Scottish & Southern Electricity Networks

TRANSMISSION

Consultation Document – Alignment Selection

Netherton Hub 400kV OHL Connection to New Deer and Peterhead: Tie-In

February 2025

Scottish & Southern Electricity Networks

TRANSMISSION

CONTENTS

GLOSSARY

Term	Definition
Above Ordnance Datum (AOD)	It is a vertical datum used by an Ordnance survey as the basis for deriving altitudes on maps.
AC	Alternating current.
Alignment	A centre line of an overhead line, along with location of key angle structures.
Amenity	The natural environment, cultural heritage, landscape and visual quality. Also includes the impact of SSEN Transmission's works on communities, such as the effects of noise and disturbance from construction activities.
Ancient Woodland	In Scotland, Ancient Woodland are areas of woodland that have existed since 1750 and are relatively undisturbed by human development. They are considered irreplaceable and have complex biodiversity that have accumulated over hundreds of years.
Ancient Woodland Inventory (AWI)	The Ancient Woodland Inventory (AWI) is a provisional guide to the location of Ancient Woodland and has three categories of woodland: i. Ancient Woodland (TIA and 2a) - Interpreted as semi-natural woodland from maps of 1750 (TIA) or 1860 (2a) and continuously wooded to the present day. If planted with non-native species during the 20th century they are referred to as Plantations on Ancient Woodland Sites (PAWS). ii. Long-established woodlands of plantation origin (LEPO) (TIB and 2b) - Interpreted as plantation from maps of 1750 (TIB) or 1860 (2b) and continuously wooded since. Many of these sites have developed semi-natural characteristics, especially the oldest ones, which may be as rich as Ancient Woodland. iii. Other woodlands on 'Roy' woodland sites (3) - Shown as unwooded on the 1st edition maps but as woodland on the Roy maps. Such sites have, at most, had only a short break in continuity of woodland cover and may still retain features of Ancient Woodland.
Beauly to Peterhead Connection (B2P)	A neighbouring overhead line development connecting the Beauly Substation to Peterhead via the New Deer development.
Biodiversity Net Gain (BNG)	It is an approach to development which makes sure that the natural environment is left in a measurably better state than they were before the development.
Biodiversity Units (BU)	Biodiversity units are the metric used to quantify the biodiversity gains and losses of a development.
Birds of Conservation Concern	Birds of Conservation Concern (BoCC) provides the status of all regularly occurring birds in the UK, Channel Islands and Isle of Man. The current version is BoCC 5. Birds of highest conservation concern will appear on the Red List.
Class 1 and Class 2 Peatland	Class 1 – Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value. Class 2 – Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential.
Construction Environmental Management Plan (CEMP)	A site specific environmental management plan setting out the environmental management procedures, legislation and requirements for a particular project and site.
Consultation	The dynamic process of dialogue between individuals or groups, based on a genuine exchange of views and, normally, with the objective of influencing decisions, policies or programmes of action.
Corridor	A linear area which allows a continuous connection between the defined connection points. The corridor may vary in width along its length; in unconstrained areas it may be many kilometres wide.
DC	Direct current.
Distribution Network Operator (DNO)	The operator of the electric power distribution system which delivers electricity to most end users. SSEN is a DNO.

Term	Definition
Drinking Water Protected Areas (DWPA)	Bodies of surface water and groundwater identified in the Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 which are used for the abstraction of water intended for human consumption.
Effect	The direct or indirect physical consequence(s) of the proposed alignment option on receptors, under each of the various topic headings.
Electricity System Operator (ESO)	National Grid is the Electricity System Operator (ESO) for Great Britain. The ESO balances electricity supply and demand to ensure the electricity supply.
Environmental Impact Assessment (EIA)	Environmental Impact Assessment. A formal process codified by EU directive 2011/92/EU, and subsequently amended by Directive 2014/52/EU. The national regulations are set out in The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The EIA process is set out in Regulation 4(1) of the regulations and includes the preparation of an EIA Report by the developer to systematically identify, predict, assess and report on the likely significant environmental impacts of a proposed project or development.
Freshwater Pearl Mussel (FWPM)	It is an endangered species of mollusc, found in clean, nutrient poor low-calcium rivers.
Gardens and Designed Landscapes (GDLs)	The Inventory of Gardens and Designed Landscapes lists those gardens or designed landscapes which are considered by a panel of experts to be of national importance.
Geological Conservation Review (GCR)	The Geological Conservation Review (GCR) is a process to select areas of national and international importance for their geology and geomorphology within Great Britain.
Geology	The study of the rocks and similar substances that make up the earth's surface.
Gigawatt (GW)	One billion watts.
Ground Water Dependent Terrestrial Ecosystem (GWDTE)	Wetlands which critically depend on groundwater flows. They are safeguarded by the Water Framework Directive (WFD) and are sensitive to hydrological and ecological changes.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Habitat Map of Scotland (HABMOS)	It is the national repository for habitat and land use data. The map adopts internationally recognised data and habitat classification standards.
Historic Environment Scotland HES	Historic Environment Scotland is the lead public body established to investigate, care for and promote Scotland’s historic environment.
High Voltage Direct Current (HVDC)	A high voltage, direct current (HVDC) electric power transmission system uses direct current for electric power transmission, in contrast to the more common alternating current systems. Most HVDC links use voltages between 100 kV and 800 kV.
Holford Rules	Guidelines on overhead line routeing first formulated in 1959 by Sir William later Lord, Holford. The Holford Rules set out a hierarchical approach to routeing which advocates avoiding areas of high amenity value, minimises changes in direction, which takes advantage of topography and which minimises visual interactions with other transmission infrastructure.
Hydrogeology	A branch of geology concerned with the occurrence, use, and functions of surface water and groundwater.
Hydrology	The study of water on and beneath the earth’s surface, with regards to its occurrence, distribution, movement and properties as well as its relationship with the environment within each phase of the water cycle.
Irreplaceable Habitat	Irreplaceable habitats are habitats which are very difficult (or take a very significant time) to restore, recreate or replace once destroyed, due to their age, uniqueness, species diversity and rarity.
Kilovolt (kV)	One thousand volts.
Land Capability for Agriculture (LCA)	It is a land evaluation ranking that groups soils based on their potential for agricultural purpose.
Landscape Character Type (LCT)	A distinct, recognisable and consistent pattern of elements in a landscape that differentiate the area from another.

Term	Definition
Level of Impact	The outcome of a comparative appraisal of the combination of effects within a specific topic along a specific alignment option after a consideration of the potential for mitigation, using professional judgement based on experience.
Limit of Deviation (LOD)	The area either side of the proposed alignment within which micrositing of structures may take place in accordance with the conditions of the Section 37 consent.
Listed Building	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories A – C.
Local Nature Reserve	Areas of natural heritage that are locally important.
Long-Established woodlands of Plantation Origin (LEPO)	LEPO refers to the wooded areas that have a continuous history of being wooded since at least 1750.
Micrositing	The process of positioning individual structures to avoid localised environmental or technical constraints.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
National Cycle Network (NCN)	It offers a collection of signed walking and cycling paths connecting Scotland's cities, towns and countryside.
NCR	The National Cycle Routes are a UK-wide network of signed paths and routes for walking, wheeling, cycling and exploring the outdoors.
National Nature Reserve	Areas of natural heritage that are nationally important.
National Scenic Area (NSA)	A national level designation applied to those landscapes considered to be outstanding scenic value in a national context.
Native Woodland Survey of Scotland (NWSS)	The Native Woodland Survey of Scotland identified and mapped the location, extent, type and condition of all of Scotland's native woodlands.
NatureScot	NatureScot is the lead public body responsible for Scotland's natural environment.
Network Options Assessment (NOA)	The National Grid's Network Options Assessment (NOA) provides their recommendation for which network reinforcement Projects should receive investment, and when.
Ornithology	The study of birds, their behaviour, physiology and taxonomy.
Overhead line (OHL)	An electric line installed above ground, usually supported by lattice steel towers or poles.
Plantation Woodland	Woodland of any age that obviously originated from planting.
Potential Alignment	The Potential Alignment presents the outcome of our initial appraisal, before consultation, of environmental, technical, and cost constraints. It is the alignment we consider is the best balance of the constraints identified.
Private Water Supply (PWS)	A water supply that is not provided by Scottish Water.
Proposed Alignment	The Proposed Alignment presents the outcome following consultation and is taken forward to detailed design and section 37 consent application.
RAG Rating	A Red, Amber, Green rating provided to assess the potential impact of the proposed OHL.
Ramsar	A wetland site designated to be of international importance under the Ramsar Convention.
Route	A linear area of approximately 1 km width (although this may be narrower/wider in specific locations in response to identified pinch points / constraints), which provides a continuous connection between defined connection points.
Routeing	The work undertaken which leads to the selection of a Proposed Alignment, capable of being taken forward into the consenting process under Section 37 of the Electricity Act 1989.
Schedule 1 Species	Birds listed on the Schedule 1 of the Wildlife & Countryside Act 1981, of which it is an offence to intentionally or recklessly disturb at, on or near an 'active' nest.

Term	Definition
Scheduled Monument	A monument which has been scheduled by the Scottish Ministers as being of national importance under the 'Ancient Monuments and Archaeological Areas Act 1979'.
Scottish Environment Protection Agency (SEPA)	Scotland's principal environmental regulator, protecting and improving Scotland's environment.
Scottish Water (SW)	Scottish Water is a public company that provides public drinking water and sewerage services across Scotland. It is accountable to the public through the Scottish Government.
Semi-natural Woodland	Woodland that does not obviously originate from planting. The distribution of species will generally reflect the variations in the site and the soil. Planted trees must account for less than 30% of the canopy composition
Sites and Monument Record (SMR)	Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments.
Sites of Special Scientific Interest (SSSI)	Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.
Span	The Section of overhead line between two structures.
Special Area of Conservation (SAC)	An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status.
Special Landscape Area (SLA)	Landscapes designated by councils, which are considered to be of regional/local importance for their scenic qualities.
Special Protection Area (SPA)	An area designated under the Wild Birds Directive (Directive74/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981.
Scottish and Southern Electricity Networks Transmission (SSEN Transmission)	The owner, operator and developer of the high voltage electricity transmission system in the north of Scotland and remote islands.
Stakeholders	Organisations and individuals who can affect or are affected by SSEN Transmission works.
Study Area	The area within which the corridor, route and alignment study takes place.
Target Species	Legally protected and notable species of conservation concern.
The National Grid	The electricity transmission network in the Great Britain.
Vantage Point (VP)	A place, especially a high place, that provides a good, clear view of an area.
Volts	The international unit of electric potential and electromotive force.
Water Framework Directive (WFD)	European Community (EC)'s Water Framework Directive, sets out rules to halt deterioration in the status of water bodies and achieve good status for Europe's rivers, lakes and groundwater.
Wayleave	A voluntary agreement entered into between a landowner upon whose land an overhead line is to be constructed and Scottish Hydro Electric Transmission.
Wild Land Area (WLA)	Those areas comprising the greatest and most extensive areas of wild characteristics within Scotland.

1. INTRODUCTION

1.1 Purpose of the Document

This Consultation Document has been prepared by WSP UK Ltd ('WSP') on behalf of Scottish and Southern Electricity Networks Transmission (SSEN Transmission). SSEN Transmission, operating under licence held by Scottish Hydro Electric Transmission plc, owns, operates and develops the high voltage electricity transmission system in the north of Scotland and remote islands. This Consultation Document invites comments from all interested parties on the Potential Alignment identified for the Netherton Hub 400kV OHL Connection to New Deer and Peterhead: Tie-In (herein referred to as 'the Project'). The Project comprises a permanent tie-in of the existing New Deer to Peterhead 400 kV overhead line (OHL) into a new 400 kV substation proposed as part of the Netherton Hub and removal of the associated length of the existing OHL.

This Consultation Document describes the alignment options appraisal undertaken, the alternatives considered during the selection of alignment options and the identification of the Potential Alignment. Comments are now sought from statutory authorities, key stakeholders, elected representatives and the public on the alignment selection process and the Potential Alignment identified.

All comments received will inform further consideration of the Potential Alignment.

The Consultation Document is available online at the Project website:

https://www.ssen-transmission.co.uk/netherton-400kV-OHL-tie-in

1.2 Document Structure

This report is comprised of the following Sections:

1. Introduction – setting out the purpose of the Consultation Document and document structure.
2. The Proposals – describes the need for and description of the proposals, and the typical construction methods.
3. Alignment Selection Process – sets out the alignment selection process and methodology that has been applied to date to derive a Potential Alignment.
4. Alignment Options - provides a description of the alignment options.
5. Comparative Analysis of Alignment Options – summarises the key considerations of each alignment option from an environmental, engineering and economic perspective, and provides a comparative appraisal of each alignment option in order to select a Potential Alignment.
6. Consultation on the Proposals – invites comments on the alignment assessment process and identification of the Potential Alignment.

1.3 Providing Feedback

As part of the consultation exercise, comments are sought from members of the public, statutory consultees and other key stakeholders on the Potential Alignment put forward in this Report.

When providing comments and feedback on this Consultation Document, SSEN Transmission would be grateful for your consideration of the questions below:

- Has the approach taken to select the Potential Alignment been clearly explained?
- Are there any factors, or environmental features, that you believe we may not have already considered during the Potential Alignment selection process?
- Do you have any specific concerns in relation to the Potential Alignment? If so, is there anything we could do to mitigate the impact of this?
- Do you feel, on balance, that the Potential Alignment selected is the most appropriate for further consideration at the Environmental Impact Assessment stage?

- SSEN Transmission's Community Benefit Fund will provide an opportunity for local groups and organisations to apply for community funding. Do you have any suggestions for local community benefits or local initiatives, such as volunteering, that we could support to leave a positive legacy in your area?

Comments on this Consultation Document should be sent to:

Gillian Doig

Community Liaison Manager

SSEN Transmission

E: gillian.doig@sse.com

M: +44 07879 288666

Grampian House, 200 Dunkeld Road, Perth PH1 3GH

All comments are requested by Wednesday 16 April 2025.

1.4 Next Steps

Following conclusion of the consultation phase, a Report on Consultation will be produced which will document the consultations received, and the decisions made in light of these responses. The Proposed Alignment will then be confirmed which will be taken forward into the next stage of the environmental appraisal process.

Section 37 consent under the Electricity Act 1989 will be sought from the Energy Consents Unit of the Scottish Government for the proposed new OHL infrastructure.

2. THE PROPOSALS

2.1 The Need for the Project

Significant volumes of new renewable generation are expected to connect to the SSEN Transmission network, resulting in much greater bulk power transfer requirements on all major SSEN Transmission boundaries.

A strategic hub at Peterhead (herein referred to as 'Netherton Hub') is required for the purpose of establishing a common and coordinated approach to development for the future network reinforcements as identified in the Holistic Network Design (HND) to meet the UK's 2030 net zero targets. This holistic approach to project planning and development was considered necessary to maximise the potential efficiencies which comes from a single coordinated and collocated development site for both Alternating Current (AC) and Direct Current (DC) transmission infrastructure in the region. This collective development will substantially strengthen the local transmission network and support new onshore and offshore connections, such as those created through the Scotwind offshore lease rounds. Furthermore, it will help facilitate the export of future renewable generation from the North of Scotland to demand centres in throughout the UK.

The diversion of the existing New Deer to Peterhead 400 kV OHL into a 400kV AC substation within the Netherton Hub is required to integrate the new substation site into the existing network and maximise the transfer capability between the new Hub substation and the wider transmission network to increase network security.

Further information on SSEN Transmission Pathway to 2030 can be found at the following:

https://www.ssen-transmission.co.uk/projects/2030-projects/2030-need/

2.2 Project Overview

The Project comprises a permanent diversion, referred to as a 'tie-in', of the existing New Deer to Peterhead 400 kV OHL into a new 400 kV AC substation proposed separately as part of the Netherton Hub. The tie-in is split into an 'In' leg, stemming from the existing New Deer – Peterhead OHL to the Hub substation, and an 'Out' leg, connecting the substation back out to the existing OHL.

The Project sits adjacent to a second connection considered in parallel to this one, comprising a connection from the Netherton Hub directly to the existing Peterhead Substation, referred to as the Netherton Hub 400kV OHL Connection to New Deer and Peterhead: Rebuild (hereafter referred to as 'the Rebuild').

This Consultation Report details the Tie-In portion of the OHL and makes reference to the Rebuild where relevant. For details on the Rebuild portion of the OHL, please see the Rebuild Consultation Report (*Netherton Hub 400kV OHL Connection to New Deer and Peterhead: Rebuild*). An overview of the Project is shown on **Figure 1: Site Location**, and comprises the following elements:

- diversion of the existing 400 kV OHL from a point between approximately 6.1 km and 8.6 km west of the Peterhead Substation into Netherton Hub via a new 400 kV OHL between approximately 1.6 – 3.3 km in length;
- connection from Netherton Hub back out to a point on the existing OHL approximately 5.0 km west of Peterhead Substation via a new 400 kV OHL approximately 2.0 km in length;
- removal of approximately 1.1 – 3.7 km of existing OHL between the diversion points into and out of Netherton Hub; and
- installation of a temporary OHL circuit to facilitate the transfer of the connection between the existing OHL and Netherton Hub.

The Proposed Development would likely comprise steel lattice towers from the SSEN Transmission ASTI SSE400 tower suite. The typical height for the ASTI SSE400 tower suite is approximately 57 m, with a maximum standard height of up to 70 m.

The size of towers and span lengths is generally dependent on three main factors: altitude; weather; and the topography of the route. Towers are typically closer together at high altitudes to withstand the effects of greater exposure to high winds, ice and other weather events. Higher towers may be required in certain locations to maintain the required ground clearance heights, such as at road, river and rail crossings.

The proposed steel lattice towers would support six conductor bundles (2-3 wires per bundle) on six cross-arms (three on each side) and an earth wire between the peaks. Typical tower designs can be seen in **Plate 2.1**[1].

Plate 2.1 – Existing SSE400 steel lattice tower design

2.3 Construction Activities

The main construction elements associated with the Project are anticipated to include:

- establishment of temporary construction compound(s);
- establishment of permanent stoned access to areas identified as requiring operational access;
- establishment of temporary construction access to areas where permanent access is not operationally required;
- establishment of suitable laydown areas for materials and working areas for tower foundations and erection equipment;
- delivery of components and materials to site;
- undergrounding of any distribution OHLs that cross or are in close proximity to the alignment;
- construction of approximately 3.6 – 5.3 km of new double circuit OHL;
- dismantling of approximately 1.1 – 3.7 km of redundant section of the existing New Deer to Peterhead double circuit OHL;
- remedial works would be carried out to reinstate the immediate vicinity, and any ground disturbed to pre-existing condition; and
- inspections and commissioning.

All construction activities will be undertaken in accordance with a Construction Environmental Management Plan (CEMP) which will define specific methods for environmental survey, monitoring and management throughout construction. A CEMP will be produced by the contractor and agreed with statutory stakeholders prior to the commencement of construction.

2.4 Programme

It is anticipated that construction of the potential OHL would take place over a 24-month period, although detailed programming of works would be the responsibility of the Principal Contractor in agreement with SSEN Transmission.

[1] The existing SSE400 tower suite design is currently being modified to provide stronger tower structures. The final tower design and appearance may differ slightly from the existing SSE 400 tower suite shown in Plate 2.1.

Subject to gaining the necessary consents, it is anticipated that construction would commence in 2027, with an estimated completion date in 2029.

3. ALIGNMENT SELECTION PROCESS

3.1 Introduction

The approach to alignment selection has been informed by SSEN Transmission's guidance 'Procedures for Routeing OHLs and Underground Cables of 132 kV and above'[2]. This guidance considers within it the Holford Rules[3], which sets out a hierarchical approach to routeing which advocates avoiding areas of high amenity value, minimises changes in direction, and takes advantage of topography to minimise visual interaction with other transmission infrastructure.

The guidance document sets out SSEN Transmission's approach to selecting a corridor, route or alignment for an OHL. This document helps SSEN Transmission to meet its obligations under Schedule 9 of the Electricity Act 1989, which requires transmission license holders:

- to have a 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 interests; and
- to do what they reasonably can to mitigate any effect that the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

The guidance develops a process which aims to balance these environmental considerations with technical and economic considerations throughout the Project.

The guidance splits a Project into the following key stages:

- Stage 0: Routeing Strategy Development;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection;
- Stage 3: Alignment Selection; and
- Stage 4: Environmental Impact Assessment (EIA) and consenting.

The stages that are carried out can vary depending on the type, nature of and size of a project and consultation is usually carried out at each applicable stage of the process.

The Project has assessed from Stage 3: Alignment Selection due to the relatively short lengths of the diversions and number of nearby planned, approved and constructed OHLs, there would be little to no difference between route options, which are typically 1 km in width. Instead, the Project has taken a hybrid approach between the higher-level Red-Amber-Green constraints appraisal normally conducted for route options (see further details in **Section 3.2**) and a more detailed comparative alignment options appraisal, both of which are presented in the Appendices to this Report.

