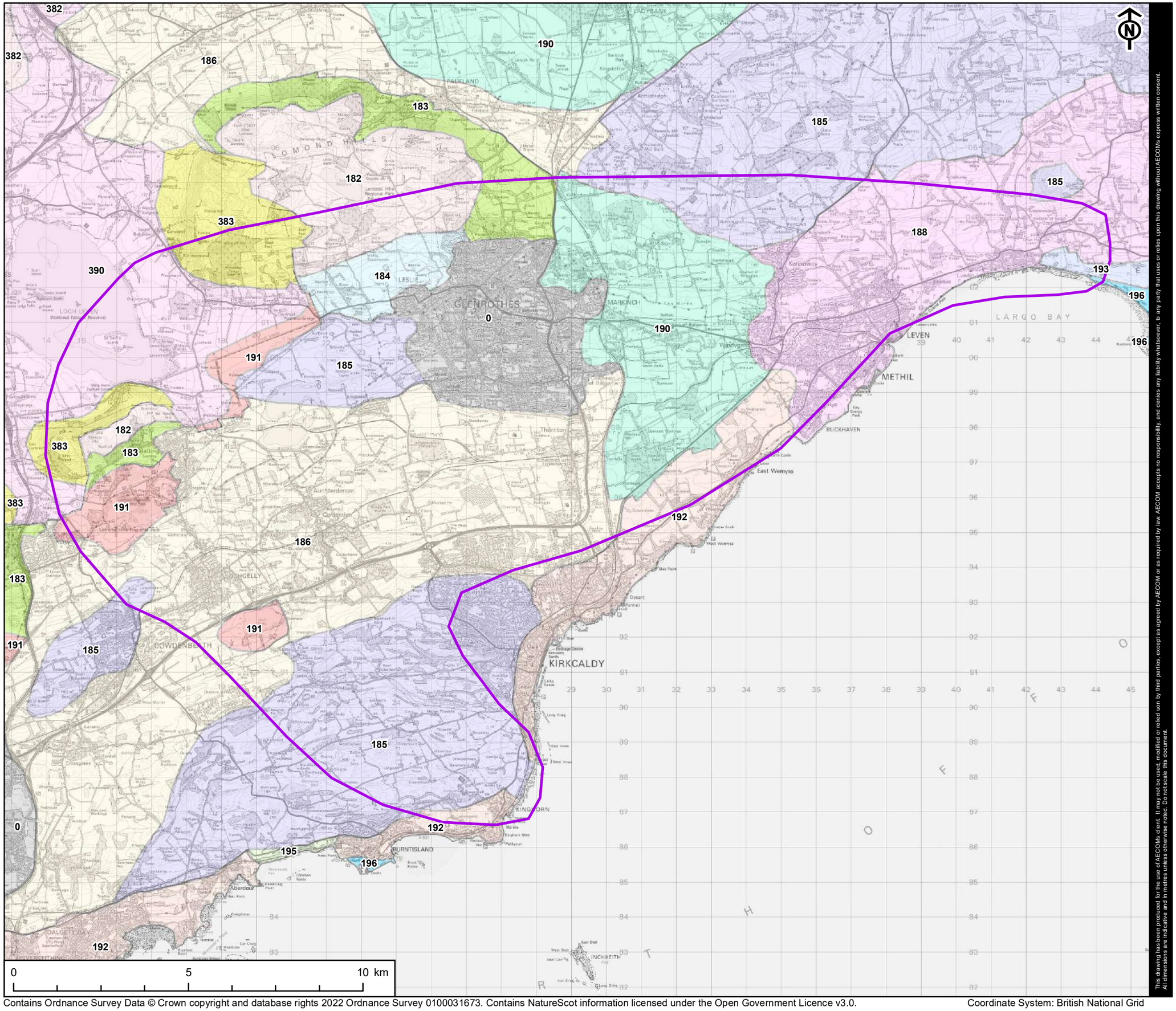


Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY

- Study Area

Landscape Character Assessment (NatureScot)

- 0, Urban
- 182, Upland Hills
- 183, Hill Slopes
- 184, Foothills - Fife
- 185, Pronounced Hills and Crags
- 186, Lowland Hills and Valleys
- 188, Lowland Dens
- 190, Lowland River Basins
- 191, Lowland Loch Basins - Fife
- 192, Coastal Hills - Fife
- 193, Coastal Terraces - Fife
- 195, Coastal Braes
- 196, Coastal Flats - Fife
- 382, Lowland Hill Ranges
- 383, Rugged Lowland Hills
- 390, Lowland Basins