The project is effectively at Stage 3 Alignment Selection.

This study has involved the following four key tasks:

- identification of the baseline situation;
- identification of alternative alignment options;
- environmental analysis of alignment options; and
- identification of a Potential Alignment.

3.2 Methodology

3.2.1 Area of Search

The extent of the area of search, hereafter referred to as the study area, has been defined by the existing New Deer - Peterhead OHL and the area between the OHL and the Netherton Hub , with the aim of minimising the length of

[2] SSEN Transmission (September 2020). Procedures for Routeing Overhead Lines and Underground Cables of 132 kV and above. Revision 2.

[3] Holford Rules: Guidelines for the Routeing of New High Voltage Overhead Transmission Lines with NGC 1992 and SHETL 2003 Notes.

existing OHL to be replaced, on balance with other environmental and engineering factors. **Figure 1: Site Location** illustrates the locations of these elements, within the bounds of which alignment options were defined.

3.2.2 Baseline Conditions

A series of desk-based studies have been undertaken to identify a broad range of potential constraints and opportunities within the study area, which may be constraints to alignment options. This has involved the following activities:

- identification of environmental designated sites and other constraints, utilising GIS datasets available via NatureScot Site Link;
- identification of archaeological designations and other recorded sites, utilising GIS datasets available via Historic Environment Scotland Data Services and Local Historic Environment Teams;
- review of SEPA interactive Flood Risk Mapping;
- review of relevant Local Development Plans to identify further environmental constraints and opportunities, such as regional level designations or other locations important to the public;
- review of landscape character assessments of relevance to the study area;
- review of Ordnance Survey (OS) mapping (1:50,000 and 1:25,000 and online GIS data sources from OS OpenData) and aerial photography (where available) to identify other potential constraints such as settlement, properties, walking routes, cycling routes etc.;
- extrapolation of OS Vectormap GIS data to identify further environmental constraints including locations of watercourses and waterbodies, roads classifications and degree of slope;
- review of other local information through online and published media such as tourism sites and walking routes;
- identification of existing OHL transmission infrastructure, roads and railway lines within the study area;
- identification of existing and proposed windfarm developments and other third-party infrastructure within the study area;
- review of existing terrain, soil and ground conditions;
- landscape and ecology site visits and surveys;
- review of ecological data received from relevant bodies; and
- review of public and private water supply data from local authorities and Scottish Water.

3.2.3 Alignment Options Identification and Selection Methods

The following tasks have been undertaken in identifying and analysing Alignment Options:

- Desk-based review of initial alignment options presented by the engineering consultant. Comments and alternative alignment options were provided for discussion and further review.
- Site visits by the project landscape specialist, project ecology team, and SSEN Transmission to review the alignments on site and review environmental and technical considerations, particularly cumulative considerations.
- Ornithology surveys were undertaken to inform the alignment options and comprised Flight Activity Surveys (from one vantage point).
- Workshops held with SSEN Transmission and engineering consultants to review preliminary and final alignment options and suggested alternatives.
- Follow up workshops with SSEN Transmission, and the engineering, environmental and land consultants to further discuss alignment options and agree on a Potential Alignment.

Considerations for alignment options included a review of the steps outlined in the Holford Rules and SSEN Transmission's Routeing Guidance. In summary the following has been considered as far as is practicable at this Alignment Selection stage:

- Avoid if possible major areas of highest amenity value (including those covered by national and international designations and other sensitive landscapes) (Holford Rule 1).
- Other things being equal, try to avoid sharp changes of direction and reduce the number of larger angle towers required (Holford Rule 3).
- Avoid skylining the alignment in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity (Holford Rule 4).
- Consider construction access and the availability of existing roads and tracks.
- Consider the appearance of other lines in the landscape to avoid a dominating or confusing wirescape effect.
- Consider technical issues related to crossing the existing OHL alignment, clearances, connectivity, outages, maintenance and faults.

Applying these principles, Alignment Options were identified for further assessment. The Alignment Options are shown on **Figure 1: Site Location** and described in **Section 4** of this Report.

3.2.4 Appraisal Method

At construction stage, to account for the likelihood of minor changes in the alignment following EIA and design stages, a buffer is included either side of the alignment, referred to as a Limit of Deviation (LOD). For this appraisal, where appropriate, a 100 m LOD has been assumed to account for features which have been identified in close proximity to the centreline of each option, such as consideration of Private Water Supplies (PWS).

Environmental Criteria

A series of appraisals were carried out by experienced professionally qualified individuals in the various specialist fields to enable an informed combined opinion on how the potential environmental effects identified during the baseline studies could influence the alignment options. Appraisal of alignment options has involved systematic consideration against the following environmental topic areas:

- Natural Heritage – designations, protected species, habitats, ornithology, hydrology, geology and hydrogeology;
- Cultural Heritage – designations and cultural heritage assets;
- Landscape and Visual – designations, landscape character and visual amenity;
- Land Use – agriculture, forestry and recreation; and
- Planning Proposals[4].

The following should be noted:

- The topic 'Proximity to Dwellings – residential properties and other sensitive receptors' is covered within the engineering criteria 'Proximity';
- 'Habitat' types have been defined in relevant UK Habitat Classification (UKHab primary habitats[5]). For peatland, peatland classes as shown the Carbon and Peatland map (2016) are also referenced. For woodland, the categories assigned to areas noted on the Ancient Woodland Inventory (AWI) are also referenced, where relevant. Woodland definitions may therefore differ from those used within the 'Forestry' Section descriptions.
- For the Biodiversity Net Gain (BNG) assessment, in the absence of field data at this stage, condition was assumed to be moderate for all habitats. Blanket bog habitats were identified using the Peatland Classification of Scotland[6] and the HABMoS data[7]. Only peatland Class 1 and 2 were taken forward as blanket bog. Again, this habitat was assumed to be of 'Moderate' condition. Connectivity followed the simplified SSEN Transmission Guidance, where habitats of 'High' were assigned 'Medium' connectivity. Online available resources were used where possible to assign strategic significance, which relates the mention of the relevant habitats within the local plans. i.e. Local Biodiversity Action Plans (LBAPs). In the absence of an interactive map of the relevant local plans

[4] Planning proposal search was last carried out in September 2024

[5] UK Habitat Classifications. Available at: HM_Data Sheet_UKHab Classifications_A4 Landscape.pdf (habitat-matters.com)

[6] Peatland Classification of Scotland. Available at: https://map.environment.gov.scot/Soil_maps/?layer=10

[7] Habitat Map of Scotland. Available at: https://opendata.nature.scot/datasets/habitat-map-of-scotland/explore

allowing identification of sites of local conservation interest in the Aberdeenshire Council area, strategic significance was set at 'Moderate' to adopt a precautionary approach.

Engineering Criteria

Appraisal of alignment options has involved systematic consideration against the following engineering topic areas:

- Infrastructure crossings – major OHL crossings, road crossings, railways, rivers/lochs and navigable waterways.
- Environmental Design – elevation, atmospheric pollution, contaminated land and flooding.
- Ground Conditions – terrain.
- Construction/ Maintenance – access.
- Proximity – residential properties, windfarms, communication masts, urban environments and metallic pipelines.

Economic Criteria

Appraisal of alignment options has involved systematic consideration against the following economic topic areas:

- Capital Costs – construction, diversions, public road improvements, tree felling and land assembly; and
- Operational Costs – inspections and maintenance.

Comparative Appraisal

To identify the alignment which achieves the best balance between the technical, environmental and cost considerations, a series of multi-disciplinary workshops were held which focused on differences between the alignment options and ways of avoiding or minimising the interaction with a constraint.

This was aided by a by the use of a Red-Amber-Green (RAG) approach similar to that undertaken at the route selection stage. The rating is based on a four-point scale as follows:

Performance	Comparative Appraisal	
Most Preferred  Least Preferred	No Impact	Negligible, or no potential effects
	Lower Impact	Potentially minor effects, with little or no requirement for mitigation
	Moderate Impact	Potentially moderate effects subsequent to appropriate mitigation
	Higher Impact	Potentially major effects which may be difficult to mitigate

However, at the alignment stage the RAG ratings are often similar and differences not as apparent from using this tool. As such, a hybrid approach was used for assessment of the alignment options for the Project, using RAG ratings as the basis and then carrying out more detailed comparative appraisal, where relevant.

Using the terminology of SSEN Transmission's Routeing Guidance, the following definitions have been used:

Effect – the direct or indirect physical consequence(s) of the alignment option on receptors, under each of the various topic headings.

Level of Impact – the outcome of a comparative appraisal of the combination of effects within a specific topic along a specific route option after a consideration of the potential for mitigation, using professional judgement based on experience.

Cumulative Appraisal

In addition to the standard approach outlined above, the environmental appraisal for the Project included additional cumulative considerations.

The 'In' alignment options of the Tie-In are in close proximity to the separately proposed Beauly to Peterhead (B2P) OHL connection, with one of the options running in parallel. Each topic has therefore appraised the 'In' options in combination with the B2P line, alongside the individual appraisals.

The landscape and visual appraisals take this further due to the varying possible combinations of connections into and out of the Netherton Hub within an area containing several existing OHLs. Each landscape and visual appraisal considers six combinations (comprising three Tie-In 'In' alignments and two Tie-In 'Out' alignments) and appraises these cumulatively with the B2P OHL and the Potential Alignment identified for the Rebuild connection (namely Alignment R2).

3.2.5 Identification of a Potential Alignment

The overall objective throughout the appraisal of alignment options is to take full consideration of all environmental, engineering and cost factors to determine the most appropriate design to use for the development. Alignment options have been considered in combination to arrive at a Potential Alignment for the Project. The Potential Alignment presents the outcome of the initial appraisal, before consultation, of environmental, technical, and cost constraints. It is the alignment considered to be the best balance of the constraints identified.

3.2.6 Identification of a Proposed Alignment

Following the consultation period, the consultation feedback and SSEN Transmission responses to the feedback will be reported in a Report on Consultation document which will be made publicly available. Its purpose is to record the stakeholder feedback received during the consultation process; explain how SSEN Transmission has responded, and how it has informed the selection of the Proposed Alignment. If the consultation does not feed into the Project design this will also be incorporated into the Report on Consultation, with an explanation provided.

The Potential Alignment will be subject to further review after consultation to ensure feedback is considered fully before a Proposed Alignment is identified and taken forward to detailed design and section 37 consent application.

4. ALIGNMENT OPTIONS

As the Project is formed of two sections of OHL, the following terminology is used from this point onwards:

- In: Alignments stemming off of the existing OHL and entering the Netherton Hub substation from the west or south.
- Out: Alignments exiting the Netherton Hub substation from the south to rejoin the existing OHL.

The alignment options are shown on **Figure 1: Site Location**.

4.1 In Alignments

4.1.1 Alignment T1A

Alignment T1A stems off the existing OHL nearby tower 65 in the section between tension towers 62 and 70. The alignment travels north east for approximately 1.9 km, then heads eastward for a further 1.4 km, approximately, before reaching the Netherton Hub substation and connecting in from the west side.

This alignment observes the preferred 170 m separation from most residential properties, infringing on this only on the last segment into Netherton Hub substation. Woodland loss would be minimal along the alignment with only minor clearing potentially required south west of the Netherton Hub. No records of peatland or poor ground condition were identified along this alignment. All angle towers appear to be accessible for pulling positions during construction. This option avoids known areas of peatland habitat and flood risk.

This alignment option runs parallel to the Proposed Beauly to Peterhead (B2P) alignment, which also connects into the Netherton Hub, with an approximate separation of 80 m.

4.1.2 Alignment T1B

Alignment T1B stems off the existing OHL nearby tower 67 in the section between tension towers 62 and 70. The alignment travels generally north east for approximately 2.4 km, before taking a turn to the north for the last 0.1 km and connecting into the Netherton Hub substation from the south side.

This option heads more or less directly towards the southern side of the Netherton Hub substation with one defined angle change immediately to the south. One very slight angle change is proposed near the centre of the alignment to observe separation distance from residential properties. As the line stems off the existing OHL it passes over a small hill, however the elevation changes are only in the region of 15 m and therefore not overly significant. A small block of woodland is present south of the Netherton substation, near this alignment, however it may be possible to microsite tower positions to prevent the need for any felling in this area. This option avoids known areas of peatland habitat and flood risk.

4.1.3 Alignment T1C

Alignment T1C stems off the existing OHL nearby tower 73 in the section between tension towers 70 and 77. The alignment travels north east for approximately 0.6 km, then turns north-north west to travel the remaining 1.0 km (approximately) into the Netherton Hub substation from the south side. This option may be challenging for a temporary diversion whilst a new tower is constructed to replace T73 as residential properties are present to the south of the existing OHL.

This option represents the shortest connection across very gradual terrain, and the current centreline observes the preferred separation from residential properties. This option passes the same woodland block as Alignment T1B, but travels closer and may require some woodland removal to ensure appropriate wayleaves for the OHL. No areas of poor ground conditions or flood risk were identified beneath this alignment option.

4.2 Out Alignments

Both of the Out alignments leave the Netherton Hub substation from the south side.

4.2.1 Alignment T2A

Alignment T2A is connects from the south boundary of the Netherton Hub substation to a point on the existing OHL close to Tower 76. It heads south east from the substation, with a slight angle at the approximate halfway point of its 2.0 km length.

Option T2A breaks into the existing OHL in the section between tension towers 70 and 77. This allows for a temporary diversion off towers 77 and 75 whilst a new tension tower is constructed in place of Tower 76. A section of woodland may be impacted by this temporary diversion.

The alignment comes within 100 m to some industrial sheds and what appears to be remains of a building. Depending on the separation requirement from this building it could be possible to maintain 170 m from all residential buildings however based on the current alignment the buffer of one property is slightly infringed. The ground is relatively level posing no construction challenges with space at the angle locations for conductor pulling.

4.2.2 Alignment T2B

This alignment option leaves the Netherton Hub substation from the same point as T2A, and also meets the existing OHL at the same point. It differs by taking a slightly more easterly heading before angling south to the existing OHL, and has a total length of approximately 2.0 km.

As per alignment option T2A, this option would allow for a temporary diversion to the south during construction of the new tower.

This alignment observes a minimum of 170m separation from all residential properties and passes over generally rolling terrain so poses no construction challenges. Space is available at the angles for pulling positions.

5. COMPARATIVE ANALYSIS OF ALIGNMENT OPTIONS

5.1 Introduction

The following is a summary of the key considerations of each alignment option from environmental, engineering and economic perspectives, and provides a comparative appraisal of each of the In and Out alignment option in order to select an overall Potential Alignment for each. The following figures accompany the text in this section and illustrate potential environmental baseline constraints identified under each topic.

- **Figure 2: Natural Heritage**
- **Figure 3: Cultural Heritage**
- **Figure 4: Landscape and Visual**
- **Figure 5: Land Use**

For cumulative context, **Figure 6: Cumulative Figure** displays other nearby developments associated with the Netherton Hub.

Appendices 1.1 – 1.3 and **2.1 – 2.3** provide more detail on individual alignment option considerations for each topic as listed in **Section 3**.

Where topics are not mentioned specifically within the text, there is no notable preference between the alignment options. This does not mean that there are no potential impacts relating to that topic, but that the topic does not differentiate between the options sufficiently to have a bearing on the alignment option choice.

5.2 In Alignments

5.2.1 Environment

Considered in isolation, there is no obvious preference between options in relation to protected species; however, when considered in combination with the B2P alignment, Alignment T1A would be preferred as construction of the two OHLs in parallel may reduce the number of access routes and construction zones that may present barriers to terrestrial species. Habitats are broadly similar across the three options, and there are unlikely to be Annex 1 habitats present, but there is a clear preference for Alignment T1C in terms of biodiversity net gain (BNG) due to having the lowest biodiversity unit (BU) value and BU/ha, likely due to being the shortest connection. For ornithology, constraints are similar for all options, but there is a slightly lower preference for Alignment T1A due to potential disturbance or displacement of barn owl, and more so in combination with B2P due to increased disturbance by both projects.

In consideration of hydrology and hydrogeology, the three options are broadly comparable and moderately constrained by surface water or groundwater; however, Alignment T1A is less preferred due to the presence of private water supplies (PWS) within the likely LOD, and this remains the case when considered in combination with B2P.

There is limited presence of cultural heritage features in the vicinity of the three options. Alignment T1B is preferred as it is further from the Scheduled Monument of Cairn Catto Cairn than T1C and no SMR entries have been identified within the likely LOD. It is also the furthest from any identified listed buildings. It is recognised that there is potential for unknown archaeological remains to exist within each alignment option.

All of the tie-in and rebuild options are sufficiently far from landscape designations that there is no risk of cumulative impact. All cumulative options were therefore given a Green rating, with not obvious preference identified.

Alignment T1A running close parallel to the B2P alignment follows the Holford Rules to the greatest degree, with both OHLs aligned with the grain of the landscape as far as reasonably possible. This would have less of a cumulative effect on the landscape than either Alignment T1B plus B2P or Alignment T1C plus B2P.

The presence of transmission lines is recognised as characteristic of the wider landscape character type and this is very much the case just south of Peterhead, but they do not characterise the landscape locally to the Netherton Hub. All cumulative options risk adversely affecting the local landscape character so are given an Amber rating. However,

Alignment T1A aligned closely parallel with B2P, in combination with alignments T2A or T2B, would create two distinct separate OHL corridors: one approaching Netherton Hub from the west, and one from the south east. By comparison, either Alignment T1B or Alignment T1C plus B2P risks creating a wirescape around the Netherton Hub. Alignment T1A has the added benefit of removal of the greatest number of existing towers on the New Deer OHL on higher ground land, further reducing the risk of creating a wirescape. Alignment T1C offers less opportunity for tower removal of the existing line and would have several bulky angle towers.

Similarly to landscape character, Alignment T1A running close parallel to B2P alignment would have less of a cumulative visual amenity effect than either Alignment T1B or Alignment T1C plus B2P. It would concentrate visual amenity effects in one corridor whereas either Alignment T1B or Alignment T1C plus B2P would affect receptors over a wider area and cause a group of receptors from Mains of Kinmundy to Hillhead Dairy to be 'boxed in' by OHLs. When considered cumulatively with the rebuild options, Alignment T1A, B2P and either of Alignment T2A or T2B offer the best overall solution from a visual amenity perspective.

Alignments T1A and T1B both pass through Land Capability for Agriculture (LCA) of Class 3.1, and are more constrained than Alignment T1C which passes through only Class 3.2 agricultural land, which has a lower productivity value, making it the preferred option in the agriculture category. There is very limited potential for any of the options to impact upon commercial forestry; however, Alignment T1A is the slight preference as the only parcel forestry it passes through does not appear to be commercial. It is highlighted that, in combination with the B2P OHL, a greater overall area of woodland removal would be required than the other two options. None of the options are considered to be constrained by recreational land uses.

All options broadly accord with national and local planning policies. Alignment T1A is the slight preference in this regard as Alignments T1B and T1C have greater potential to contribute to a 'wirescape' when considering cumulative landscape and visual impacts and are thus less aligned with the Local Development Plan (LDP) policy E2. There is no obvious preference in consideration of third-party planning applications.

Primarily on landscape and visual grounds, Alignment T1A is the overall environmental preference, due to its better alignment with the Holford Rules and lower potential for cumulative visual impacts. It is recognised that this is the less favoured option in consideration of natural heritage topics when considering constraints presented by habitats, protected species and PWS, but on balance these are considered less significant constraints than landscape and visual amenity considerations.

5.2.2 Engineering

None of the alignment options have Red constraint ratings applied for any of the engineering assessment categories, therefore the differences between them are quite marginal.

All alignments are situated within 10 km of the coast resulting in an Amber rating and this is unavoidable given the location of the Netherton Hub substation. Similarly, all options were rated Amber for clearance distance to residential properties. There are however some considerations to make relating to this.

Alignment T1A encroaches within one 100 m residential buffer and one 170 m residential buffer, relating to properties at Netherton Farm and Invereddie House, respectively. The 100 m buffer encroachment is not considered to represent a constraint as the property is being removed as part of the Netherton Hub substation development. The second property, which the alignment encroaches within 170 m of, may not be removed and therefore should be considered a constraint to this option. Alignment T1B impacts on two possible 170 m property buffers near its midpoint. This is a distinct pinch point along the alignment which would be unavoidable. Alignment T1C impacts on one 170 m property buffer at Upper Savoch Croft; the property is currently in close proximity to the existing line and this option would, in effect, move the tower further from the property so could be seen as an advantage. In addition to this, it may also be possible to adjust the alignment to keep it outwith the 170 m buffer. Therefore, from a clearance perspective, Alignment T1C is preferable as it may be possible to keep further than 170 m and a new OHL is not being introduced into an area where there currently isn't one.

Similar to above, both Alignment T1A and Alignment T1B are rated Amber in terms of urban developments. This is due to both these options being situated closer to larger groups of properties at the Mains of Kinmundy and Nether Kinmundy, whereas Alignment T1C remains further away from these areas.

The final differing categories between the options concern route length and number of Distribution Network Operator (DNO) crossings. Alignment T1A is over double the length of Alignment T1C which would result in additional cost. Alignment T1B's length sits between the two options. Alignment T1C is the shortest; however, as mentioned within the report all options are relatively short so the difference between the longest and shortest is only in the region of six spans.

In relation to DNO crossings, Alignment T1A has a significantly greater number when compared to alignments T1B and T1C. This is partly due to the longer length but also appears to pass through an area with significant distribution infrastructure leading to the surrounding properties. It is therefore not optimal from that perspective. In addition to this, Alignment T1B, although rated Green, also crosses the 33 kV DNO network whereas T1C only crosses the 11 kV network, and thus would involve a lower associated cost.

Therefore, based upon on the RAG ratings developed in accordance with the methodology given in PR-NET-ENV-501 and the additional reasoning provided above, Alignment T1C is least constrained and represents the engineering preference for the Tie-In alignments.

In addition to the previous points, several other considerations also need to be made. As the Netherton Hub substation is a new development, the exact entry points and gantry positions are yet to be confirmed. Based on initial layouts there is adequate space to approach the substation from either the south or the west. However, there is only one spare pair of gantries to the west as the new 400 kV double circuit from the separate New Deer 2 development is entering the site from this side taking up two of the bays. This offers a potential advantage for Alignment T1A as there is an opportunity to parallel with the New Deer 2 OHL which may provide both visual and access benefits.

There is also a new High Voltage Direct Current (HVDC) connection into the site to be considered; however, coordination with the HVDC team should result in a crossing of the cable as close to 90 degrees as possible reducing any possible interaction.

5.2.3 Economic

From a Capital cost perspective, Alignment T1C is preferred. T1C is the most direct alignment into the substation and therefore the cheapest. Alignment T1B has a cost between 120 – 140% of T1C, and thus is Amber rated. Alignment T1A as the longest of the three options has the highest associated costs at over 140% of Alignment T1C, owing to additional construction requirements including a greater number of towers and conductors, making this the least preferred option.

5.2.4 Multi-Disciplinary Appraisal

To summarise, the environmental appraisal identified Alignment T1A as the overall preference, while the engineering and economic appraisals identified Alignment T1C as the overall preference.

It is noted that the differences between the options from an engineering perspective are marginal. While the economic appraisal clearly distinguishes a preference, this is mostly based on length, and the three options are relatively short. Consequently, the differences are, again, considered to be marginal.

As such, greatest weight is given to the outcomes of the environmental appraisal and, on balance, Alignment T1A is considered to be the overall Potential Alignment for the Tie-In options on the basis of its better alignment with the Holford Rules and lower potential for cumulative visual impacts, which are considered to be a key consideration for this development.

5.3 Out Alignments

5.3.1 Environment

There is little to differentiate between the two alignment options in relation to ecology. Both are similarly constrained by natural heritage designations, protected species and habitats, with no Annex 1 habitats identified for the latter appraisal. For BNG, there is a slight difference in Alignment T2A having a lower total BU value, but slightly higher BU/ha, but not do a sufficient degree to identify a clear preference. Ornithology similarly displays no clear preference, as constraints are very similar for both options.

There is a slight preference for Alignment T2A in hydrogeological terms as one fewer PWS has been identified within proximity of the option but is otherwise similar in degree of constraint as Alignment T2B in regards to the number of nearby PWS, lack of any registered abstractions in proximity, and being situated outwith DWPA designations.

The main designated cultural heritage features nearby include the Cairn Catto Long Cairn, which is 1.7 km south of both alignment options. Neither option is considered likely to significantly affect designated sites. Alignment T2A is slightly preferred as T2B contains a Scheduled Monument Record (SMR), comprising a post-medieval house that is no longer extant.

Both rebuild options are sufficiently far from landscape designations that there is no risk of cumulative impact. They were therefore given a Green rating, with not obvious preference identified.

Alignments T2A and T2B lie on high ground, and both pass through a similar landscape character with overhead lines present as existing features in the locality. Both alignments are given an Amber rating as the potential impact on the local characteristic features would be the same with minimal tree felling. In relation to the cumulative landscape impact, T2A is the preferred option aligned with T1A or T1C as this creates two distinctive corridors of overhead lines entering the Hub.

In terms of visual considerations, Alignment Option T2A is preferred as it lies further from nearby residential properties at Toddlehills with fewer visual receptors affected. In relation to the cumulative comparison, Alignment T2A with T1A, B2P and R2 is the preferred arrangement as is T2A located at a greater distance from the sensitive residential receptors and users of local highways and consequently visual effects would be less. In addition, this arrangement has the potential to create two distinct corridors of overhead lines creating a neater solution thereby reducing potential wirescape effects.

Alignment T2A avoids LCA of Class 3.1 or higher and is generally unconstrained by agricultural land uses. Alignment T2B avoids but is situated in close proximity to Class 3.1 land, and thus considered the less preferred option. Both options avoid areas of forestry, although some individual roadside trees or vegetation may require removal for construction. Neither alignment option is considered to be constrained by recreational land uses.

Both options broadly accord with national and local planning policies with no clear preference in policy terms. There is also no obvious preference in consideration of third-party planning applications.

As the two alignment options are both relatively short and close to each other, they are broadly similar in degree of environmental constraints. Largely on landscape and visual grounds, and to a lesser degree on the basis of the hydrogeology and cultural heritage appraisals, Alignment T2A is the overall environmental preference. This is due to creation of a more distinct arrangement of OHLs into infrastructure corridors and reduced associated potential for adverse landscape and visual impacts. T2A is also slightly less constrained by PWS and avoids any SMR records.

5.3.2 Engineering

As per the In alignments, no Red RAG ratings have been applied to the Out alignments for any engineering topics, indicating a moderate to low degree of constraint overall. In many instances the levels of constraint for both alignments are comparable the given appraisal topics, given their similar length and location. The following text identifies where there are notable differences between constraints.

In regard to major crossings, both options are similarly rated as Amber; they cross the same service lines and are considered comparable in terms of constraint. Although the preference is to avoid pipeline crossings and parallelism where possible, due to the location of the substation this is unavoidable and therefore both options are considered equal for this factor.

For proximity to buildings option T2A infringes upon a 170m residential property buffer, associated with a private hire taxi business, and is within 100m of a historic property buffer, which appears to be abandoned farm sheds from the aerial imagery, whereas option T2B maintains 170m separation from all residential buildings. Option T2A has therefore been designated Amber and T2B Green. It may be possible for Alignment T2A to be adjusted to observe the 170m offset from the property; however, it would result in the alignment moving closer to the historic property buffer. If this does not need to be classed as a possible future development, then the alignment could move slightly closer as long as the operational corridor can be secured.

Alignment option T2B is considered less preferable for communication masts, urban development and DNO crossings, having been assigned Amber constraints as whereas T2A has been allocated Green ratings for these topics. While alignment T2B is further than 170m from residential properties, it has been designated Amber for urban developments due to running parallel with a road to the east that is lined with a large number of properties at Toddlehills, whereas T2A observes further separation from these. For communication links, T2B crosses a fixed link registered to BT at two locations. The alignment is approximately 2.5 km from the transmitter/receiver and thus considered unlikely to cause notable issues, assuming no towers are located directly within the link, however the transmitter is within a Ministry of Defence (MOD) area and therefore further clarification may be required to ensure that this would not be considered a significant issue.

The final factor that differs between the two alignment options is the number of DNO crossings. Alignment T2B has a greater number of crossings (four 11 kV lines) whereas alignment T2A only crosses two. This is not considered to be a significant difference, but the associated increased costs and planning requirements make T2B less preferable.

Based on the factors above, Alignment T2A is deemed to be less constrained in technical terms, and thus the overall preference in engineering terms.

5.3.3 Economic

From a Capital cost perspective, both alignments have similar lengths and therefore similar costs, and both are rated as Green levels of constraint. As alignment T2B is the slightly longer of the two options and therefore has a marginally higher associated construction cost, Alignment T2A is the preferred option from a capital costs perspective.

5.3.4 Multi-Disciplinary Appraisal

To summarise, the environmental, engineering and economic appraisals have all identified Alignment T2A as the overall preference. Given that the two Out alignment options are very similar in terms of length and location, constraints are broadly similar across all topics; however, certain key considerations, particularly in relation to landscape and visual constraints and some technical aspects, result in Alignment T2A consistently identified as the preferred option.

5.4 Potential Alignment

Following on from the comparative analysis carried out in Section 5, the Potential Alignment can be seen on **Figure 7: Potential Alignment** and comprises the following alignment options:

- Alignment T1A
- Alignment T2A

6. CONSULTATION ON THE PROPOSALS

SSEN Transmission places great importance on, and is committed to, consultation and engagement with all parties, or stakeholders, likely to have an interest in proposals for new projects such as this. Stakeholder consultation and engagement is an essential part of an effective development process.

6.1 Questions for Consideration by Consultees

When providing your comments and feedback, SSEN Transmission would be grateful for your consideration of the questions below:

- Has the approach taken to select the Potential Alignment been clearly explained?
- Are there any factors, or environmental features, that you believe we may not have already considered during the Potential Alignment selection process?
- Do you have any specific concerns in relation to the Potential Alignment? If so, is there anything we could do to mitigate the impact of this?
- Do you feel, on balance, that the Potential Alignment selected is the most appropriate for further consideration at the Environmental Impact Assessment stage?
- SSEN Transmission's Community Benefit Fund will provide an opportunity for local groups and organisations to apply for community funding. Do you have any suggestions for local community benefits or local initiatives, such as volunteering, that we could support to leave a positive legacy in your area?

6.2 Next Steps

The responses received from the consultation events, and those sought from statutory consultees and other key stakeholders, will inform further consideration of the alignments put forward, and the confirmation of the Proposed Alignment to take forward to EIA.

All comments are requested by **Wednesday 16 April 2025**. A Report on Consultation will be published after the consultation period has ended, which will document the consultation responses received, and the decisions made in light of these responses.

Submission of the Section 37 application is expected to take place in Q3 2025.

APPENDIX 1.1: TIE-IN ALIGNMENT APPRAISAL DETAIL - ENVIRONMENTAL

1.1. Natural Heritage

1.1.1. *Designations*

Designated sites for Natural Heritage have been identified within the following study areas to account for potential connectivity between designated sites, their qualifying interests, and the alignment options.

- International or European designations e.g., Special areas of Conservation (SAC), Special Protection Areas (SPA), Wetlands of International Importance (Ramsar sites) – 10 km, extended to 20 km for SPA designated for greylag goose and pink-footed goose.
- National designations e.g., Sites of Special Scientific Interest (SSSI), National Parks, National Nature Reserves – 2 km.
- Regional designations e.g., Local Nature Reserves, Local Nature Conservation Sites, Wildlife Sites – 1 km.
- Ancient Woodland (identified from a review of the Ancient Woodland Inventory, Native Woodland Survey of Scotland, 1st Edition maps, and any available site-specific field data) – within the option or appears connected.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	International or European designations: Buchan Ness to Collieston Coast SPA is located between approx. 5.5 – 9.0 km southeast of the Alignments and is designated for breeding fulmar, guillemot, herring gull, kittiwake, shag and seabird assemblage. These species are reliant upon the coastal habitat within and connected to the SPA, and the land associated with each Alignment (arable, >5 km inland) would not represent supporting or functionally linked habitat. Similarly, Buchan Ness to Collieston SAC is located approx. 5.5 – 9.0 km from the Alignments and is designated for vegetated sea cliffs which are not connected / functionally linked to the habitat along the Alignment options. Loch of Strathbeg SPA and Ramsar (approx. 12 km north of the Alignments), and Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar (approx. 12.5 km south of the Alignments) qualifying interest include pink-footed goose. The arable farmland within and surrounding the footprint of the alignment options potentially provides suitable foraging habitat for pink-footed goose and is within the foraging range of qualifying populations from the two designated sites based on studies[8]. Therefore, there is potential for effects from the Project on qualifying populations of pink-footed geese through disturbance and displacement during construction and collision risk during operation. National designations: none (Hill of Longhaven SSSI is designated for geological interests is approx. 1.5 km south east of options T2A, and T2B). Regional designations: none. Ancient Woodland: none.
Alignment T1B	A	
Alignment T1C	A	

[8] Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.

Alignment Option	RAG	Alignment Comparison Notes
		Based on the potential effects to qualifying populations of pink-footed geese highlighted above, all the alignment options are given an Amber rating. There is little to differentiate between them considering the extent of suitable foraging habitat for geese incorporating the alignment options and the wider area and considering the mobile nature of the species involved.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	A	There is no change in RAG rating when considering each alongside B2P alignment.
T1B + B2P	A	
T1C + B2P	A	

Further Assessment:

There is no alignment option preference for this topic. Considering the addition of Alignment T1A + B2P OHL, there are no significant differences to the other options. These two OHL alignments running alongside each other may reduce collision risk to geese as this arrangement could potentially increase visibility of the structures to birds. However, this can't be confirmed without more detail on the design of the respective OHL alignments.

Ongoing flight activity surveys to the inform the Project and goose field use surveys for a related project, LT360 Aberdeenshire HVDC Connection S2P, will inform on goose activity in the Project's Zone of Influence. When a Potential Alignment is identified and further information on construction methods and programme are available, a Habitats Regulations Appraisal (HRA) Screening exercise will be undertaken to determine if the Project could result in Likely Significant Effects upon a European site, either alone or in combination with other plans or projects.

1.1.2. *Protected Species*

Data available from surveys for protected species for the Netherton Hub project and Eastern Green Link 3 (EGL3) project have been reviewed to inform this appraisal where the study areas overlap. This includes data for:

- Badgers – coverage available for part of the alignment options because surveys have extended 1km beyond the Netherton Hub site and surrounding the EGL3 site.
- Bats – coverage available for residential properties and trees in proximity to the alignment options.
- Otter and water vole – coverage available for watercourses within and up to 200 m beyond the Netherton Hub and EGL3 sites which partially overlap with the alignment options.

For other species, a habitat suitability assessment has been undertaken from a review of habitat data, with reference to the known distribution of species from publicly available datasets (e.g., red squirrel[9,10], great crested newt revised geographic zones[11], pine marten distribution map[12]), and professional experience of undertaking other ecological surveys in the same geographical region.

The following species have been considered for this exercise, with reference to their protection and conservation status e.g., European Protected Species (EPS) protected under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), species protected under national legislation such as the Wildlife and Countryside Act 1981 as

[9] Saving Scotland's Red Squirrels (online). Available at: https://scottishsquirrels.org.uk/squirrel-sightings/

[10] Scottish Forestry, Red Squirrel Stronghold Areas (online). Available: https://forestry.gov.scot/publications/21-map-of-red-squirrel-stronghold-areas

[11] O'Brien, D. Hall, J., Miró, A., & Wilkinson, J. (2017). Testing the validity of a commonly-used habitat suitability index at the edge of a species' range: great crested newt Triturus cristatus in Scotland. Amphibia-Reptilia 38: 265-273.

[12] Vincent Wildlife Trust, Pine Marten (online). Available: https://www.vwt.org.uk/species/pine-marten/

amended (WCA), Protection of Badger Act 1992 (PBA), Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 (SFFA), and priority species on the Scottish Biodiversity List (SBL).

- Bats (EPS, SBL);
- Otter (EPS, SBL);
- Wildcat (EPS, SBL);
- Great crested newt (EPS, SBL);
- Badger (PBA, SBL);
- Red squirrel (WCA, SBL);
- Pine marten (WCA, SBL);
- Water vole (WCA, SBL);
- Reptiles (WCA, SBL);
- Freshwater pearl mussel (WCA, SBL); and
- Migratory salmonids (SFFA, SBL).

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T1A	A	European protected species: Otter spraints were recorded along the Burn of Ludquharn during surveys for the Netherton Hub project; Alignment T1A spans a connecting tributary. There are other watercourses (predominantly field drains) across all alignment options that have not yet been surveyed, these are assumed to be used by otter to navigate and forage. Buildings at Netherton and Inverveddie within Alignment T1A have moderate suitability to support bats during the maternity, transitional and hibernation seasons. No confirmed transitional roosts were identified during surveys of Inverveddie in September 2023 for the Netherton Hub project; there was no access to survey Netherton Farm buildings. There is a line of trees along the minor road at the northern connecting point for Alignments T1B and T1C which have been inspected for potential bat roost features; a single tree approximately 70 m from the Alignments T1B and T1C was assessed to have suitability for multiple bats but no evidence. Negligible suitability for Scottish wildcat. Standing water has been mapped from the edge of Alignment T1A, however no other ponds appear to occur within 250 m of it and the surrounding terrestrial habitat appears to be modified grassland and cropland; this pond is likely to have limited suitability for breeding great crested newts. There also appears to be standing water within 250 m of Alignment T1B but no others connected nearby. Nationally protected species: Badgers are active in the general area. Badger setts and mammal burrows have been identified in proximity to all alignment options (locations undisclosed due to sensitivity). All alignment options are likely to extend through the territories of badger social groups and therefore precautionarily 'may' compromise their conservation
Alignment T1B	A	
Alignment T1C	A	

Alignment Option	RAG	Alignment Comparison Notes
		status (Amber rating). However, it is acknowledged that the footprint of the Project would be minimal, it should be feasible to microsite the tower locations away (minimum 30 m) from known badger setts, and construction works would largely be localised to tower bases (i.e., not exclude the full length of the OHL during construction which would otherwise create a barrier to movement of mammals). Potential effects may be mitigated and are unlikely to be significant. Water voles may use the drainage ditches and tributary burns crossed the alignment options. The watercourses in the general area appeared relatively modified (drainage ditches) and are likely to have limited suitability for migratory salmonids – although migratory salmonids may be present in watercourses connected to the Ugie catchment. The modified watercourses and drainage ditches are unlikely to support freshwater pearl mussels. Suitable resources for red squirrel and pine marten appear limited. No confirmed evidence of these species has been recorded during any surveys for the Netherton Hub and EGL3 projects. Generally, pine marten and red squirrel distributions appear to be more closely linked to more extensive areas of woodland and valleys in Aberdeenshire. It is assumed that the OHL may be microsited to avoid felling / woodland clearance because only the edges of woodland blocks occur within 100 m either side of these alignment options. Suitable habitats for reptiles appear relatively limited in the modified landscape and this species is unlikely to be a material constraint because of the localised footprint of the towers. Overall, an Amber rating is applied to all alignments as a precaution. There are no obvious features from the desk-based review that would differentiate the alignment options.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	A	As above, an Amber rating is applied to all Alignments alongside B2P.
T1B + B2P	A	
T1C + B2P	A	

Further Assessment:

All alignment options have been assigned an Amber rating and further surveys will be required to further assess the potential impacts.

When considering construction of the Project alongside other proposed infrastructure (e.g., B2P) in the vicinity of the tie-in alignments and cumulative effects on the local populations of protected species, Alignment T1A would be preferred between the alternatives for Section 1 because construction of the two OHLs in parallel may reduce the

number of access routes and construction zones that may create barriers to movement of terrestrial species. The construction timescales are currently unknown (e.g., if concurrent or sequential) and this assessment is made on the assumption that tower locations and access routes may be sensitively designed to avoid and reduce effects to badgers, and other species.

Field surveys for protected species will be undertaken for the Potential Alignment to inform assessment of how the Project may affect species which use the area for foraging, resting, commuting etc. The scope of protected species will be defined upon selection of a Potential Alignment, but is likely to include surveys for badgers, otters, water vole and bats.

1.1.3. *Habitats*

Ground-truthed UK Habitat Classification (UKHab) data from the Netherton Hub which overlaps with the northern sections of all alignment options has been reviewed to inform this assessment. This data was extrapolated across the rest of the alignment options, using professional experience of the setting and land use from site visits to Netherton Hub and field surveys conducted within nearby alignment options T2A and T2B, as a desk-based exercise using the following information sources:

- Publicly available map resources and aerial photography;
- Carbon and Peatland 2016 Map[13] data to identify the presence of potentially irreplaceable peatland habitat (blanket bog/areas of deep peat). Class 1 and Class 2 peat are considered irreplaceable habitat; and
- Habitat Map of Scotland[14] (HABMoS) data to identify priority habitats including Annex I habitats (listed in the Habitats Directive).

A separate BNG assessment has been undertaken to calculate the baseline Biodiversity Units (BU) for each Alignment Option and identify areas of irreplaceable and high distinctiveness habitats. This does not include linear features.

The RAG rating for Habitats is separated out below into Annex I habitats and Biodiversity (units), following SSEN Transmission Guidance. The Biodiversity RAG table is presented separately, as this provides a comparison between the alignment options.

Groundwater Dependent Terrestrial Ecosystems (GWDTE) are covered under Hydrology/Geology further below.