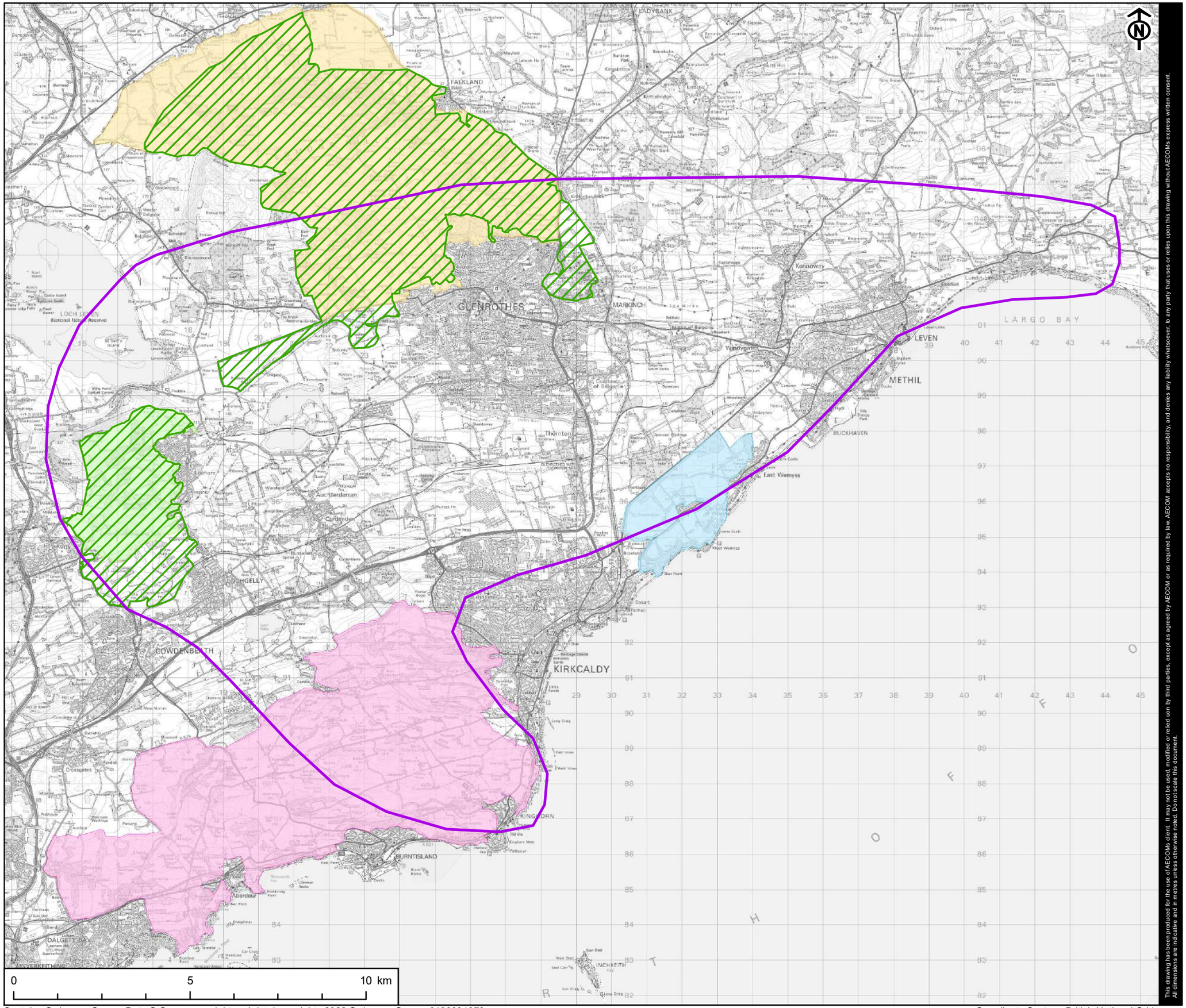
TITLE
Figure D3
Landscape Character

REFERENCE
EL4_20240312_RR_D3_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Project Management Initials: DR Designer: ER Checked: LC Approved: TC



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Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Study Area
- Regional Park

Local Landscape Area
- Cullaloe Hills and Coast
- Loch Ore and Benarty
- Lomond Hills
- West Wemyss

TITLE
Figure D4
Landscape Designations

REFERENCE
EL4_20240312_RR_D4_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

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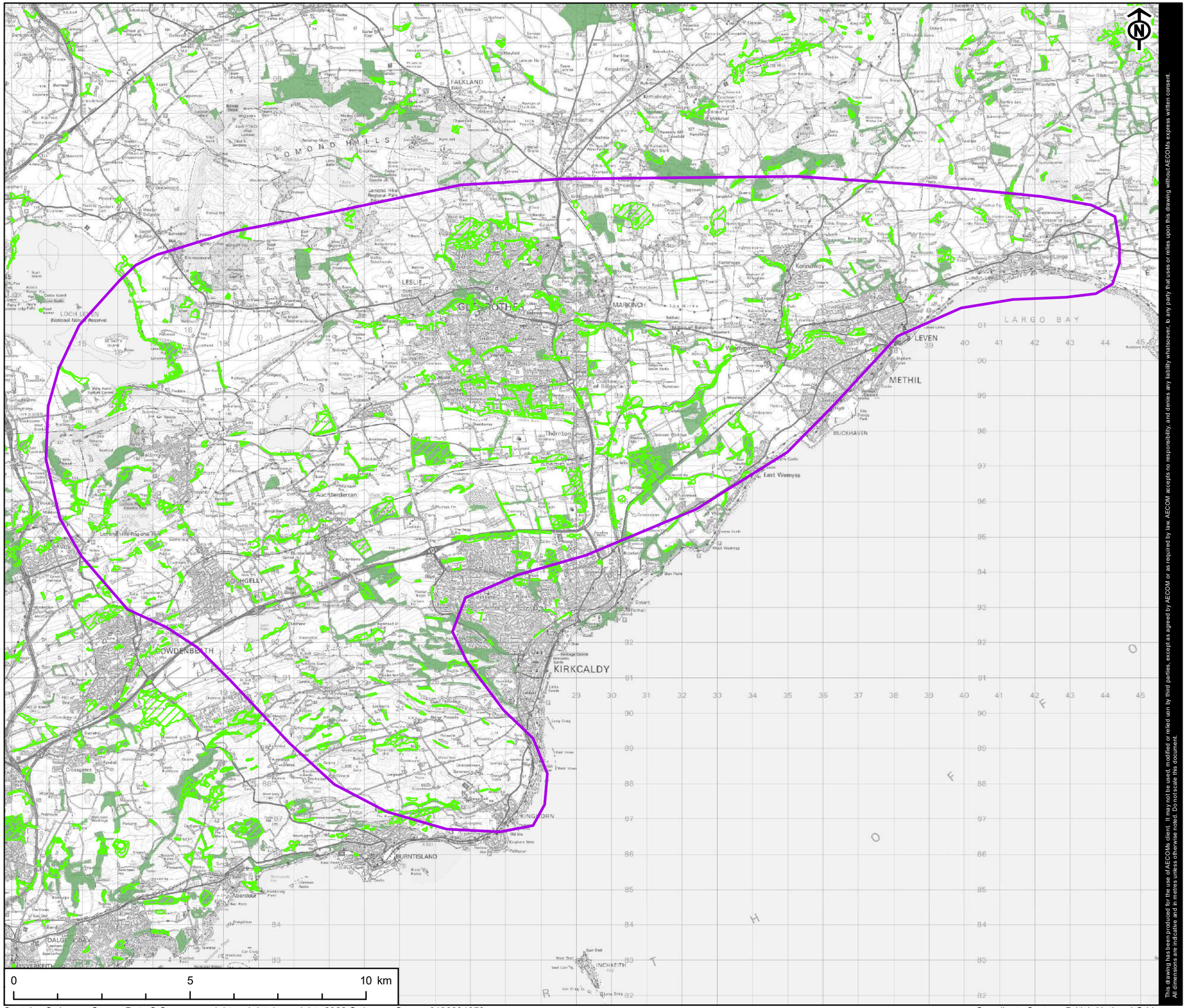

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Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY
- Study Area
- Ancient Woodland
- Native Woodland Survey