Habitats RAG Rating

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	G	Habitats are broadly similar across all alignment options and appear to comprise mainly modified or arable land, with minor areas of developed land (e.g., residential / farm buildings and roads). Coniferous woodland (likely plantation origin) appears to be present in Alignment T1A, T1B and T1C, as well as minor areas of broadleaved woodland in T1A. An area of standing water, precautionarily mapped as a priority pond feature, occurs to the edge of Alignment T1A. Watercourses, which are likely field drains, appear to occur in all alignment options. There are no areas of overlapping Class 1 or Class 2 peatland visible from the Carbon and Peatland 2016 Map. There are unlikely to be any Annex I habitats within the alignment options. According to SSEN Transmission Guidance, all alignment
Alignment T1B	G	
Alignment T1C	G	

[13] NatureScot (2016). Carbon and Peatland 2016 Map. Available: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map

[14] NatureScot (2015). Habitat Map of Scotland. Available: https://www.nature.scot/landscapes-and-habitats/habitat-map-scotland

		options are assigned a Green rating due to perceived lack of Annex I habitats.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	G	As noted above, there are unlikely to be any Annex I habitats within alignment options T1A, T1B and T1C. Therefore, each of these alignment options alongside B2P would still be given a Green rating.
T1B + B2P	G	
T1C + B2P	G	

Biodiversity 'RAG' rating:

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	R	When compared with the alternative alignment options T1B and T1C, this Alignment Option has the highest BU value at 162.62 BU, however this is mainly because it covers the largest area rather than habitats of increased ecological value (although potentially a priority pond feature is present). This is >120% of the least 'biodiversity units impacted' option (T1C). It does however have a relative BU value of 2.03 BU/ha, similar to Alignment T1C (the lowest/least).
Alignment T1B	R	When compared with the alternative alignment options T1A and T1C, this Alignment Option has the second highest BU value at 106.13 BU similarly owing to the larger area rather than habitats of increased ecological value. This is >120% of the least 'biodiversity units impacted' option (T1C). It does however have a relative BU value of 2.01 BU/ha, similar to Alignment T1C (the lowest/least).
Alignment T1C	G	When compared with the alternative alignment options above, this Alignment Option has the lowest BU value at 68.04 BU; and a relative BU value of 1.97 BU/ha.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	R	It is proposed that the same ratings for Alignments T1A, T1B and T1C with regards to BU values would apply regardless of which is progressed alongside B2P, because the BNG process is reported on a project-by-project basis.
T1B + B2P	R	
T1C + B2P	G	

Further Assessment:

In terms of potential effects to habitats of elevated conservation importance, all alignment options have been assigned a Green rating due to perceived lack of Annex I habitat types.

For tie-in options, the BNG assessment identified Alignment Option T1C to have the lowest BU value – but there are marginal differences between the alignment options when considering the BU value per hectare. Alignment T1C is perceived to have the lowest BU value likely because it is the most direct alignment with relatively smallest spatial area and comprises habitats of relatively low biodiversity value - cropland, modified grassland, developed / urban land, and coniferous woodland (likely plantation).

In terms of permanent footprint on habitats and impacting the least number of BU, Alignment T1C would remain preferred for because it may require fewer towers as the more direct route and therefore lowest permanent footprint (in terms of area). It is plausible that by pairing Alignment T1A and B2P, the number of access tracks and temporary footprint on habitats may be reduced. However, the construction timescale of these two projects is unknown and therefore it is not possible to confirm there would be any benefits to this in terms of reducing the BU impacted.

A field survey to corroborate the UKHab mapping will be undertaken for the Potential Alignment, as well as a habitat condition assessment to support subsequent BNG assessments of the Project. A full BNG assessment should be undertaken to provide compensation estimates for achieving a net gain in biodiversity for whichever Alignment Option is taken forward. This should use field-based evidence, be accurate to the footprint of the Project (i.e., tower bases and access routes), and also account for any linear habitat features for which impacts would be unavoidable.

1.1.4. *Ornithology*

A high-level habitat suitability assessment of the Project's broad corridor options for legally protected and notable species of conservation concern (referred to hereafter as 'Target Species') has been undertaken, informed by professional judgement and survey findings from a related Proposed Development with overlapping survey areas, Peterhead Hub. Target Species are those which correspond to any of the following criteria, in accordance with the relevant NatureScot[15, 16] and Scottish Hydro Electric Transmission[17] guidance:

- Listed on Annex I of the EU Directive on the Conservation of Wild Birds 79/409/EEC (the 'Birds Directive') (Annex I);
- Listed on Schedule 1 (including Schedule T1A and/or A1) of the Wildlife and Countryside Act (1981) (Schedule 1);
- Listed as 'Red' Birds of Conservation Concern 2021 (BoCC5); and
- Listed on the Scottish Biodiversity List (SBL).

In addition, flight activity surveys have been undertaken across breeding and non-breeding seasons between 2023 – 2024.

All alignment options incorporate similar habitat mainly comprising agricultural land (grazing pasture and arable land). Bird surveys undertaken for a related project, Netherton Hub, indicate all alignment options are of low value for ornithological interests in the breeding season. Species recorded during May to July 2023 have included a range of typical farmland passerines (songbirds) in addition to grey partridge and oystercatcher. Grey partridge is a declining Red List species within Birds of Conservation Concern[18] (BoCC5) and listed within SBL. However, given the relatively localised nature of the alignment options and the extent of suitable habitat in the wider area, this species is unlikely to be significantly affected by the Project.

All alignment options occupy mainly agricultural habitat potentially used by foraging geese and swans. The same habitat could also support wintering populations of waders such as curlew and golden plover. Both species are listed within SBL, curlew is a Red List species within BoCC5, and golden plover is an Annex I species. These species will be recorded during ongoing flight activity surveys to inform the Alignment and Project and as incidental observations during field use surveys for the related project, LT360 Aberdeenshire HVDC Connection S2P.

---

[15] SNH (2016). Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. Version 1, July 2016.

[16] SNH (2017). Recommended bird survey methods to inform impact assessment of onshore windfarms. Version 2, March 2017.

[17] Coleman, M., Fitchet, A., Seller, J., Williams, F. & Wright, P. (2016). SHE Transmission Ornithology Workshop – Ornithology Methods for Transmission Developments. SHE Transmission

[18] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.

There was an incidental record for barn owl during the ecology surveys for the related Netherton Hub project; the individual bird was disturbed from a roost site in a hedge. The roost site was not suitable for breeding, although buildings within the Netherton Hub site are potentially suitable for breeding barn owl. If barn owls are present, then they may forage within the Alignment. The potential for collision risk is considered low given that barn owls typically forage close to ground level (typically 0-3m). However, there is potential for disturbance/displacement effects from the Project on roosting / breeding barn owl if they are present within buildings within the Netherton Hub site. This only applies to Alignment T1A which passes alongside some of the buildings, other alignment options are routed at sufficient distance from buildings with potential to support barn owl and don't present a disturbance/displacement risk based on maximum protection zones recommended for this species[19].

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	The arable farmland within and surrounding the alignment options potentially provides suitable foraging habitat for species potentially sensitive to disturbance and collision risk such as geese and waders during the non-breeding season. Therefore, there is potential for effects from the Project on these species. All alignment options have been given an Amber rating. There is little to differentiate between the alignment options considering the extent of suitable foraging habitat for these species incorporating the alignments and the wider area and considering the mobile nature of the species involved. Alignment T1A is least preferred because of the potential for disturbance/displacement effects if barn owls are present.
Alignment T1B	A	
Alignment T1C	A	

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	A	There is no change in RAG rating when considering each alongside B2P.
T1B + B2P	A	
T1C + B2P	A	

Further Assessment:

All alignment options have been assigned an Amber rating and there is little to differentiate between the alignment options. In isolation, Alignment T1A is least preferred because of the potential disturbance / displacement effects to barn owl. With the addition of T1A and B2P OHL, this becomes less preferred because of the potentially increased disturbance / displacement effects discussed above for barn owl. Flight activity surveys to inform the Project and goose field use surveys for a related project, Aberdeenshire HVDC Connection S2P, have recorded very low activity from Target Species within the Project's Zone of Influence.

1.1.5. *Hydrology, Geology and Hydrogeology*

Hydrology, Geology and Hydrogeology receptors have been considered within a 1 km Study Area in relation to all alignment options.

Scottish Environment Protection Agency (SEPA)'s guidance on assessing the impacts of developments on groundwater abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTE) (LUPS-GU31) requires assessment of groundwater abstractions and potential GWDTE located within 250 m of excavations greater than 1 m

[19] Shawyer, C. R. 2012. Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting. IEEM, Winchester.

and within 100 m of excavations less than 1 m. Therefore, the 'GWDTE Study Area' includes the area within 250 m of the Site. Abstractions within 250 m of the Site have also been identified.

Consultation has been undertaken with Aberdeenshire Council in February 2024, in request for private water supply (PWS) information. Locations of PWS sources and infrastructure have not yet been verified. Further investigation through consultation and site survey, if required, may identify locations within the Alignment / LOD.

The Scottish Water asset database (December 2024) has been consulted for information relating to public water supplies.

In response to consultation for another SSEN project, Scottish Water (SW) provided Drinking Water Protected Areas (DWPA) data, which are considered as part of this appraisal.

Consultation has been undertaken with SEPA regarding licensed abstractions within all alignment options.

Habitat survey information was not available at the time of this appraisal in order to establish potential GWDTE. In the absence of this information, it has been assumed that GWDTEs are present for the purpose of this appraisal.

A desk study and data search has been undertaken to identify the baseline environment, including information on solid and drift geology, surface water and groundwater and designated sites. Available information has been used from the following sources:

- SEPA Water Classification Hub (River Basin Management Plan interactive web map)[20];
- Ordnance Survey (OS) 1:50,000 scale mapping;
- British Geological Survey (BGS) Geoindex Onshore Hydrogeological Map of Scotland 1:625,000 scale (interactive web map)[21];
- NatureScot SiteLink[22] (interactive web map); and
- SEPA DWPAs – Scotland River Basin District Maps (via The Scottish Government online) - Scotland river basin district maps [23].

According to SEPA DWPAs, most of Scotland is located within SEPA DWPA for groundwater, including the area in which the alignment options are located; however, each Alignment Option has been considered in relation to SEPA DWPA for surface waters.

According to NatureScot Sitelink, there are no Protected Areas, designated for their hydrological or geological features, within 1 km of any of the alignments.

As the Limit of Deviation (LOD) for each alignment is 100 m, all distances are measured from the LOD at the closest point for each alignment option.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	Alignment T1A crosses an unnamed tributary of Burn of Ludquharn (ID: 23225). Alignment T1A is underlain by an unnamed igneous intrusion (Ordovician to Silurian) and Argyll group, low productivity aquifers, where small amounts of groundwater may be present in the near surface weathered zone and in secondary fractures.

[20] Water Classification Hub (interactive web map), SEPA. Available at: https://www.sepa.org.uk/data-visualisation/water-classification-hub/ [Accessed July 2023]
[21] The British Geological Survey – Hydrogeology. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed July 2023]
[22] NatureScot Sitelink (interactive web map). Available at: Available at: https://sitelink.nature.scot/map [Accessed September 2023]. [Accessed July 2023]
[23] Scottish Government Drinking water protected areas - Scotland River basin district [online]. Available at: Scottish Government. Drinking water protected areas - Scotland river basin district [online]. Available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ [Accessed July 2023]

Alignment Option	RAG	Alignment Comparison Notes
		Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1A. Two of which are indicated within the LOD, and four within 250 m of the LOD. SEPA data indicates that there are no registered abstractions within 1 km of Alignment T1A. SW data indicates that there are no SW abstractions within 1 km of Alignment T1A. Alignment T1A is not located within a SEPA DWPA for surface water. Alignment T1A is located entirely within SW DWPA of River Ugie which supplies Forehill WTW. Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T1A, this option has been assigned an Amber rating.
Alignment T1B	A	Alignment T1B crosses an unnamed tributary of Faichfield Burn (ID:23217). Alignment T1B is underlain by an unnamed igneous intrusion (Ordovician to Silurian), a low productivity aquifer, where small amounts of groundwater may be present in the near surface weathered zone and in secondary fractures. Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1B, none of which are indicated within the LOD; however, six are indicated within 250 m of LOD. SEPA data indicates that there are no registered abstractions within 1 km of Alignment T1B. SW data indicates that there are no SW abstractions within 1 km of Alignment T1B. Alignment T1B is not located within a SEPA DWPA for surface water. Alignment T1B is located entirely within SW DWPA of River Ugie which supplies Forehill WTW. Based on the presence of watercourses, PWS, SW DWPA, and the likely presence of GWDTEs within 1 km of Alignment T1B, this option has been assigned an Amber rating.
Alignment T1C	A	Alignment T1C crosses an unnamed tributary of Faichfield Burn (ID:23217). Alignment T1C is underlain by an unnamed igneous intrusion (Ordovician to Silurian) and Argyll group, low productivity aquifers, where small amounts of groundwater may be present in the near surface weathered zone and in secondary fractures. Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1C, none of which are indicated within the LOD; however, there are two indicated PWS within 250 m of LOD.

Alignment Option	RAG	Alignment Comparison Notes
		SEPA data indicates that there are no registered abstractions within 1 km of Alignment T1C. SW data indicates that there are no SW abstractions within 1 km of Alignment T1C. Alignment T1C is not located within a SEPA DWPA for surface water. Alignment T1C is located entirely within SW DWPA of River Ugie which supplies Forehill WTW. Based on the presence of watercourses, PWS, SW DWPA, and the likely presence of GWDTEs within 1 km of Alignment T1C, this option has been assigned an Amber rating.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	A	Alignment T1A + B2P crosses two unnamed tributaries of Burn of Ludquharn (ID: 23225). Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1A + B2P. Two of which are indicated within Alignment T1A LOD and two within B2P LOD, four within 250 m of the Alignment T1A LOD and seven within 250 m of the B2P. Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T1A + B2P, this option has been assigned an Amber rating.
T1B + B2P	A	Alignment T1B + B2P crosses one unnamed tributary of Burn of Ludquharn (ID: 23225) and one unnamed tributary of Faichfield Burn (ID:23217). Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1B + B2P. None of which are indicated within the Alignment T1B LOD, however two are indicated within B2P LOD. Six PWS are indicated within 250 m of the Alignment T1B LOD and seven within 250 m of the B2P. Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T1B + B2P, this option has been assigned an Amber rating.
T1C + B2P	A	Alignment T1C + B2P crosses one unnamed tributary of Burn of Ludquharn (ID: 23225) and one unnamed tributary of Faichfield Burn (ID:23217). Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T1C + B2P. None of which are indicated within the Alignment T1C LOD, however two are indicated within B2P LOD. Two PWS are indicated within 250 m of the Alignment T1C LOD and seven within 250 m of the B2P.

Alignment Option	RAG	Site Comparison Notes
		Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T1C + B2P, this option has been assigned an Amber rating.

Further Assessment:

All of the alignment options have been assigned an Amber RAG rating, as each of the alignment options may compromise the quality and / or quantity of surface waters or groundwater. However, Alignment T1A is the least preferable as there are PWS within the LOD.

When considering the alignment options in combination with B2P, an Amber RAG rating has also been applied, due to similar constraints posed by surface waters or groundwater. Alignment T1A + B2P is the least preferable because, in addition to the presence of PWS within the B2P LOD, there are also PWS within the LOD of Alignment T1A.

1.2. Cultural Heritage

Baseline information on known Designations and Cultural Heritage Assets was gathered for the following study areas:

- Inner Study Area: all recorded Designations and Cultural Heritage Assets held in the Scottish National Record of the Historic Environment Record (SNRHE) within each Alignment Option.
- Outer Study Area: Designations and Cultural Heritage Assets (i.e. Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes and Inventory Historic Battlefields) within 2 km of each Alignment Option.

1.2.1. *Cultural Heritage Designations*

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	G	There are no World Heritage Sites, Gardens and Designed Landscapes (GDL) or Inventory Battlefields within the study areas. There is a core of a First World War airship complex that is a scheduled monument (SM13679), located approximately 1 km south of Alignment T1A. There is the potential for impacts through changes within the setting of the heritage asset, but these impacts are not likely to lead to significant effects due to intervening vegetation and the presence of the existing OHL in the same direction. There are two SMR entries within Alignment T1A, both of which are post-medieval farmsteads. One of the farmsteads (Invereddie – Canmore ID 20998) has been replaced by modern barns and sheds, and the other is no longer upstanding but easily avoidable through micro-siting of the towers. Based on the low potential for significant effects on Designations, the alignment option has been assigned a RAG rating of Green.
Alignment T1B	G	There are no World Heritage Sites, Gardens and Designed Landscapes (GDL), Inventory Battlefields, or SMR entries within the study areas. There is a core of a First World War airship complex that is a scheduled monument (SM13679), located approximately 1.4 km south west of Alignment T1B. There is the potential for impacts

Alignment Option	RAG	Alignment Comparison Notes
		through changes within the setting of the heritage asset, but these impacts are not likely to lead to significant effects due to intervening vegetation and the presence of the existing OHL in the same direction. Based on the low potential for significant effects on Designations, the alignment option has been assigned a RAG rating of Green.
Alignment T1C	G	There are no World Heritage Sites, Gardens and Designed Landscapes (GDL), Inventory Battlefields, or SMR entries within the study areas. Cairn Catto Long Cairn (SM3276) is located approximately 2.3 km south east of Alignment Option T1C. There is potential for impacts through changes within the setting of the heritage asset, but these impacts are not likely to lead to significant effects due to the presence of the existing OHL adjacent to the monument and the existing OHL in the same direction, as well as intervening buildings and vegetation. Based on the low potential for significant effects on Designations, the alignment option has been assigned a RAG rating of Green.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	G	There is no change in RAG rating when considering each alongside B2P.
T1B + B2P	G	
T1C + B2P	G	

Further Assessment:

None of the alignment options would have the potential to result in significant effects on Designations, so have all been assigned a Green RAG rating.

The preferred Alignment Option is T1B as it is further from the Scheduled Monument of Cairn Catto Cairn and does not contain any SMR entries within the LOD.

There is the potential for unknown archaeological remains to exist within each Alignment option.

1.2.2. *Cultural Heritage Assets*

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	G	There are no Conservation Areas, or Non-Inventory Gardens and Designed Landscapes within the study areas. There are several Listed Buildings within the Outer Study Area to the north west and north of the alignment option, including the Category A Listed Old Parish Church of Longside (LB9410), located approximately 2 km to the north. Most of these are within the village of Longside and have no visibility of the wider area. However,

Alignment Option	RAG	Alignment Comparison Notes
		there is the potential for impacts through changes within the setting of the Listed Buildings outside the village, but these impacts are not likely to lead to significant effects due to distance, and intervening buildings and vegetation. Based on the low potential for significant effects on Cultural Heritage Assets, the alignment option has been assigned a RAG rating of Green.
Alignment T1B	G	There are no Listed Buildings, Conservation Areas, or Non-Inventory Gardens and Designed Landscapes within the study areas. Based on the low potential for significant effects on Cultural Heritage Assets, the alignment option has been assigned a RAG rating of Green.
Alignment T1C	G	There are no Listed Buildings, Conservation Areas, or Non-Inventory Gardens and Designed Landscapes within the study areas. Based on the low potential for significant effects on Cultural Heritage Assets, the alignment option has been assigned a RAG rating of Green.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	G	There is no change in RAG rating when considering each alongside B2P.
T1B + B2P	G	
T1C + B2P	G	

Further Assessment:

The preferred Alignment Option in relation to Cultural Heritage Assets would be Alignment T1B as it is furthest from any of the Listed Buildings within Longside.

1.3. People

1.3.1. *Proximity to Dwellings*

See **Appendix 1.2 Section 1.5.1 Proximity** within the Engineering Assessment for an appraisal of proximity to dwellings.

1.4. Landscape and Visual

1.4.1. *Designations*

The potential for effects on national designations and on wild land areas is excluded as they lie beyond 10 km of the alignment options. The potential for effects on regional designations is noted when these lie within approximately 5 km of the alignment options. Gardens & Designed Landscapes are considered in **1.2 Cultural Heritage**.

Assumptions:

- It is assumed that the existing towers and associated cables of the existing New Deer OHL would be removed between the stemming-off and rejoining points of the tie-in connection.
- The angle towers required for changes in direction of the new alignment would have an increased bulk in comparison with the regular support towers.
- The tie-in section towers would be SSEN 400 kV with triple conductors, approximately 57 m in height which would have a greater bulk than the existing New Deer 400kV SSEN standard 275 kV towers, 45 m in height.

Designations: Comparison of Options T1A, T1B and T1C

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	G	There are no National Parks or National Scenic Areas within 10 km of Alignment T1A The North East Aberdeenshire Coast Special Landscape Areas lie between 5 to 10km east of Alignment T1A and are unlikely to be affected.
Alignment T1B	G	There are no National Parks or National Scenic Areas within 10 km of Alignment T1B. The North East Aberdeenshire Coast Special Landscape Areas lie between 5km to 10 km east of Alignment T1B and are unlikely to be affected.
Alignment T1C	G	There are no National Parks or National Scenic Areas within 10 km of Alignment T1C. The North East Aberdeenshire Coast Special Landscape Areas lie between 5 to 10km east of Alignment T1A and are unlikely to be affected.

Further Assessment:

All alignment options have been allocated a RAG Rating of Green as it is unlikely for any of the alignment options to compromise any of the key attributes and qualities of any landscape designation.

Landscape designations are not considered to constrain the options considered.

Designations: Cumulative Comparison of Alignment Options

Alignment Option	RAG	Site Comparison Notes
Tie IN T1A + Tie OUT Option T2A + B2P + Rebuild R2	G	There are no National Parks or National Scenic Areas within 10 km of any alignment option or the B2P OHL The North East Aberdeenshire Coast Special Landscape Areas lie between 5 to 10km east of Alignment T1A and is unlikely to be affected.
Tie IN T1A + Tie OUT Option T2B + B2P + Rebuild R2	G	
Tie IN T1B + Tie OUT Option T2A + B2P + Rebuild R2	G	

Alignment Option	RAG	Site Comparison Notes
Tie IN T1B + Tie OUT Option T2B + B2P + Rebuild R2	G	
Tie IN T1C + Tie OUT Option T2A + B2P + Rebuild R2	G	
Tie IN T1C + Tie OUT Option 2B + B2P + Rebuild R2	G	

Further Assessment:

All alignment options have been allocated a RAG Rating of Green as it is unlikely for any of the alignment options to compromise any of the key attributes and qualities of any landscape designation. Landscape designations do not constrain the options considered.

1.4.2. *Landscape Character*

This appraisal considers the potential for effects on areas of Landscape Character Type (LCT) as defined by the SNH (now NatureScot) 2019 national landscape character mapping[24]. Effects are noted when these character areas lie within or adjacent to the alignment options.

All three options lie within LCT 17 Coastal Agricultural Plain - Aberdeenshire

Key features of this LCA applicable to this appraisal are:

- *low lying gently undulating landform;*
- *mixed farmland with occasional residential and farmsteads;*
- *occasional coniferous plantation often on elevated land;*
- *existing overhead lines, telecommunication towers. Peterhead Power station, windfarms and single wind turbines are features of the local landscape.*

Consideration is also given to potential effects on the local landscape character with an assumption of a potential area of significant effects of 5 km. All options lie within a rural landscape characterised by the features listed above and below:

- *small to medium sized fields with fences and hedgerows as field boundaries;*
- *woodland copse, tree belts and occasional conifer plantation;*
- *local windfarm on Gallows Hill with distant views of other wind development as single turbines or windfarm*
- *existing high and low level transmission lines within the locality;*
- *views of local disused airfield with various commercial uses, large industrial sheds and large agricultural storage sheds in farmsteads.*

[24] Available at Landscape Character Assessment in Scotland | NatureScot

Landscape Character: Comparison of Alignment Options T1A, T1B and T1C

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	Alignment T1A begins at Tower 65, crossing mixed farmland, skirting a woodland and tree belt before heading east into the Netherton Hub. The option follows the Holford Rules 4 and 5, using the local topography by avoiding high ground of the Hill of Ludquharn, passing east of the Hill at +75m AOD into a small stream valley, falling to +45m AOD. The alignment then passes eastwards onto higher ground reaching +60m AOD at Netherton Hub. The land is mixed farmland, medium sized fields with hedges (vary in height), drystone walls and fences as boundaries. There are occasional tree belts, conifer plantation and tree groups associated with farmsteads and residential properties. Settlement consists of occasional farmsteads and individual residential properties, some derelict. A wood pole distribution line is present in the valley. The three wind turbines of Gallows Hill Windfarm lie 1.8 km to the north east of Alignment T1A. The presence of transmission lines is recognised as a characteristic of LCT17with the New Deer 400kV and local 33kV overhead lines present. The overall local character is rural. The introduction of a further 400kV OHL risks adversely affecting the local landscape character so has been given an Amber RAG rating.
Alignment T1B	A	Alignment T1B begins at Tower 67 and crosses the gently undulating farmland, skirting a coniferous plantation, rising gradually north of Nether Kinmundy onto higher ground to approximately +80 m Above Ordnance Datum (AOD) and then falling gradually to the Netherton Hub at +55 m AOD. The route lies on elevated land. The land is mixed farmland, medium sized fields with hedges (vary in height) and fences as boundaries. There are newly planted woodland and conifer plantations, tree belts and tree groups associated with farmsteads and residential properties. Settlement consists of occasional farmsteads and isolated residential properties. The presence of transmission lines is recognised as characteristic of LCT17, but the overall character of the locality is rural. The introduction of a 400kV OHL risks adversely affecting the local landscape character so has been given an Amber RAG rating
Alignment T1C	A	Alignment T1C begins at Tower 73 at +75 m AOD falling gradually down the north facing slope to +60 m AOD, then changing direction and gradually passing downhill on the north facing slope to approximately +55 m AOD at the Netherton Hub substation. The route lies on elevated land. The land is gently undulating mixed farmland. The fields are medium sized with fences and trimmed hedgerows as boundaries.

Alignment Option	RAG	Alignment Comparison Notes
		Settlement consists of occasional individual residential properties. The presence of transmission lines is recognised as characteristic of LCT17, but the overall character of the locality is rural. The introduction of a 400kV OHL risks adversely affecting the local landscape character so has been given an Amber RAG rating

Further assessment:

The presence of transmission lines is recognised as a characteristic feature of LCT17. The introduction of an additional 400 kV OHL risks adversely affecting the local landscape, predominantly rural in character, so all three options have been given an Amber RAG rating. This single RAG rating however masks substantial differences in potential effect.

Alignment Option T1A follows the grain of the landscape as far as reasonably possible, low in the landscape past Nether Kinmundy, before rising to approach the Netherton Hub substation from the west. This has the benefit of reducing its potential prominence in the landscape. The alignment lies close to Gallows Hill wind turbines, prominent by their movement on high ground to the west. The proposed B2P 400 kV OHL follows the same alignment, closely parallel to the north (see cumulative appraisal, below). If this line were already in existence at the time of construction, its presence would reduce the RAG rating for Option T1A to Green

A section of the existing New Deer to Peterhead 400kV OHL would be removed for any tie-in option, with the number of towers removed depending on the tie-in alignment selected. Option T1A would entail the removal of a larger number of the more prominent existing towers. Further detail is given in the cumulative appraisal, below.

Alignments T1B and T1C lie on higher more open ground with fewer existing detracting landscape features and would be more prominent, potentially affecting a wider area. Alignment Option T1A is the preferred option.

Landscape Character: Cumulative Comparison of Alignment Options

Alignment Option	RAG	Site Comparison Notes
Tie IN T1A + Tie OUT Option T2A + B2P + Rebuild R2	A	Option T1A +B2P would run close parallel from Tower 65, as described in the landscape character table above. Option T2A runs south then southeast from the Netherton Hub, separated both in distance and direction from Option T1A+B2P. A section of New Deer 400kV OHL would be removed from the T1A to T2A on high ground. Two distinct infrastructure corridors would be created, T1A + B2P to the west side of the Hub and Option T2A to the south side, providing a 'neat' alignment of overhead lines. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17), but the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating.
Tie IN T1A + Tie OUT Option T2B + B2P + Rebuild R2	A	As above. Two distinct corridors of overhead line created providing a 'neat' solution minimising wirescape in the locality The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local character is rural.

Alignment Option	RAG	Site Comparison Notes
		The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating.
Tie IN T1B + Tie OUT Option T2A + B2P + Rebuild R2	R	Option T1B runs from Tower 67 of the existing New Deer OHL as described in the landscape character table above, to enter the substation from the south. Option T2A runs south then south east from the Netherton Hub. Three infrastructure corridors would be created, converging on the Netherton Hub, with Option T1B passing over locally high ground south of Mains of Kinmundy, with the risk of creating a cluttered 'wirescape' to the surrounding the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local landscape character is rural. The introduction of several 400 kV OHLs converging on the Hub from different directions is likely to adversely affect the local landscape character so has been given an Red RAG rating.
Tie IN T1B + Tie OUT Option T2B + B2P + Rebuild R2	R	As above. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) the overall local landscape character is rural. The introduction of several 400 kV OHLs converging on the Hub from different directions is likely to adversely affect the local landscape character so has been given an Red RAG rating.
Tie IN T1C + Tie OUT Option T2A + B2P + Rebuild R2	A	Option T1C runs from Tower 73 of the existing New Deer OHL as described in the landscape character table above. Option T2A runs south then southeast from the Netherton Hub, close and near parallel to Option T1C for approximately a kilometre. Two distinct infrastructure corridors would be created close to the Netherton Hub, the B2P line to the west and Option T1C and Option T2A to the south. In addition, the retained towers of the existing New Deer line to the south would remain on elevated land. Four bulky angle towers close to each other, on locally high ground, would be required to form the turn-in to the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating
Tie IN T1C + Tie OUT Option T2B + B2P + Rebuild R2	A	As above. Option T2B runs south east then south from the Netherton Hub, close and near parallel to Option T1C for approximately a kilometre. Four bulky angle towers close to each other, sited on the existing

Alignment Option	RAG	Site Comparison Notes
		New Deer OHL, the T1C and T2B, on locally high ground, would be required to form the turn-in to the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating

Further assessment:

All of the alignment options combined with the B2P OHL have the potential to compromise the landscape character of the LCT17 Coastal Agricultural Plain - Aberdeenshire at a local level in the vicinity of the Netherton Hub. The degree to which each of the options combined with the B2P OHL varies with benefits derived from removal of existing towers of the New Deer OHL which is sited on high ground in this location.

Option T1A + B2P together with either Options T2A or T2B would create two distinct infrastructure corridors entering Netherton Hub: Option T1A + B2P (close parallel, with towers lined up) from the west and the Tie-In Options 2A or 2B and Rebuild R2 from the south. This also has the benefit of removing the largest number of towers on the existing New Deer OHL, which is located on higher ground. Alignment T1A + B2P also have a nearby windfarm acting as a visual detracting feature.

Option T1B risks creating a cluttered wirescape in the area south of the Netherton Hub. Option T1C offers less potential for tower removal of the existing New Deer line and introduces sharp changes of direction with the greatest number of bulky angle towers on locally high ground.

Option T1A + B2P + Option T2A or T2B offers the neatest design for overhead lines entering the hub, following the Holford Rules and has the beneficial effect of removal of towers on elevated land. This solution has less of a cumulative effect on the local landscape character and is the Potential Alignment combination.

1.4.3. *Visual*

In this section the potential for effects on visual receptors (both individual and groups) are noted when the visual receptors have potentially clear visibility of the particular alignment option. It is assumed that visual receptors would potentially have a significant effect within approximately 2 km of the alignment options, although this could extend further up to 3 km as all options pass over elevated ground with open views particularly to the west north and east towards Peterhead.

There would be localised views during the construction phase of contractors' compounds, earthworks and the installation of the towers, cables access tracks and entrances. These works would be temporary.

Visual receptors present in the locality include isolated farmsteads and individual residential properties, users of minor highways and recreational routes such as the public footpaths providing access to local schools. There is a potential visual impact from the regional route, the Formantine and Buchan Way located 3 – 4 km to the north.

All alignment options pass across gently undulating topography with mixed farmland of medium sized fields with low hedges, walls or fences as field boundaries. There are open long distance views in all directions as the OHL crosses higher ground for all options. Consequently, all alignment options would be visible at distance on the horizon from some locations within the surrounding area. There would be a cumulative visual effect with the B2P OHL entering the Netherton Hub from the west and the existing New Deer 400kV OHL.

There are visual detractors present, such as industrial sheds at Longside Airfield, Gallows Hill Windfarm to the east, Peterhead Power Station and the existing Peterhead to Aberdeen 400 kV OHL to the south, however these visual detractors are isolated features present in different directions and minimal in their visual impact.

At this stage of the assessment, it is assumed that offsite planting of hedgerow trees, hedgerows and woodland plantations would not be possible. The assessment assumes the worst-case scenario with little planting present.

Visual: Comparison of Alignment Options T1A, T1B and T1C

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	Alignment T1A passes from higher ground into a low-lying stream valley which offers the opportunity for screening the lower part of the towers and providing a backdrop effect from views at long distance. Alignment T1A skirts an existing woodland which could provide screening for a tower west of the farmstead, Mains of Kinmundy. Alignment T1A changes direction north of the Mains of Kinmundy Farm on low lying land and then rises up passing east to Netherton Hub. There would be localised views of Option T1A from highway users of nearby minor lanes and residential properties at Auchtydore, Cairnlea, Mains of Ludquharn, Nether Kinmundy, Beanacharan and Mains of Kinmundy. There would be a beneficial effect for some residential properties with a north facing aspect at the hamlet of Nether Kinmundy with the removal of existing towers from Tower 66 eastwards to Tower 76. Several towers would be removed, which are located on high ground (65 m to 80 m AOD). Initial field work finds some residential properties which face north located within 0.5 km of the existing OHL would have an improvement on the view as the new OHL would lie on lower lying land further from the properties. Other properties near Mains of Ludquharn Farm would have an adverse effect to their existing view.
Alignment T1B	A	Alignment T1B passes from Tower 67 onto higher ground which would be partially screened by intervening topography from the nearby lane and residential properties at Nether Kinmundy with a north facing aspect. Alignment T1B is linear with slight change of direction at Netherton Hub only, limiting potential visual impact which is exacerbated by changes in direction. There would be closeup views from nearby minor lanes and residential properties at Nether Kinmundy Farm and Lyn-Lea Cottage. Towers from 68 eastwards to Tower 76 would be removed, located on high ground. Initial fieldwork finds that there would be a slight improvement of the view from residential properties at Nether Kinmundy with the diversion of the OHL further from their properties. Alignment T1B would be remain present in the view from these residential properties. Other properties near Nether Kinmundy Farm would have an adverse visual effect as the Alignment T1B would lie closer to their property.
Alignment T1C	A	Alignment T1C passes from elevated land north east from Tower 73 and then passes down a north facing slope into the Netherton Hub Substation across open farmland. The overhead line arrangement, although the shortest, has acute changes of direction with the use of bulky angle towers increasing

Alignment Option	RAG	Alignment Comparison Notes
		the local visual impact. Towers would be removed from Tower 74 eastwards to Tower 76, the least number of towers removed on all the tie-in options. There are limited residential properties with a close up view. Residential properties at West Toddlehills would have a partial view looking west and north of the OHL entering the Netherton Hub. Properties near to Hillhead Dairy would have a view looking north, from Gushetneuk looking south. Residential properties at 1 km distance at Toddlehills with a west facing aspect would have an open view over a wide horizontal angle in the middle distance of Alignment T1C, which would be considered significant. Towers would be removed to the south and south west from Tower 74 providing a slight improvement to the view.

Further Assessment:

Alignment T1A follows the Holford Rules for siting overhead lines to the greatest degree, aligned with the grain of the landscape in part. With Option T1A, there is the benefit of removal of existing towers of the New Deer OHL for residents at Nether Kinmundy and Toddlehills.

Alignment T1B has a direct route with minimal change of direction; however, it passes over higher ground and would be more visible than Option T1A. The tower removal of the existing New Deer OHL on elevated land would be an improvement on the view, however the benefit would be less than with Alignment T1A as the route would remain prominent within the view for residents at Nether Kinmundy with a north facing aspect.

Alignment T1C passes over high ground with the fewest new towers to be constructed but with sharp changes of direction requiring bulky angle towers. It would also have the least number of towers to be removed from the existing New Deer OHL. Alignment T1C with the bulky angle towers would be a prominent feature on elevated land in the view from residential properties at Toddlehills with a west facing aspect.

Alignment T1A is the preferred Alignment Option due to the alignment within the landform, minimal visual receptors, presence of local detracting vertical features and potential for the greatest number of existing towers on locally high ground to be removed.

Visual: Cumulative comparison of Alignment Options

The following appraisal assumes that rebuild option R2 is selected, although rebuild option R1 is preferred in terms of landscape and visual effects (please refer to the *Netherton Hub 400kV OHL Connection to New Deer and Peterhead – Rebuild* report). The table below considers the following combined cumulative options that is, Tie IN 1A, 1B, 1C + Tie OUT 2A, 2B + with B2P (Beauly to Peterhead 400kV OHL) + Rebuild R2, with the existing New Deer 400kV OHL removed from the Tie-In Optional Tower 76 to Peterhead Substation. With Rebuild R2, near to Peterhead Substation, a temporary diversion of a small section of OHL would be required. Refer to **Figure 4: Landscape and Visual** for Site Plan showing location of the different alignment options with the removal of existing OHL near to the existing substation at Peterhead.

Alignment Option	RAG	Site Comparison Notes
Tie IN T1A + Tie OUT T2A + B2P + Rebuild R2	A	Alignment T1A and B2P OHL would lie in parallel for approximately 2.5 km from the Hill of Ludquharn and into the Netherton Hub. Tie OUT Option T2A would create a separate route corridor to the south of the Hub with removal of existing towers from Tower 66 to Tower 75 on elevated land to the south.

Alignment Option	RAG	Site Comparison Notes
		There exists potential for significant cumulative visual effects from the B2P OHL to nearby residential properties at Mains of Kinmundy, Mains of Ludquharn, Cairnlea, Nether Kinmundy Farm. There would be a beneficial effect to residential properties with a north facing aspect at the hamlet of Nether Kinmundy with the removal of existing towers on the New Deer OHL from Tower 66 eastwards, which are located on high ground from +65 m to +80 m AOD. Alignment T1A aligned with B2P and Option T2A and Rebuild R2 offers the opportunity to create two distinct infrastructure corridors entering Netherton Hub, thereby creating a neater solution and reducing potential wirescape. The difference between T2A and T2B for visual receptors is not a factor in distinguishing a preferred option as both T2A and T2B leave the Hub at approximately the same distance from Option T1A.
Tie IN T1A + Tie OUT T2B + B2P + Rebuild R2	A	Two distinct infrastructure corridors are created, T1A + B2P and Tie Out Options T2B + R2. The difference between T2A + T2B for visual receptors is not a factor in distinguishing a preferred option as both T2A and T2B leave the Hub at approximately the same distance from T1A.
Tie IN T1B + Tie OUT T2A + B2P + Rebuild R1	R	Three distinct infrastructure corridors of overhead line would be created coming into the Netherton Hub, the B2P line to the west, Tie IN Option T1B and Tie OUT Option T2A/R2 to the east. A group of receptors around Mains of Kinmundy would be 'boxed-in' such that they would have OHLs visible at close quarters in all directions This combination would create a clutter of wirescape in the locality for visual receptors in nearby residential properties and users of local highways.
Tie IN T1B + Tie OUT T2B + B2P + Rebuild R2	R	As above
Tie IN T1C + Tie OUT T2A + B2P + Rebuild R2	R	From residential properties at Toddlehills and Parkhill with a west facing aspect there would be a combined cumulative visual effect of the overhead lines in the far and near distance for a wide horizontal angle of view, Tie IN T1C and B2P line with the existing New Deer OHL visible on the horizon to the south and Tie OUT T2A or T2B/Rebuild R2. A larger group of receptors from Mains of Kinmundy to Hillhead Dairy would be 'boxed-in' with OHLs visible in all directions. Alignment Tie IN T1C and Tie OUT T2A/Rebuild 2 could be aligned in parallel, however the towers of each alignment would be of a different height and span due to the different circuit ratings, which would exacerbate the potential visual impact.

Alignment Option	RAG	Site Comparison Notes
		Overall, this solution creates a cluttered wirescape with localised views from nearby residential properties and local highways.
Tie IN T1C + Tie OUT T2B + B2P + Rebuild R2	R	As above

Further assessment:

All alignment options have potential for a cumulative effect with the existing New Deer OHL the B2P alignment and Rebuild R2, although this varies in extent for each. Each of the alignments has advantages and disadvantages in relation to visual amenity, however there is a preferred design solution as described below.

Alignment Tie IN T1A + B2P OHL follows the Holford Rules to the greatest degree, with both options aligned with the grain of the landscape as far as possible. With alignment option Tie IN T1A + B2P + Tie OUT T2/Rebuild R2 there is the opportunity to create two discrete infrastructure corridors, providing a 'neater' solution to OHL lines entering and leaving Netherton Hub. Option Tie IN T1A and B2P running parallel would intensify the effect on those visual receptors affected but reduce the number of receptors affected. Tie IN Option T1A would remove a number of towers on higher ground north of Nether Kinmundy, with a consequential visual amenity benefit for receptors in this area.

The selection of Tie IN Option T1A + B2P OHL + Tie OUT T2A/T2B/Rebuild R2 is preferred when considered in relation to cumulative effects initiated by the other Tie IN options and the retained New Deer OHL.

With Tie IN Option T1B + B2P +Tie OUT Options T2A/T2B/Rebuild 2, three infrastructure corridors would be created in addition to the retained towers of the New Deer OHL, resulting in a clutter of towers surrounding Netherton Hub. The appearance of three OHLs entering Netherton Hub from different directions would create a greater visual effect than those with a more constrained corridor with towers aligned in parallel.

Alignment T1C passes over high ground with the fewest number of towers to be constructed and the least number of towers to be removed from the existing New Deer OHL. The existing OHL would remain in the view virtually intact. If Alignment T2A is selected there is an opportunity to align the two in parallel for a short section south of the Hub, however local residents would then have a cumulative view of four OHLs present in a wide horizontal angle of view which is undesirable and considered overbearing.