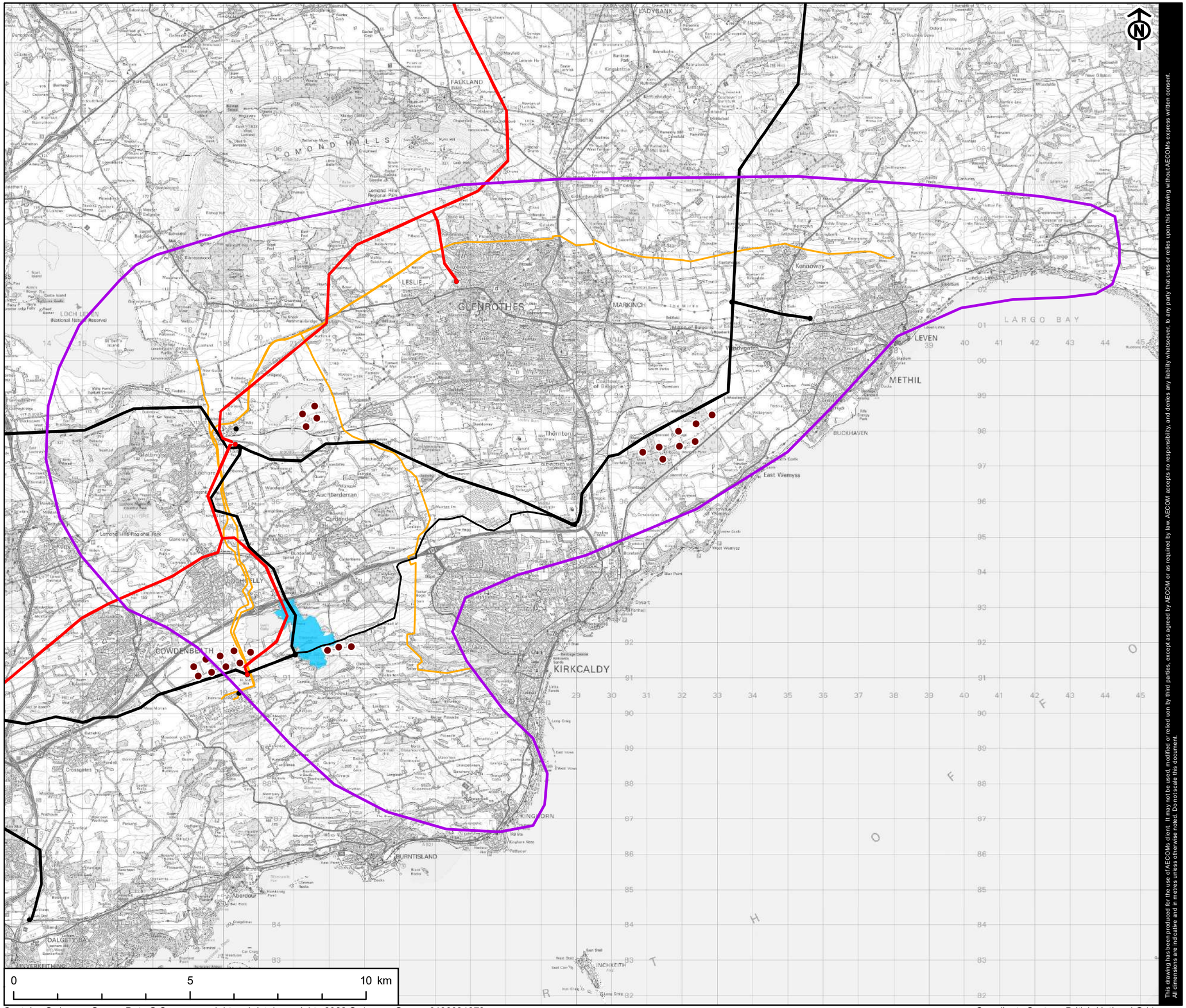
TITLE
Figure D5
Woodland and Trees

REFERENCE
EL4_20240312_RR_D5_v2

SHEET NUMBER
1 of 1

DATE
12/03/24

Project Management Initials: DR Designer: ER Checked: LC Approved: TC



Coordinate System: British National Grid

AECOM

PROJECT
Eastern Green Link 4

CLIENT
SP Energy Networks

KEY

- Study Area
- Hazard Pipe Consultation Zone
- Operational Wind Turbine Location
- Glenniston Solar Farm

Substation Location

- 132
- 275

SPT Network

- Existing 132kV
- Existing 275kV

TITLE
Figure D6
Other Infrastructure

REFERENCE
EL4_20240312_RR_D6_v2

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Appendix D Landfall Sites Appraisal

Landfall	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Physical environment Considerations	Other Marine Considerations	Summary
Landfall Option A Kinghorn	• Firth of Forth SPA/SSSI and Ramsar requires to be crossed. • Proximity to/overlaps with a designated seal haul out site. • Requires a longer subsea cable route through the Outer Forth and St Andrews Complex SPA. • Constraints or impacts are mitigable through installation method and timing.	• No designated cultural heritage or archaeology constraints at the landfall area.	• Landfall is within the Cullaloe Hills and Coast LLA, however, impacts on landscape are temporary.	• Landfall is located away from settlement and residential properties. Subject to micro-siting nearest properties are at Linton Court, however amenity related impacts are mitigable.	• Requires crossing of coastal path.	• Requires crossing of Edinburgh-Aberdeen Railway Line and A921.	• Coastline comprises cliff section and rocky foreshore with c. 30m drop from landfall area to sea-level.	• Subsea cable routes approaching Landfall A require a longer route through the Firth of Forth including a section through an area of high shipping density identified by Forth Ports as the area used by pilots for vessel manoeuvres.	**Shortlist**
Landfall Option B Buckhaven	• Firth of Forth SPA/SSSI and Ramsar requires to be crossed. • Requires a longer subsea cable route through the Outer Forth and St Andrews Complex SPA. • Constraints or impacts are mitigable through installation method and timing.	• No designated cultural heritage or archaeology constraints at the landfall area.	• No landscape constraints present at the landfall area.	• Landfall is located away from settlement and residential properties. Subject to micro-siting nearest properties are at Rosie View, however amenity related impacts are mitigable.	• Requires crossing of coastal path.	• Requires crossing of A955	• Coastline comprises cliff section and rocky foreshore with c. 30m drop from landfall area to sea-level.	• Subsea cable routes approaching Landfall B are constrained by the presence of a number of anchorages as well as an area identified as 'foul ground' which is understood to contain unexploded ordnance (UXO) as well as spoil and construction waste.	**Discount**
Landfall Option C Lower Largo West	• Firth of Forth SPA/SSSI and Ramsar requires to be crossed. • Requires a shorter subsea cable route through the Outer Forth and St Andrews Complex SPA. • Constraints or impacts are mitigable through	• No designated cultural heritage or archaeology constraints at the landfall area.	• No landscape constraints present at the landfall area.	• Landfall is located away from settlement and residential properties. Subject to micro-siting nearest properties are at Largo Road, however amenity related impacts are mitigable.	• Requires crossing of a golf course as well as recreational beach.	• Requires crossing of A915	• Coastline is part of a flat, open sandy bay.	• Subsea cable routes approaching Landfall C are less constrained as they avoid anchorages and cross an area of lower shipping density.	**Discount**

Landfall	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Physical environment Considerations	Other Marine Considerations	Summary
	installation method and timing.								
Landfall Option D Lower Largo East	• Firth of Forth SPA/SSSI and Ramsar requires to be crossed. • Requires a shorter subsea cable route through the Outer Forth and St Andrews Complex SPA. • Constraints or impacts are mitigable through installation method and timing.	• No designated cultural heritage or archaeology constraints at the landfall area.	• No landscape constraints present at the landfall area.	• Landfall is located away from settlement and residential properties and is comparatively further than other landfalls.	• Requires crossing of coastal path.	• No infrastructure constraints present at landfall area.	• Coastline is part of an open bay but landfall is set back on slightly elevated land with c.20m drop to sea-level.	• Subsea cable routes approaching Landfall D are less constrained as they avoid anchorages and cross an area of lower shipping density.	**Shortlist**