Alignment Option T1A + B2P + Option T2A/T2B/Rebuild 2 are considered the preferred choice in relation to potential visual effects, with the neatest solution in relation to minimising the wirescape and creation of routes entering and leaving the Hub. There is also an additional benefit of tower removal on elevated land.

Should Rebuild option R1 be selected (the preferred rebuild option in terms of landscape and visual effects) the conclusions of this tie-in appraisal would remain unchanged.

1.5. Land Use

1.5.1. Agriculture

Effects on agricultural land consider the potential for effects on land capability for agriculture. Effects are noted when land capable of producing an average to wide range of crops is located adjacent to or within the alignment options.

The wider area is characterised by largely ALC rating of 3.2 ("Land capable of average production though high yields of barley, oats and grass can be obtained"). Land capability for agriculture decreases further south of the Project (down to an ALC rating of 6.1).

Alignment Option	RAG	Alignment Comparison Notes
Alignment T1A	A	Option T1A passes through Land Capability for Agriculture (LCA) of Class 3.1: land capable of producing consistently high yields of a

		narrow range of crops and / or moderate yields of a wider range; and 3.2: land capable of average production though high yields of barley, oats and grass. It is not anticipated that this option would compromise the functionality / viability of the land, and as such this alignment has been assigned an Amber RAG rating.
Alignment T1B	A	As above.
Alignment T1C	G	Alignment T1C passes through agriculture land with a LCA rating of 3.2 and below. This option has therefore been allocated a Green RAG Rating.

Alignment Option	**RAG**	**Site Comparison Notes**
T1A + B2P	A	There is no change in RAG rating when considering each alongside B2P.
T1B + B2P	A	
T1C + B2P	G	

Further Assessment:

Alignment T1C passes through agricultural land with an LCA rating of 3.2, therefore being less constrained by agriculture and is the preferred option. Options T1A and T1B are slightly more constrained due to the presence of class 3.1 agricultural land for stretches of each option; Option T1B is slightly preferred over T1A as it crosses a smaller parcel of higher grade agricultural land.

When considering each option alongside B2P, the RAG ratings remain the same. Option T1A runs in parallel to the B2P alignment and crosses similar stretches of LCA 3.1 rated land, localising the impacts in terms of tower footprints and potential access arrangements. Option T1B in combination with B2P results in less rating 3.1 agricultural land being developed, but may spread associated construction works and access arrangements across a larger area. Option T1C remains the preferred option in combination with the B2P alignment.

1.5.2. *Forestry*

Constraints in relation to forestry, per the SSEN Guidance Document, relate specifically to potential to compromise the commercial viability of forestry operations. Forestry constraints related to natural heritage are considered earlier in this Appendix.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T1A	G	Option T1A passes through the corner of a small area of woodland south west of the Netherton Hub, largely comprising conifer plantation with some mixed species trees at the periphery. This option would require clearance of a small area of trees to establish the necessary wayleave for safe operation. This woodland does not appear to be utilised as commercial forestry, and thus a Green RAG rating is applied to this option.
Alignment T1B	G	Option T1B passes close to a block of conifer plantation woodland directly south of the Netherton Hub, with a separation distance of

		approximately 50 m; however, adjustment of the centreline within the LOD may bring this close enough to warrant some tree removal to establish a wayleave. This forestry may be utilised commercially; however, worst case placement of the alignment would result in only a very minor area of tree removal, and thus commercial viability is unlikely to be compromised. Consequently, a Green RAG rating has been applied.
Alignment T1C	G	Similar to Option T1B, this alignment passes close to the block of conifer plantation south of Netherton Hub, but runs adjacent to the woodland and would require some removal of trees. This is not expected to compromise commercial viability, and a Green RAG rating is applied.

Alignment Option	**RAG**	**Site Comparison Notes**
T1A + B2P	G	The B2P alignment is situated parallel to Option T1A, and runs through approximately the same stretch of woodland. Together, they would likely require removal of much of the east corner of this block, with little to no woodland retained between the lines. However, as this does not appear to be commercial forestry, a Green RAG rating has still been applied.
T1B + B2P	G	There is no change in constraint when considering option T1B in combination with B2P, and the same Green RAG rating has been applied.
T1C + B2P	G	As above.

Further Assessment:

All three alignment options have limited to no potential to impact upon areas of commercial forestry, and thus are minimally constrained. Option T1A is the slight preference as the area of forestry that may need to be removed to form a suitable wayleave does not appear to be commercial. Option T1B has the potential to avoid any woodland removal, subject to suitable tower placement. Option T1C is the least preferred option.

In combination with the B2P alignment, Option T1A would require a greater extent of woodland removal compared with B2P or T1A individually, and the entire eastern section of the woodland block would likely need to be removed. However, as this does not appear to be commercial woodland, it is not constrained by forestry. Option T1B in combination with B2P is the preferred option as there exists potential to avoid woodland removal altogether.

1.5.3. Recreation

Effects on recreation consider the potential for effects on receptors including national cycle networks and public core paths. Effects are noted when these recreational receptors are located adjacent to or within the alignment options.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T1A	G	These alignments are not located near any national cycle network routes or public core paths. These alignments do not interact with any area known to be used for commercial sporting activities,
Alignment T1B	G	

Alignment T1C	G	including golf courses, country parks and shooting / stalking activities. These alignments have therefore been allocated a Green RAG Rating.

Alignment Option	RAG	Site Comparison Notes
T1A + B2P	G	There is no additional constraints in relation to recreation when considering options in combination with the B2P alignment.
T1B + B2P	G	
T1C + B2P	G	

Further Assessment:

All alignment options have been assigned a RAG rating of Green. As such, there is no preferred option with regard to recreation.

1.6. Planning

1.6.1. *Policy*

National Policy

National Planning Framework 4 (NPF4) was adopted by the Scottish Government in February 2023 and is a long-term plan looking to 2045 that guides spatial development, sets out national planning policies, designates national developments and highlights national and regional spatial priorities.

In contrast to previous National Planning Frameworks, NPF4 places national policy at the heart of planning decision making as it is part of the statutory Development Plan along with Local Development Plans. Upon the adoption of NPF4 in February 2023, NPF3, Scottish Planning Policy (SPP) and all Strategic Development Plans ceased to have any relevance to planning decision making in Scotland. NPF4 encapsulates the National Planning Framework, and National Planning Policy in the same document for the first time.

NPF4 identifies a number of National Developments which are significant developments of national importance that will help to deliver the spatial strategy. Statements of need are set out in NPF4 that describe the development to be considered as a national development for consent handling purposes. Amongst the national developments identified is National Development 3: Strategic Renewable Electricity Generation and Transmission Infrastructure which includes:

b) New and / or replacement upgraded on and offshore high voltage electricity transmission lines, cables and interconnectors of 132kv or more; and

c) New and / or upgraded Infrastructure directly supporting on and offshore high voltage electricity lines, cables and interconnectors including converter stations, switching stations and substations.

As stated above, NPF4 contains National Planning Policies, and these policy positions are to be taken into account in land use planning decision making. The NPF4 policies that are of the most relevance to the development are:

- Policy 1 – Tackling the Climate and Nature Crises. The intent is to encourage, promote and facilitate development that addresses the global climate emergency and nature crisis.
- Policy 2 – Climate Mitigation and Adaptation. Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible and adapt to current and future risks from climate change.

- Policy 3 – Biodiversity. Development proposals need to contribute to the enhancement of biodiversity and integrate nature based solutions. Proposals requiring an EIA will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity.
- Policy 4 – Natural Places. Development proposals which by virtue of type, location or scale will have an unacceptable impact on the natural environment will not be supported. Development Proposals that are likely to have a significant effect on an existing or proposed European Site, and are not directly connected with or necessary to their conservation management, are required to be subject to an appropriate assessment of the implications to conservation objectives. Development proposals that will not compromise the designation status/overall integrity of a National Park, National Scenic Area, SSSI, Natural Nature Reserve, local conservation site, or local landscape area. Development proposals that are likely to have an adverse effect on species protected by legislation will only be supported where the proposal meets the relevant statutory tests. If there is reasonable evidence to suggest that a protected species is present on a site or may be affected by a proposed development, steps must be taken to establish its presence.
- Policy 5 – Soils. Development will only be supported if they are designed and constructed in accordance with mitigation hierarchy, and in a manner that protects soil from damage. Development proposals on prime agricultural land, or land of lesser quality that is culturally or locally important for primary use (as identified by the LDP), peatland, carbon-rich soils, and priority peatland habitat, will only be supported where it is for essential infrastructure and there is a specific locational need and no other suitable site. Where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required.
- Policy 6 – Forestry, Woodland and Trees. Development proposals that enhance, expand and improve woodland and tree cover will be supported. Development proposals will not be supported where they will result in any loss of ancient woodlands, ancient and veteran trees, or adverse impact on their ecological condition, native woodlands, hedgerows, individual trees of high diversity value, or identified for protection. Fragmenting or severing woodland habitat without appropriate mitigation will also not be supported. Development proposals involving woodland removal will only be supported where they will achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal. Where woodland is removed, compensatory planting will most likely be expected to be delivered. Development proposals on sites which include an area of existing woodland or land identified in the Forestry and Woodland Strategy as being suitable for woodland creation will only be supported where the enhancement and improvement of woodlands and the planting of new trees on the site (in accordance with the Forestry and Woodland Strategy) are integrated into the design.
- Policy 7 – Historic Assets and Places. Development proposals with a potentially significant impact on historic assets or places will be accompanied by an assessment which is based on an understanding of the cultural significance of the historic asset and/or place. Development proposals in or affecting conservation areas will only be supported where the character and appearance of the conservation area and its setting is preserved or enhanced. Development affecting SM will only be supported where direct and significant adverse impacts on the integrity of the setting are avoided, or exceptional circumstances have been demonstrated to justify the impact. Development proposals affecting nationally important Gardens and Designed Landscapes will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact on important views to, from and within the site, or its setting. Development proposals which sensitively repair, enhance and bring historic buildings, as identified as being at risk locally or on the national Buildings at Risk Register, back into beneficial use will be supported. Non-designated historic environment assets, places and their setting should be protected and preserved in situ wherever feasible. Where there is potential for non-designated buried archaeological remains to exist below a site, developers will provide an evaluation of the archaeological resource at an early stage so that planning authorities can assess impacts. Historic buildings may also have archaeological significance which is not understood and may require assessment.
- Policy 11 – Energy. To encourage, promote and facilitate all forms of renewable energy development onshore and offshore.

- Policy 12 – Zero Waste. Development proposals will seek to reduce, reuse, or recycle materials in line with the waste hierarchy.
- Policy 14- Design, quality and place - Development proposals will be designed to improve the quality of an area whether in urban or rural locations and regardless of scale. Development proposals will be supported where they are consistent with the six qualities of successful places and development proposals that are poorly designed, detrimental to the amenity of the surrounding area or inconsistent with the six qualities of successful places, will not be supported.
- Policy 18 – Infrastructure First. To encourage, promote and facilitate an infrastructure first approach to land use planning, which puts infrastructure considerations at the heart of placemaking.
- Policy 19 - Heating and Cooling - National and major developments that will generate waste or surplus heat and which are located in areas of heat demand, will be supported providing wider considerations, including residential amenity, are not adversely impacted. A Heat and Power Plan should demonstrate how energy recovered from the development will be used to produce electricity and heat.
- Policy 20 – Blue and green Infrastructure. Development proposals that result in fragmentation or net loss of existing blue and green infrastructure will only be supported where it can be demonstrated that the proposal would not result in or exacerbate a deficit in blue or green infrastructure provision, and the overall integrity of the network will be maintained. Development proposals for or incorporating new or enhanced blue and/or green infrastructure will be supported.
- Policy 22 – Flood Risk and Water Management. Development at risk of flooding or in a flood risk area will only be supported if they are for essential infrastructure. Developments will not increase the risk of surface water flooding, manage rain and surface water through SUDS, and seek to minimise the area of impermeable surface. Development proposals will be supported if they can be connected to the public water mains. Development proposals which create, expand or enhance opportunities for natural flood risk management, including blue and green infrastructure, will be supported.
- Policy 23 - Health and Safety - Development proposals that will have positive effects on health will be supported whilst development proposals which are likely to have a significant adverse effect on health will not be supported. A Health Impact Assessment may be required. Development proposals that are likely to raise unacceptable noise issues will not be supported. A Noise Impact Assessment may be required where the nature of the proposal or its location suggests that significant effects are likely. Development proposals within the vicinity of a major accident hazard site or major accident hazard pipeline (because of the presence of toxic, highly reactive, explosive or inflammable substances) will consider the associated risks and potential impacts of the proposal and the major accident hazard site/pipeline of being located in proximity to one another.
- Policy 25 - Community Wealth Building - Development proposals which contribute to local or regional community wealth building strategies and are consistent with local economic priorities will be supported. This could include for example improving community resilience and reducing inequalities; increasing spending within communities; ensuring the use of local supply chains and services and local job creation amongst other things.
- Policy 29 – Rural Development. Development proposals in rural areas should be suitably scaled, sited and designed to be in keeping with the character of the area. They should also consider how the development will contribute towards local living and take into account the transport needs of the development as appropriate for the rural location. Development proposals in remote rural areas, where new development can often help to sustain fragile communities, will be supported where the proposal can lead to local employment, and is suitable in terms of location, access, siting, design and environmental impact.

Local Policy

Local Development Plans (LDPs) cover all planning authority areas and provide detailed and site-specific planning policy for an area. The current development plan for the Aberdeenshire administrative area is the Aberdeenshire Local Development Plan, January 2023[25] (referred to as the LDP hereafter). The LDP lays out detailed policies which

1.1 [25] https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/

are used as a basis for determining planning applications on a local scale. As indicated above NPF4 now forms a part of the Development Plan and has replaced a number of predecessor planning policy documents at various levels. This includes Strategic Development Plans. Although a relatively recently adopted LDP, the Aberdeenshire LDP 2023 predates the adoption of NPF4 and has been formulated to interpret and implement the policy positions stated in the now superseded Aberdeen City and Shire Strategic Development Plan and as such some policy positions stated may be out of step with those contained in NPF4. The Town and Country Planning (Scotland) Act 1997 (as amended) makes it clear that where policy positions differ in this circumstance NPF4 policy positions will take priority. There are several policies that may be relevant in consideration of the Project. These include:

- R2 – Development Proposals Elsewhere in the Countryside- Permits development at appropriate locations in the countryside where there is a national requirement, and no suitable alternative site is available. Prefers brownfield redevelopment over greenfield development.
- P1 – Layout, Siting and Design- Major development (non-residential) may be required to participate in a design review process. Requires a masterplan that has been subject of public consultation to be prepared for employment sites >2ha. The Council will assess all development, whether on sites we have allocated or elsewhere, using a process that includes appropriate public consultation. Certain proposals for a national or major development should meet the prescribed criteria/level of public and stakeholder engagement, as outlined in Planning Advice- 1/2018, SP=EED® (Successful Planning = Effective Engagement and Delivery) – Planning Advice for development management and prospective applicants.
- Policy P2: Open Space and Access in New Development - All new developments must be accompanied by adequate public open space appropriate to the standards shown in the Aberdeenshire Parks and Open Spaces Strategy and should facilitate public access as appropriate.
- P4- Hazardous and Potentially Polluting Developments and Contaminated Land - In determining planning applications for development within the consultation zones for hazardous installations (including oil and gas pipelines), the council will consult with, and take full account of advice from the Health and Safety Executive (HSE), the Competent Authority (in the case of Control of Major Accident Hazardous sites) and the facility's owners and operators, and will seek to ensure that any risk to public safety is not increased.
- E1 – Natural Heritage - Generally protective towards sites designated for nature conservation interests at European, National, and local levels. Will not permit development where integrity of a protected site will be compromised.
- E2 – Landscape - states presumption against development that causes unacceptable effects through its scale, location or design on key characteristics, natural landscape elements, features or the composition or quality of the landscape character as defined in the Landscape Character Assessments produced by NatureScot whether impacts are alone or cumulatively with other recent developments.
- E3 – Forestry and Woodland - Generally protective towards woodland and the protection and enhancement of trees and woodlands in the planning and construction of built development.
- HE1 – Protected Listed Buildings, Scheduled Monuments and Archaeological Sites (including other historic buildings) - resistant to development that would have an adverse impact on the character, integrity or setting of listed buildings, or scheduled monuments, or other archaeological sites.
- PR1 – Protecting Important Resources - presumes against developments that have a negative effect on important environmental resources associated with air quality, the water environment, important mineral deposits, prime agricultural land, peat and other carbon rich soils, open space, and important trees and woodland.
- PR2 - Reserving and Protecting Important Development Sites - Safeguards land allocations from alternative development including sites to support the national developments identified in the National Planning Framework. Makes specific reference to High-voltage electricity transmission infrastructure, including cabling, substations, and converter stations and anticipates that they will be at a range of locations but are expected to include sites associated with the electricity substation south of Peterhead.
- C4 – Flooding - Requires FRAs to be undertaken in appropriate circumstances, requires climate change to be taken into account and presumes against development that increases flood risk vulnerability although does

permit essential infrastructure in vulnerable locations if required to be located there for operational reasons where no alternatives are available.

- RD1 – Providing Suitable Services - Outlines developer responsibilities in relation to location and design of development that takes advantage of services that will support it. Covers transport, water/waste water management and supply etc.
- RD2 – Developer Obligations - Details that where, by itself or cumulatively, development would give rise to the need for new or improved infrastructure or services, and this is not to be directly provided as an integral part of the development, planning obligations or other appropriate means to secure such provision may need to be put in place. This could include contributions towards trunk road improvements.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T1A	G	From the perspective of national policy, all alignments comply broadly with national policy. The National Policy Framework (NPF4) details a plan for 'north-east revitalisation' with goals for both economic revitalisation and energy transition. In addition, the framework should support the development of domestic renewable energy. The Project would align with these objectives, helping to achieve energy transition away from fossil fuels, improving domestic energy supplies and specifically aligning with the actions to increase the provision and support of offshore renewable energy. The Project aligns with Policy 1 and 2 that tackles the climate and nature crisis with the intent to encourage and promote facilities that address the global energy crisis and minimise lifecycle greenhouse gases. None of the alignment options interact with any local policy allocations as part of the Aberdeenshire Local Development Plan and, in combination with evidence of compliance given above, has therefore been assigned a Green RAG rating.
Alignment T1B	G	
Alignment T1C	G	

Alignment Option	**RAG**	**Site Comparison Notes**
T1A + B2P	G	With the exception of LDP policy E2 – Landscape, all options in combination with B2P are considered to accord with policy to much the same degree as in isolation. The increased potential cumulative impacts in relation to options T1B and T1C combined with B2P may be considered less alignment with policy E2, but not to a degree which contravene it, and thus a Green RAG rating has been retained.
T1B + B2P	G	
T1C + B2P	G	

Further Assessment:

All alignment options have been assigned a Green RAG rating as they are broadly in accordance with national and local policy. No individual preference has been identified.

In combination with the B2P alignment, there is increased potential for cumulative landscape and visual impacts for options T1B and T1C, as these may result in more of a 'wirescape', as discussed under landscape and visual constraints appraisals earlier in this Appendix. These are thus less preferred than Option T1A when considered cumulatively, but all options are still considered to have a Green level of constraint in regards to policy.

1.6.2. *Proposals*

Proposals have been identified via searching the Aberdeenshire Council planning portal for developments of a sufficient size and nature that have been submitted within the last five years. Planning applications that have been refused are not included within this appraisal. The below lists are not exhaustive, and are intended to inform comparative appraisal of alignment options – full cumulative lists and assessments will be undertaken at the EIA stage.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T1A	G	The SSEN project LT52 Eastern Green Link 3 HVDC UGC transects all of the alignment options. An OHL development is unlikely to be inconsistent with this UGC, subject to appropriate placement of towers. The alignment options are in close proximity / connect to the following SSEN projects: • LT52 Eastern Green Link 3 HVDC Converter Station • LT360: Spittal to Peterhead Link HVDC Converter Station • LT360: Spittal to Peterhead HVDC UGC • LT429: HVDC Switching Station • LT444: Netherton 400kV Substation • LT474: Netherton 132kV Substation As these are not 'third party' proposals, they are not considered constraints under SSEN's Routeing Guidance. Other infrastructure proposals within the vicinity of the alignment options include: • ENQ/2024/0106: Land at Netherton of Invereddie Longside Peterhead – National Development for Energy Hub • ENQ/2024/0486: Marram Wind Offshore Windfarm – Installation of Onshore Infrastructure • ENQ/2024/0953: Land North, North West and West of Peterhead – Onshore Transmission Infrastructure for Muir Mhòr Offshore Wind Farm • ENQ/2023/1286: Land North, North West And West Of Peterhead Aberdeenshire - Formation of Onshore Landfall Point, Laying of Underground Cable and Erection of Substation • ENQ/2022/1845: Substation Near New Deer Peterhead Aberdeenshire – Installation of Underground Cable • APP/2022/2161: Land North West of Four Winds Buckie Farm Boddam Aberdeenshire – Formation of a Cable Sealing End Tower Compound and Access (Approved) • APP/2023/1788: Land to the South West of Peterhead Grid Electricity Substation – National for Extension and Upgrade of Existing 275kV Electricity Substation (Approved) It is not currently anticipated that the alignment options would interact with any of these other proposals.
Alignment T1B	G	
Alignment T1C	G	

		An approved application (Ref: APP/2024/1058) is located in the vicinity of Option T1A for the erection of Dwellinghouse. Appropriate separation has been observed between this property and Option T1A to avoid interaction. No other projects of a sufficient scale or nature likely to result in an adverse effect on receptors are located within or in close proximity to each Alignment. All alignment options have been allocated a **Green** RAG Rating.