Appendix E Converter Station Sites Appraisal

Landfall	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Physical environment Considerations	Technical Considerations	Summary
Converter Station Option 1	• No statutory designated sites or other sites identified through the Fife Local Development Plan present in the vicinity of the Site.	• No designated cultural heritage or archaeological constraints present within or near to the Site.	• There are no landscape designations present at or near to the Site. It is currently agricultural land but its character is heavily influenced by its former use associated with previous opencast coalmine. A converter station would be seen in the context of Westfield Energy Recovery Facility and the wider Westfield Restoration Project.	• With the exception of a farm/farmhouse approximately 130m to the north which could be impacted, settlement and properties are generally distant to the site. The proximity of the farm/farmhouse would require mitigation with regard to potential amenity impacts including visual and noise impacts.	• There are no recreational features within or close to the Site.	• An existing gas pipeline is routed across the Site limiting land available for development.	• The Site is located outside of but immediately adjacent to the Development High Risk Area identified by the Coal Authority.	• Existing gas pipeline traverses the site limiting extent of developable area and constraining design. Without diverting the gas pipeline there is limited space to develop a converter station here. • Relative proximity to Westfield, however, intervening development and constraints would increase AC connection length.	**Discount**
Converter Station Option 2	• No statutory designated sites or other sites identified through the Fife Local Development Plan present in the vicinity of the Site.	• No designated cultural heritage or archaeological constraints present within or near to the Site.	• There are no landscape designations present at or near to the Site. It is characterised by its former use associated with previous opencast coalmine. A converter station would be seen in the context of Westfield Energy Recovery Facility and the wider Westfield Restoration Project.	• There are no settlement related constraints in the immediate vicinity of the Site; the nearest property is a farm/farmhouse approximately 325m to the north.	• There are no recreational features within or close to the Site.	• The Site was previously the Westfield Development Centre. It lies to the west of the Westfield Restoration Project in an area identified within the Fife Local Development Plan as a Safeguarded Employment Area. • A gas pipeline is routed across the north west corner of the Site which cannot be constructed above and limits the developable area within the Site.	• The Site was previously the Westfield Development Centre, a former gasification site. It comprises an area of hardstanding. Given the Site's former use there is the potential for some contaminated land to be present and remediation works could be required. • The Site is also located within the Development High Risk Area identified by the Coal Authority.	• Small, constrained site with limited space for development of a converter station.	**Discount**
Converter Station Option 3	• No statutory designated sites or other sites identified through the Fife Local	• No designated cultural heritage or archaeological constraints present	• There are no landscape designations present at or near to the Site. While	• There is a commercial property to the north of the Site and a small cluster	• There are core paths in the immediate vicinity of the Site including one which follows	• An existing 132kV overhead line (owned by SPT) crosses the Site and would require	• The Site is located within the Development High Risk Area identified by the Coal	• Large sized site with sufficient land available than required providing opportunities	**Preferred**

Landfall	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Physical environment Considerations	Technical Considerations	Summary
	Development Plan present in the vicinity of the Site.	within or near to the Site.	the wider area is mainly rural a converter station on this Site would be seen in the context of the existing substation as well as energy-related development to the north which is part of the Westfield Restoration Project.	of properties approximately 200-250m south of the Site with the potential for amenity related impacts, however, the size of the Site provides opportunity to maximise separation distance through design as well as incorporate mitigation.	its western boundary. There is some potential for amenity related impacts on users of nearby core paths.	to be undergrounded in developing the converter station design on this Site.	Authority, while this does not prevent development it does indicate ground conditions may pose a risk and require additional mitigation.	through design and for mitigation. • Directly adjacent to Westfield Substation requiring the shortest AC connection of all options • Existing 132kV overhead line would require to be undergrounded to remove potential hazard and provide space for development.	
Converter Station Option 4	• No statutory designated sites or other sites identified through the Fife Local Development Plan present in the vicinity of the Site.	• The Site is in relative proximity to Harestanes Farm a category B listed building so a converter station in this location may give rise to setting impacts.	• There are no landscape designations present at or near to the Site. The landscape character is mainly rural occupying agricultural land between settlement and the Westfield Restoration Project to the north/north west. The Cardenden Concrete Plant and quarry lie to the south of the Site and comprises large industrial buildings.	• There are individual properties as well as a small village, Woodend, within 400-500m of the Site. The proximity of the site to people increases the potential for amenity related impacts.	• There are core paths in the immediate vicinity of the Site including one which follows its western boundary. There is some potential for amenity related impacts on users of nearby core paths.	• An existing 132kV overhead line crosses the northern part of the Site and would require to be avoided in developing the converter station design.	• The Site also partly lies within a Development High Risk Area identified by the Coal Authority, while this does not prevent development it does indicate ground conditions may pose a risk and require additional mitigation.	• Moderate sized site with sufficient land available than required providing opportunities through design and for mitigation. • Relative proximity to Westfield, enabling a direct AC connection route.	**Discount**
Converter Station Option 5	• No statutory designated sites or other sites identified through the Fife Local Development Plan present in the vicinity of the Site.	• The Site lies to the north of Blythe's Tower a category B listed building and has the potential for setting impacts.	• There are no landscape designations present at or near to the Site. It is characteristically rural occupying a prominent location to the west of Glenrothes and north of Kinglassie.	• There are a number of scattered farmhouses and other rural properties within approximately 500m of the Site with the potential for amenity related impacts.	• There are no recreational features within the Site, however, there are core paths to the south linking Kinglassie with Glenrothes and settlements further south. There is some potential for amenity related impacts on users of the Park.	• There is no other infrastructure at the Site, however, existing gas pipelines and overhead lines would influence AC connection routeing with at least one gas pipeline requiring to be crossed.	• Based on available information there are no significant physical environment constraints present.	• Moderate sized site with sufficient land available than required providing opportunities through design and for mitigation. • Relative to other Site options Site 6 is more distant from Westfield requiring a longer AC connection with interaction with other infrastructure.	**Discount**

Landfall	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Physical environment Considerations	Technical Considerations	Summary
Converter Station Option 6	• Loch Leven SPA/SSSI and Ramsar lies approximately 1.5km to the west of the Site. There is the potential that the Site and surrounding land is used by the qualifying species of the SPA (i.e. functionally linked land) with the potential for impacts on qualifying species.	• There are a number of listed buildings in the vicinity of the Site as well as the Scotlandwell Conservation Area. As a result the Site has high potential for setting impacts to occur.	• There are no landscape designations present at or near to the Site. It is characteristically rural in nature with limited existing screening meaning a converter station would be a prominent feature in the landscape.	• Scotlandwell village and a number of scattered farmhouses and other rural properties lie to the north and west of the Site within approximately 500m. The proximity combined with limited other development in the intervening area increases the potential for amenity related impacts.	• There are no recreational features within the Site, however, part of the Lomond Hills Regional Park lies to the immediate south. There is some potential for amenity related impacts on users of the Park.	• There is no other infrastructure at the Site, however, existing gas pipelines and overhead lines would influence AC connection routeing with at least one gas pipeline requiring to be crossed.	• The Site lies in area identified by SEPA as being at high risk of flooding. While this could be addressed by land raising the potential loss of flood storage capacity from the River Leven may require equivalent compensation to be provided.	• Very large site with more land available than required providing opportunities through design and for mitigation. • Relative to other Site options Site 6 is more distant from Westfield requiring a longer AC connection with interaction with other infrastructure. • The Site is currently accessed via a narrow road/track so a new access in the order of 400-500m would require to be constructed.	**Discount**