Alignment Option	**RAG**	**Site Comparison Notes**
T1A + B2P	G	There are not additional constraints in relation to third party proposals when considered in combination with the B2P alignment.
T1B + B2P	G	
T1C + B2P	G	

Further Assessment:

All alignment options have been assigned a Green RAG rating as they are not considered to be constrained by third party proposals. In this regard, there is no obvious preference between the options considered.

APPENDIX 1.2: TIE-IN ALIGNMENT APPRAISAL DETAIL - ENGINEERING

1.1. Infrastructure Crossings

Infrastructure creates a constraint on an overhead line often requiring additional clearance, enhanced reliability and protection provision to the infrastructure during construction and maintenance. Each crossing of infrastructure in an option thus has the potential to constrain the routeing.

1.1.1. *Major Crossings (132 kV, 275 kV, 400 kV HVDC, Rail, bridges, rivers, canals, oil and gas pipelines or hydro pipelines)*

Major crossings include other OHLs of 132 kV and above, railways, rivers / lochs 200 m+ in width, navigable waterways, motorways and other major roads, major pipelines and other significant infrastructure. These crossings require specific overhead line (OHL) solutions and can greatly constrain a design.

The main challenge with crossing of pipelines is the potential of any alternating current (AC) interference between the metallic pipeline and the OHL. Typically, where OHLs cross perpendicular to the pipeline the AC interference is negligible, however if this angle becomes shallower or there is some parallelism before and after the crossing, this can result in interaction that needs to be studied to determine if any mitigations are required.

In addition to this there is also the physical constraint from a tower spotting perspective whereby the pipelines will have a servitude associated with them ranging from 12m for the lower pressure SGN pipelines to 24.4m for the higher-pressure National Grid pipelines.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	No major crossings
Alignment T1B	G	No major crossings
Alignment T1C	G	Intermediate pressure (2-7bar) SGN pipeline crossing

Further Assessment:

Due to the short length of each of these Alignments there are no major crossings except for numerous gas pipelines operating within the area. Alignments T1A and T1B have both been ranked green as these options avoid the pipelines and have no other major crossings. Alignment T1C has also been ranked green as there is only one crossing of an SGN pipeline. Pipeline maps with the alignments overlayed are included in **Appendix 1.2-A**.

1.1.2. *Road Crossings*

Road crossings include all other road crossings not considered under major crossings. Private tracks and driveways may also be included where the need for access to be maintained is present, or where relatively high traffic volumes are anticipated. Whilst the impact on OHL design is less for these crossings, measures are still required and collectively they can greatly constrain an Alignment.

All Alignments cross a similar number of roads, with them mainly being minor unclassified roads. The restricted local access road that is crossed by Alignment T1A could result in a restriction to the property, however this road and the property is included in the red line boundary of the substation and therefore will not be an issue during construction.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	1 Restricted local access road 2 Minor road crossings
Alignment T1B	G	2 Minor road crossings
Alignment T1C	G	2 Minor road crossings

Further Assessment:

PR-NET_ENV-501 advises that where a route option has 200% more crossings than the least option it should be rated Amber. However, due to of the low number of crossings in total, it is not considered that this is a significant enough difference to rank one option worse than another. All options have therefore been ranked green and are considered equal from a road crossing perspective.

1.2. Environmental Design

The terrain, land features and atmosphere all have the potential to constrain the design of an OHL. In particular, the ease and safety of routeing, construction and maintenance can all be impacted. Furthermore, the environment can impose long term risk from pollution and flooding. Options with multiple or significant environmental features have a large risk of constraint in the routeing. Impacts on the environment from the OHL are considered outside this document and are not included in this section.

1.2.1. *Elevation*

High elevations increase wind and ice loading on the OHLs resulting in the need for shorter spans or stronger structures. This can constrain routeing options and increase cost. Additionally, access for construction and maintenance tends to be more difficult at altitude and the risk of severe weather is greater.

Due to the type of arable terrain these alignments cross, the elevations for all routes do not vary significantly and remain between 50 m and 100 m for all options. Elevation plots are included within **Appendix 1.2-B**.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	G	Length Through 50.0 m to 100.0 m – 2,325 m Max Elevation: 84 m Min Elevation: 41 m
Alignment T1B	G	Length Through 50.0 m to 100.0 m – 2,556 m Max Elevation: 80 m Min Elevation: 56 m
Alignment T1C	G	Length Through 50.0 m to 100.0 m – 1,610 m Max Elevation: 77 m Min Elevation: 53 m

Further Assessment:

Option T1A starts at a slightly higher elevation before dropping down into a bit of a natural valley in the landscape, it then turns west towards the substation and begins to climb gradually on approach to the substation.

Option T1B has a slight climb just under 1 km from where it turns of the existing line where it reaches its maximum elevation before gradually reducing in elevation on approach to the substation.

Options T1C starts at a slightly higher elevation where the alignments turn off the existing line and gradually decrease in elevation all the way to the proposed substation location.

1.2.2. *Atmospheric Pollution*

The atmospheric pollution has been checked based from the data gather from National Atmospheric Emission Inventory (NAEI: https://naei.beis.gov.uk/emissionsapp/). The NAEI provides information on the following pollutants that are deemed to affect the performance of OHLs.

- Carbon dioxide
- Nitrogen Dioxide

- Nitrogen Oxide
- Sulphur Dioxide
- Particulate matters (10um, 2.5um, 1um & 0.1um)

Based on the pollution maps and due to the proximity to the coast, all alignments will require very heavy pollution insulators. This is due to the increased risk of flashover due to the build-up of pollutants on the insulator discs and very heavy insulators mitigate this risk by having an increased creepage distance. A map is shown in **Appendix 1.2-C** showing the region within 10 km of the coastline.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	A	All Alignments are within 10km of the coast so will require very heavy pollution insulators.
Alignment T1B	A	All Alignments are within 10km of the coast so will require very heavy pollution insulators.
Alignment T1C	A	All Alignments are within 10km of the coast so will require very heavy pollution insulators.

Further Assessment:

No further assessment required.

1.2.3. *Contaminated Land*

Contaminated land poses a significant health risk to construction and maintenance operatives, and is potentially expensive to mitigate, dispose of or remediate. As such, the presence of contaminated land in an alignment would be a significant constraint. For assessment purposes, the presence of unexploded ordnance (UXO) is also considered in this section as it has similar implications.

Based on initial high-level studies, there is no known contaminated land within any of the alignments. A search has been carried out that considered past and present landfill sites and areas registered as Control of Major Accident Hazard (COMAH) sites. Further information if available will be obtained from landowners once a Potential Alignment has been identified.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	G	No known contamination Initial UXO hazard sources greater than 1km away
Alignment T1B	G	No known contamination Initial UXO hazard sources greater than 1km away
Alignment T1C	G	No known contamination Initial UXO hazard sources greater than 1km away

Further Assessment:

An initial UXO assessment has been carried out for the full areas under consideration for the different ASTI schemes. The purpose of this assessment was to identify known UXO hazard areas within the alignments from historical information. A further assessment is now in progress that aims to enhance the detail of the preliminary investigation and quantify the possible risks associated with it. The output of these studies is shown in in **Appendix 1.2-D**.

The initial survey has identified possible source of UXO relating to multiple aircraft crash sites and airfields in the area east of the alignment options, including Longside airfield. These sites are all greater than 1km from the alignments under review, however this will be refined in the next UXO assessment which will provide more granularity on the risk in this area.

1.2.4. *Flooding*

Areas vulnerable to flooding pose a potential risk during construction, may prevent maintenance and can pose a physical risk to structures during flood events. As such, Options with large areas vulnerable to flooding would have a high risk of constraint.

The SEPA flood maps for surface water and river flooding have been used to carry out the assessment on the alignments. The surface flooding data uses the present-day low likelihood of flooding which equates to a 1 in 200-year return period. This data has also been adjusted to apply a 20% increase in rainfall intensity to capture the impacts of climate change for the 2080's in the absence of SEPA's full climate change data which is not available for this layer. Further detail on this can be seen within the SEPA guidance[26].

The river flooding data has a climate change layer available that covers the impacts on flooding for the 2080's. The likelihood of flooding for this data set is classified as medium but this still equated to 1 in 200-year return period. Similarly additional explanation of this data set is available within the SEPA guidance[27].

An overlay of the two datasets above have been included within **Appendix 1.2-E**.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	No surface water or river flood risks.
Alignment T1B	G	Small surface water flood risk approx. 200m in length No river flood risk.
Alignment T1C	G	No surface water or river flood risks.

Further Assessment:

No further assessment required as flood risk for all alignments is not significant.

1.3. Ground Conditions

Ground topography and condition can directly impact the ease of routing, access, construction and maintenance. Options with large areas of difficult ground conditions are more likely to be significantly constrained.

1.3.1. *Terrain*

Steep or mountainous slopes present a significant difficulty for routeing, access, construction and maintenance. Options with a large proportion of steep or mountainous slopes are more likely to be constrained and thus more difficult and costly to build and maintain.

The terrain has been assessed by reviewing the average gradient and maximum gradients of the terrain along the alignment options using ordnance survey (OS) digital terrain model (DTM) 50 data; see **Appendix 1.2-F**.

All alignment options pass through arable farmland with very gradual rolling terrain, none of the slopes observed in these alignments pose any significant concern from a construction and maintenance perspective.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	Length through 0° to 5° slope – 3,454m Length through 5° to 10° slope – 165m Max slope: 7°
Alignment T1B	G	Length through 0° to 5° slope – 2556m Length through 5° to 10° slope – 0m

[26] https://www.sepa.org.uk/media/594528/surface_water_summary_v3.pdf
[27] https://www.sepa.org.uk/media/594527/river_summary_v3.pdf

Alignment Option	RAG	Site Comparison Notes
		Max slope: 4°
Alignment T1C	G	Length through 0° to 5° slope – 1,610m Length through 5° to 10° slope – 0m Max slope: 5°

Further Assessment:

No further assessment required.

1.3.2. *Peatland*

Peat, particularly deep peat, represents a significant difficulty for access, construction and maintenance. Options with a large proportion peatland are more likely to be constrained and thus more difficult and costly to build and maintain. Peatland is also an important habitat and construction of new OHLs can cause lasting damage.

A range of sources including British Geological Survey (BGS) and NatureScot has been utilised to determine the potential areas of peatland along the alignment, these are shown in **Appendix 1.2-G**.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	No areas of peatland
Alignment T1B	G	No areas of peatland
Alignment T1C	G	No areas of peatland

Further Assessment:

The alignment options do not pass through any designated areas of peatland and the BGS soil data for the area also confirms this.

1.4. Construction / Maintenance

Overhead lines should be routed considering the needs of construction and maintenance as the choice of alignment can have a significant impact on the safety and cost of the project throughout its lifetime.

1.4.1. *Access*

Construction of temporary access for construction are a significant project cost and an alignment that is remote from existing tracks and the public road network has the potential to incur large access costs. Furthermore, access for inspection and maintenance is necessary throughout the life of the asset. An alignment remote from existing access routes represents a significant risk and has a high potential to be constrained.

All the alignments under consideration have a good network of access tracks within the surrounding area. No portion of the alignments is greater than 1km from an existing access with the majority being situated between 100m and 300m from an existing form of access.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	Length through 50m to 100m from access roads – 359m Length through 100m to 300m from access roads – 1,486m Length through 300m to 1000m from access roads – 1,414m
Alignment T1B	G	Length through 50m to 100m from access roads – 479m

Alignment Option	RAG	Site Comparison Notes
		Length through 100m to 300m from access roads – 1,590m Length through 300m to 1000m from access roads – 180m
Alignment T1C	G	Length through 50m to 100m from access roads – 243m Length through 100m to 300m from access roads – 1,068m Length through 300m to 1000m from access roads –0m

Further Assessment:

All routes also pass through arable farmland where future operational access can likely be obtained by 4x4 vehicles and construction can be undertaken via temporary tracks or trackway matting.

1.4.2. *Angle Supports*

OHLs with a high number of angle supports tend to be more difficult to construct, due to the number of angle pull throughs, and often require more extensive access. As such, an alignment with a large number of angle supports is at a greater risk of being constrained.

The approximate number of angle towers has been assessed for each alignment, with Alignment T1C having the least number of angle supports at only two angle towers including the tower to turn off from the existing line.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	4 angle towers
Alignment T1B	G	3 angle towers
Alignment T1C	G	2 angle towers

Further Assessment:

The PR-NET-ENV-501 guidelines suggests that any option that exceeds the option with the least number of towers by under 10% be rated Amber and then anything greater than 10% Red. Due to the short length of this diversion this is not an overly practical method of appraisal, and as the variation between the options is only two towers it is considered not to be significant. Alignment T1A has the highest number of angle towers at 4, so will likely have an increased cost compared to Alignment T1C but again this cost is unlikely to be the deciding factor.

1.5. Proximity

Existing features can constrain an Alignment often requiring the features to be avoided to reduce or avoid impact. These include properties, windfarms, telecommunications masts, urban area and metallic pipes.

1.5.1. *Clearance*

Dispersed buildings and properties are a common feature of the Scottish landscape. Placing OHLs in close proximity to these features is rarely well received and best avoided. Alignments with numerous areas in close proximity to buildings and properties have significant risk of constraining routeing.

In addition to constraining the alignment, a suitable distance must be kept from residential properties from an audible noise perspective. When OHLs are energised, a phenomenon called corona discharge can occur which is when the air surrounding the OHL conductor becomes ionised. Conductors are designed to minimise this corona discharge; however, it can be impacted by other factors such as surface irregularities on the conductor or raindrops sitting on the conductor. This corona discharge can result in an audible crackling sound or a low frequency hum.

To determine the possible impact, noise studies are carried out to determine suitable offsets to remain from residential properties. These studies are in process at the moment, however an initial separation of 170m is the preference at this stage and it is likely that this can be reduced once these studies have been concluded.

The Ordnance Survey Address Base Premium data set has been used to identify the location of a residential and commercial buildings in the area surrounding the alignments. In addition to this, local planning applications have also been reviewed to identify any possible future developments in close proximity to the alignments.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	A	1 residential property within 170m 1 residential property within 100m 1 commercial building (grain store) within 100m
Alignment T1B	A	2 residential properties within 170m
Alignment T1C	A	1 residential property within 170m

Further Assessment:

All alignments have been ranked Amber in relation to residential properties. On completion of the noise studies, it may be possible to reduce these to Green.

Alignment T1A has been ranked Amber even though it passes within 100m of a residential property, which would ordinarily be a Red constraint. The reason for this is that this property is included within the red line boundary of the separately proposed substation site and therefore will no longer be resided in. There is a second property within 170m of the alignment which is the reason for the amber designation.

Alignment T1B pass between two properties achieving almost 170m from both, however once accounting for the tower width the conductors would be encroaching the buffer and therefore is also designated amber.

Alignment T1C again is just on the edge of a 170m property buffer, this property was not shown in the OS dataset as residential, however was detected via a planning application from 2015 for an extension. It may be possible to slightly adjust this alignment to remain outwith the 170m if required.

1.5.2. *Windfarms*

Windfarms pose a risk to OHLs due to disruption of airflows.

When turbines are placed in close proximity to an OHL it impacts upon the airflow around the conductors and fittings potentially causing aeolian vibration or turbulent buffeting. This in turn can impact the conductor's lifespan due to accelerated fatigue of the components. Current industry guidance states that where a turbine is situated greater than three rotor diameters from an OHL, the airflow has returned to normal, and the impact becomes negligible.

The planning applications in this area have been reviewed to confirm possible turbine locations. No turbines have been identified within three rotor diameters and therefore all options are classified as green.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	G	No known turbines within close proximity
Alignment T1B	G	No known turbines within close proximity
Alignment T1C	G	No known turbines within close proximity

Further Assessment:

No further assessment required.

1.5.3. *Communication Masts*

OHLs can block existing line of sights for telecommunication masts and thus the line of sights from mast can constrain structure locations.

The OS map and cell mapper website (https://www.cellmapper.net/) have been assessed to check if any communication masts are present near the alignment options.

Using data from OFCOM's Spectrum Information System, the location of transmitting and receiving devices that are registered with a licence can be identified. The locations of these transmitters, receivers and associated fixed links have been assessed to determine if any are in close proximity or cross the alignments.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	G	No fixed links crossed
Alignment T1B	G	No fixed links crossed
Alignment T1C	G	No fixed links crossed

Further Assessment:

No further assessment required.

1.5.4. *Urban Developments*

As with dispersed buildings and properties, urban areas represent a significant constraint that will often need to be routed around.

The alignment options are not close to any major urban developments, however some of the options do have clusters of properties nearby that can be seen on the OS maps so have been mentioned.

Alignments T1A and T1B have a group of properties that can be identified as being in close proximity to the alignments. From an engineering perspective this is not considered to be a significant issue as they are an acceptable distance away in terms of clearance requirements and potential noise impacts, however more properties are visually affected in these areas.

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A	A	Cluster of properties at Mains of Kinmundy
Alignment T1B	A	Cluster of properties at Mains of Kinmundy and Nether Kinmundy
Alignment T1C	G	No significant developments

Further Assessment:

As mentioned above, alignments T1A and T1B have larger groups of properties surrounding them and therefore have been designated Amber. As per PR-NET-ENV-501, if between 10% and 50% of the route is within an urban development it should be designated Amber; it could be debated if these areas classify as urban development but to signify the existence of a small settlement they have been classified as such.

1.5.5. *Metallic Pipes*

Metallic pipes have to be both avoided by individual supports, as they are often expensive to reroute, and, ideally, the final alignment should avoid running parallel to avoid electrical impacts on the pipelines. As such it represents a constraint on routeing options.

The metallic pipelines in proximity to the alignment options have already been considered under the major crossing section. To ensure that the constraints to alignment options are not double counted they will also be noted here but not considered as a further crossing.

No other metallic pipelines except those identified as major crossings are present along the alignments. A water pipeline is present; however, it is made of PVC and therefore not susceptible to AC interference.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	G	No pipelines present
Alignment T1B	G	No pipelines present
Alignment T1C	G	Intermediate pressure (2-7bar) SGN pipeline crossing

Further Assessment:

No further assessment is required.

1.6. Other Considerations

The considerations listed in this section are not engineering considerations in PR-NET-ENV-501; however, they are deemed to be significant enough that they require consideration in the alignment selection process.

1.6.1. *Route Lengths*

The length of an alignment affects the number of structures / accesses required, the extent of visual impact from the OHL and project cost.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	A	3,621m (225% of the shortest option)
Alignment T1B	A	2,557m (159% of the shortest option)
Alignment T1C	G	1,611m (shortest option)

Further Assessment:

Due to the short length of this diversion the alignment lengths are not significantly different, however alignments T1A and T1B are between 1.5 and 2 times longer than T1C. In reality, given the short lengths, this is likely only in the region of six more spans, however it is a factor to be considered.

In addition to this, the longer the length of the diversion the greater the length of the existing line to be removed. There are both advantages and disadvantages to this; the advantage is that it removes a section of line that may currently be quite visible to surrounding properties, but the disadvantage is the cost associated with the removal of this additional line. This however is likely outweighed by the visual benefit.

1.6.2. *DNO Crossings*

Existing Distribution Network Operator (DNO) crossings are generally undergrounded or diverted to avoid creating a construction and maintenance hazard. There is a cost and programme requirement associated with this activity and alignments with a large number of DNO crossings could find minimising such crossing a significant routeing constraint.

Each of the alignments under review have been overlayed with the distribution network to determine the required crossings / undergrounding of each option. The alignments have been assessed based on the number and voltage of the crossings.

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	A	Six 11kV crossings One 33kV crossing
Alignment T1B	G	One 11kV crossings One 33kV crossing
Alignment T1C	G	One 11kV crossings

Further Assessment:

Alignment T1A has a significant number of 11 kV crossings given the relatively short length of the diversion, and also crosses a 33 kV line which will have a greater cost to underground. Alignment T1B and T1C have been rated green as they have a minimal number of crossings which are considered reasonable for the length of the diversion.

1.6.3. *ESQCR Assessment*

The Electricity Safety Quality Continuity Regulations (ESQCR) assessment is not considered in PR-NET-ENV-501, however in this document a high level ESQCR assessment has been carried out for each option as per the SSEN ESQCR guidance: PR-PS-311.