Appendix F Underground Cable Routes Appraisal

Route Corridor	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Woodland and Trees	Physical environment Considerations	Summary
Blue Route Corridor	• There are no statutory ecological designations within the Blue Route Corridor. Camilla Loch SSSI lies to the west of the corridor where it crosses the Gleniston area. • There are no local ecological designations within the corridor, however a small number are present just outside of it.	• There are three listed buildings within the corridor as well as some on the margins of it. Impacts on listed buildings would be limited to temporary setting impacts. While the corridor provides opportunities to develop detailed routes which avoid them, some setting impacts may occur subject to final route design.	• The Blue Route Corridor crosses the Cullaloe Hills and Coast Local Landscape Area (LLA) for approximately 7km. While there will be no permanent above infrastructure, reinstatement requirements may be greater within the LLA.	• To the south of the A92, the corridor is predominantly rural with some scattered residential properties present. To the north of the A92 the corridor crosses areas on the margins of slightly larger settlements. There is some potential for disturbance during construction subject to proximity to settlement and properties.	• The Blue Route Corridor avoids recreational sites and features including the speedway at Lochgelly. Subject to final route design up to ten core paths may require to be crossed by the route, however, any disruption would be temporary during construction only.	• The Blue Route Corridor interacts with a range of other infrastructure including routeing in proximity to a small wind farm and proposed solar farm as well as crossing railway lines and major A-roads and routeing in proximity to gas pipelines which are routed from Mossmorran to Westfield.	• Subject to final route design a small part of an Ancient Woodland Inventory site would require to be crossed, however, elsewhere impacts on trees and woodland are limited. Impacts on woodland can be mitigated through use of trenchless installation methods.	• North of the A92 the route corridor crosses a High Risk area as identified by the Coal Authority. There are reinstated quarries or mines including at Gleniston and Westfield where more complex ground conditions may be encountered.	**Shortlist**
Orange Route Corridor	• There are no statutory ecological designations within the Orange Route Corridor. Carriston Reservoir SSSI lies to its immediate north/north west. • Local ecological designations are present within the corridor including Keil's Den Wildlife Site to the west of Upper Largo, the Kennoway Den Wildlife Site to the west of Kennoway and the Windygates-Kennoway Wildlife Site to east of Windygates.	• There are a number of historic environment designations within the immediate vicinity of the corridor including scheduled monuments and multiple listed buildings. Subject to route design, the Orange Route Corridor could include a crossing of the Upper Largo Conservation Area. Impacts on historic environment would be limited to temporary setting impacts during construction.	• The Orange Route Corridor avoids landscape designations.	• There are a number of settlements and properties within or in the vicinity of the Orange Route Corridor including Upper and Lower Largo, Lundin Links, Kennoway, Methil and Glenrothes where the potential for amenity related impacts and general disturbance is increased.	• The Orange Route Corridor avoids recreational sites such as golf courses as much as possible, however, crossings of more than 20 core paths are unavoidable. Impacts on core paths/core path users would be temporary during construction only.	• The Orange Route Corridor requires crossings of multiple A and B roads as well as railway lines. Other notable infrastructure in close proximity to the route includes a small-scale wind farm south of Glenrothes as well as overhead lines and underground gas pipelines, particularly closer to Westfield.	• The Orange Route Corridor has the potential to impact on designated and undesignated woodland including parts of Ancient Woodland Inventory sites south east of Glenrothes and woodland which is protected by Tree Preservation Order (TPO) around Largo. Impacts on woodland can be mitigated through use of trenchless installation methods, however, the length of this option increases the potential impact compared to shorter routes.	• The Orange Route Corridor requires to traverse a large area identified by the Coal Authority as being at High Risk due to previous coal mining activity. Generally, the depth of cable installation should be shallow enough to avoid interacting with High Risk areas, however, where the cable requires to be installed by trenchless methods then the increase in the depth of installation may result in increased risks of impacts.	**Shortlist**
Green Route Corridor	• There are no statutory ecological designations within the Green Route	• There are a number of historic environment designations within the immediate	• The Green Route Corridor crosses the Lomond Hills Local Landscape Area (LLA) for	• There are a number of settlements and properties within or in the vicinity of the Green Route	• The Green Route Corridor crosses the Lomond Hills Regional Park for approximately 8km.	• The Green Route Corridor requires crossings of multiple A and B roads as well as	• The Green Route Corridor has the potential to impact on woodland. Ancient Woodland	• With exception of some small areas between Lower Largo and north of Kennoway and	**Discount**

Route Corridor	Ecology and Ornithology	Cultural Heritage and Archaeology	Landscape	Settlement	Recreation	Other Infrastructure	Woodland and Trees	Physical environment Considerations	Summary
	Corridor, however, there are a number in its vicinity including Carriston Reservoir SSSI, Star Moss SSSI, Ballo and Harperleas Reservoirs SSSI and the Loch Leven SPA and SSSI. • Local ecological designations are present within or close to the corridor Keil's Den Wildlife Site to the west of Upper Largo, Kennoway Den Wildlife Site to the west of Kennoway and Coul Reservoir Wildlife Site/Coul Den Local Nature Reserve within the Lomond Hills Regional Park and Leslie - Strathendry Wildlife Site to the south of Leslie	vicinity of the corridor including scheduled monuments and multiple listed buildings. Subject to route design, the Green Route Corridor could include a crossing of the Upper Largo Conservation Area. Impacts on historic environment would be limited to temporary setting impacts during construction.	approximately 8km. While there will be no permanent above infrastructure, reinstatement requirements may be greater within the LLA.	Corridor including Upper and Lower Largo, Lundin Links, Kennoway, Star, Glenrothes, Leslie and Kinglassie where the potential for amenity related impacts and general disturbance is increased.	The Park supports a range of outdoor recreational activities which could be temporarily impacted subject to detailed route s design.	railway lines. Closer to Westfield the Green Route Corridor interacts with a number of existing underground gas pipelines as well as overhead lines which woul constrain routes to a converter station at Westfield.	Inventory sites are larlgey avoided and limited to the margins of the corridor, however, TPO woodland is present at Largo while other undesignated woodland is present including within the Lomond Hills Regional Park.	closer to Westfield the Green Route Corridor largely avoids areas identified by the Coal Authority as being at High Risk due to previous coal mining activity.	