At this stage, tower positions are not known as no alignment has been selected as the preferred. For the purpose of this assessment indicative towers have been spotted at approximately 300m intervals and then an ESQC classification has been applied.

The conductors on transmission lines are not covered and there is no historic information relating to vandalism therefore the ESQC rating is only high if the surrounding land classification code is between A-H. Figure 1 uses satellite imagery overlayed with the indicative tower positions to determine the land classification.

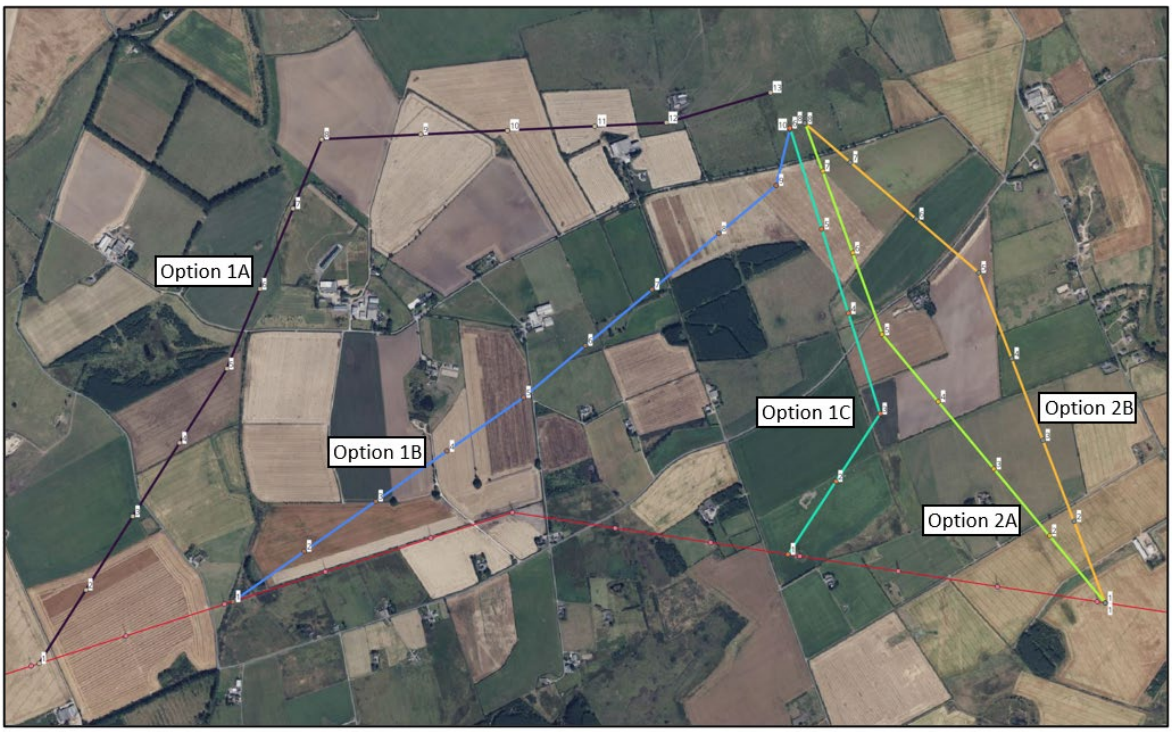
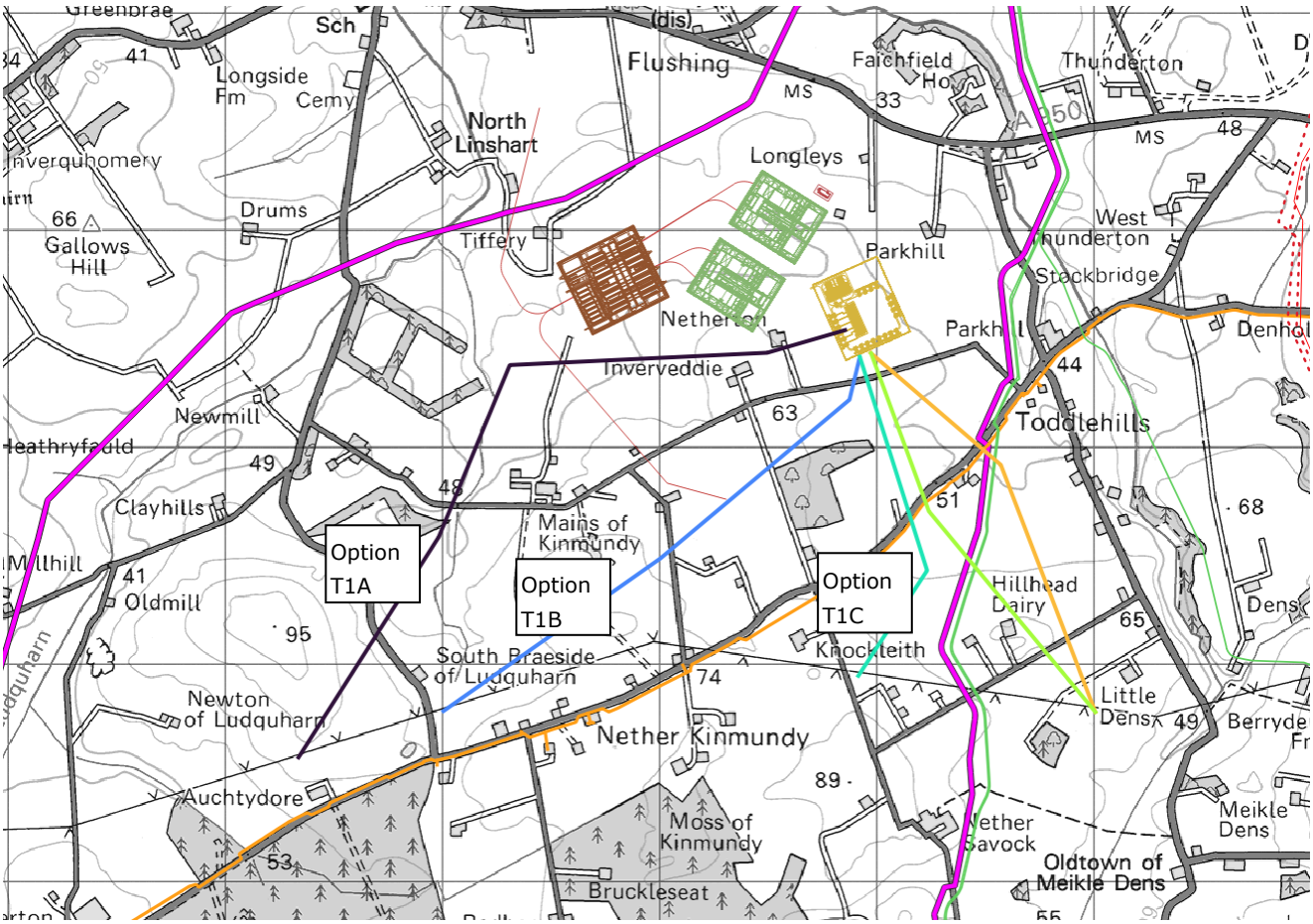


Figure 1 – ESQCR indicative tower placement

	Alignment T1A Land Classification	Alignment T1B Land Classification	Alignment T1C Land Classification
Structure 1	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 2	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 3	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 4	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 5	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 6	Arable Crops - N	Arable Crops - N	Arable Crops - N
Structure 7	Arable Crops - N	Forest - R	-
Structure 8	Arable Crops - N	Forest - R	-
Structure 9	Arable Crops - N	Arable Crops - N	-
Structure 10	Arable Crops - N	Arable Crops - N	-
Structure 11	Arable Crops - N	-	-
Structure 12	Arable Crops - N	-	-
Structure 13	Arable Crops - N	-	-

All Alignments have been classified as low risk from an ESQC perspective due to being situated mainly in arable crops. Structures 7 and 8 on alignment T1B are in proximity to some forestry but this still remains low risk.

Appendix 1.2-A Pipeline Crossings



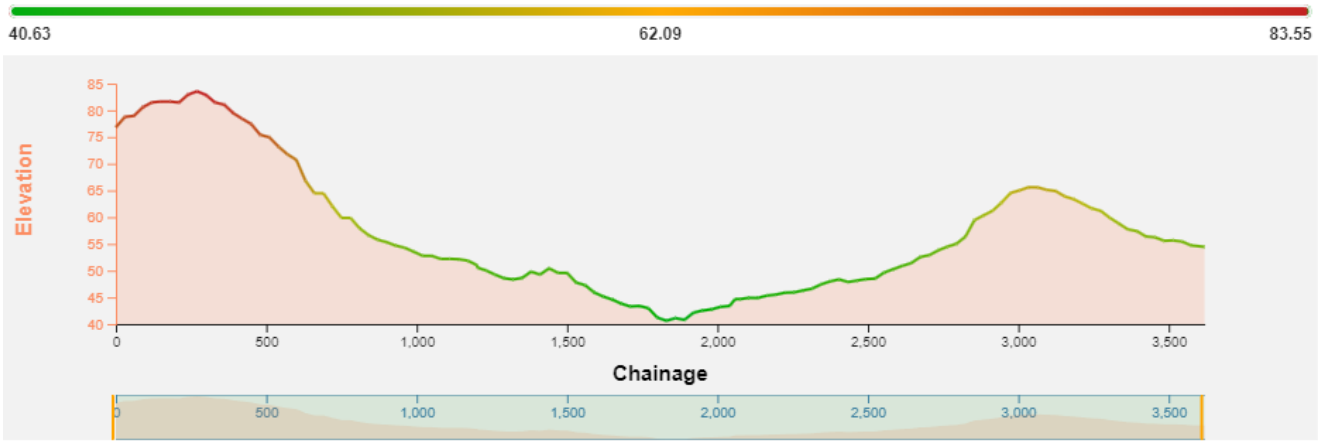
National Grid Pipelines

SGN Pipelines

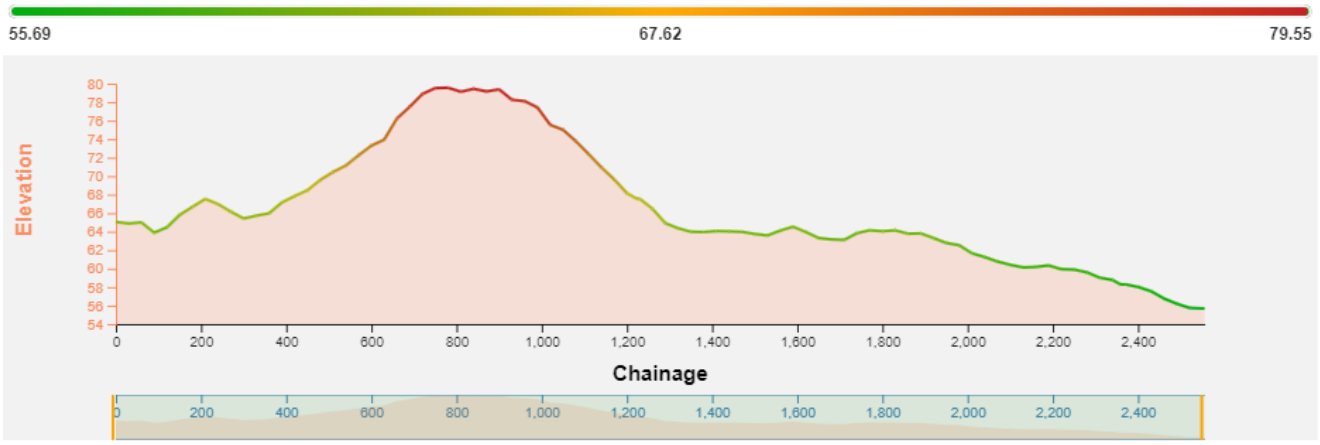
Shell Pipelines

Appendix 1.2-B Elevation Plots

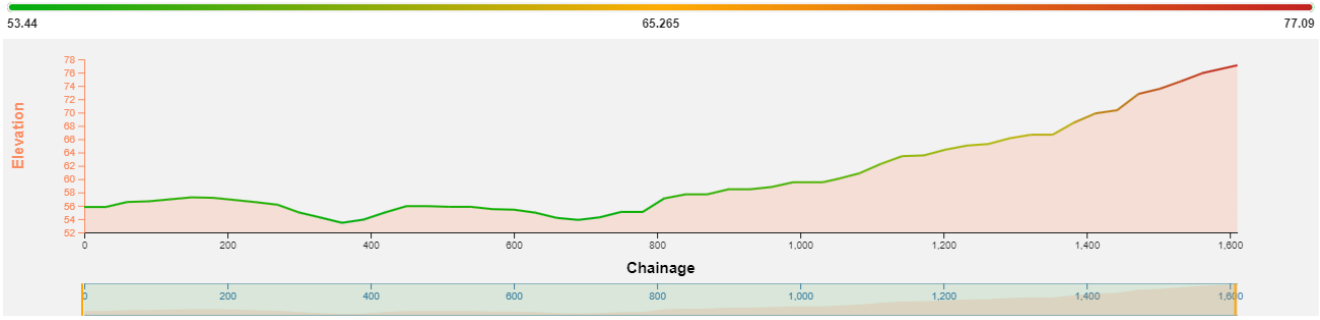
Option T1A



Option T1B



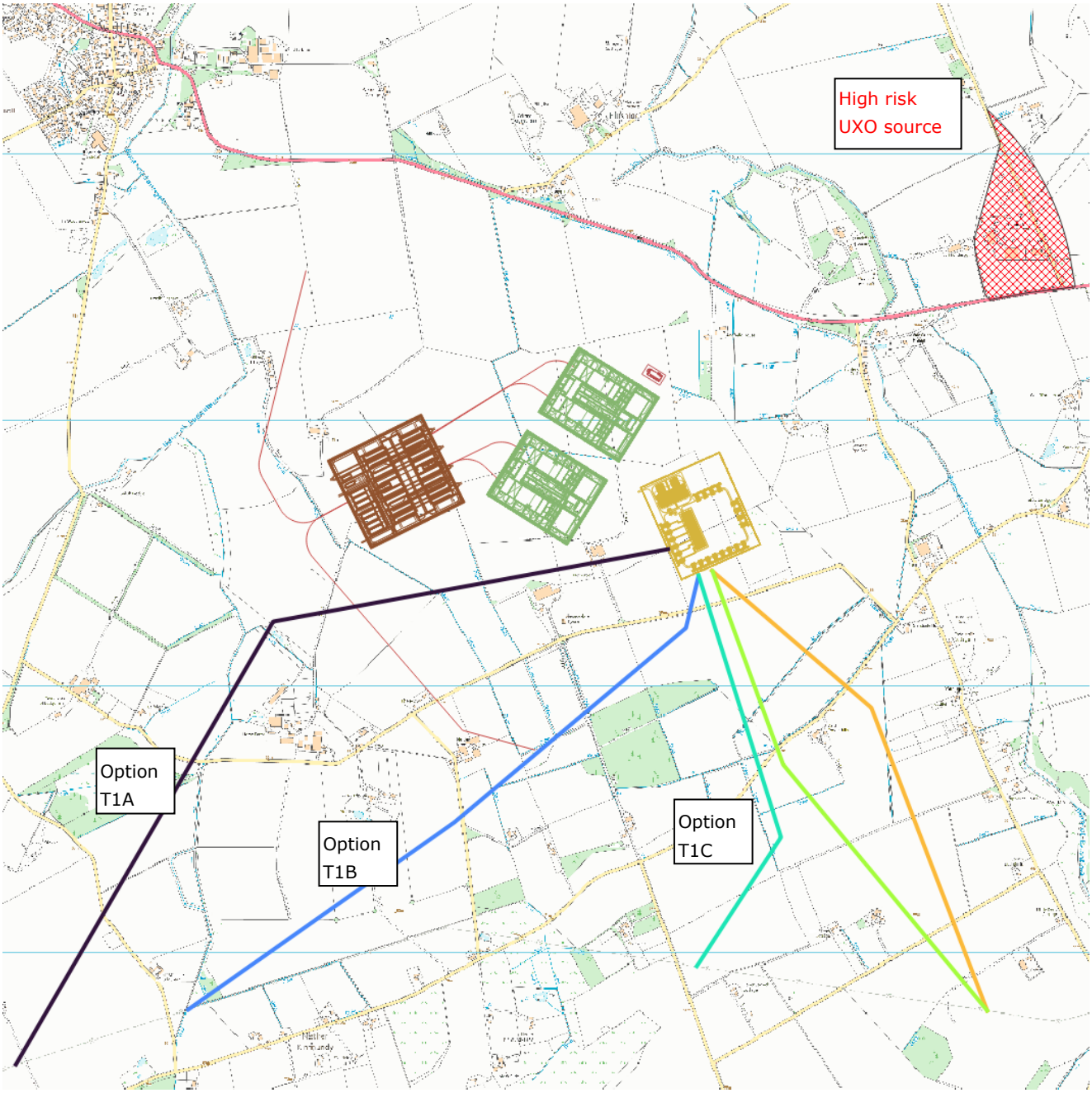
Option T1C



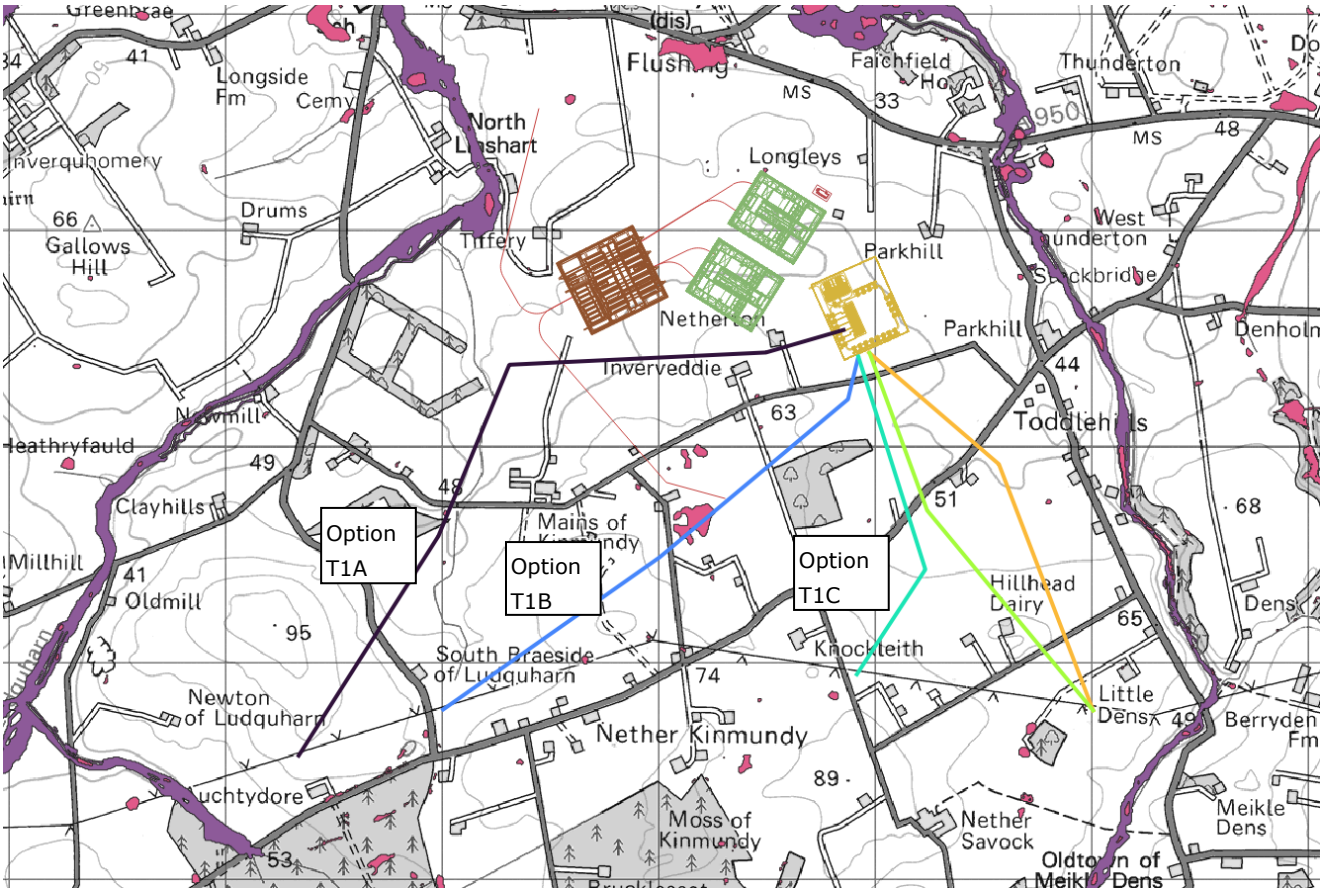
Appendix 1.2-C Coastal region – Very Heavy Pollution

Area greater than 10km from coast

Appendix 1.2-D UXO Survey



Appendix 1.2-E Flood Risk

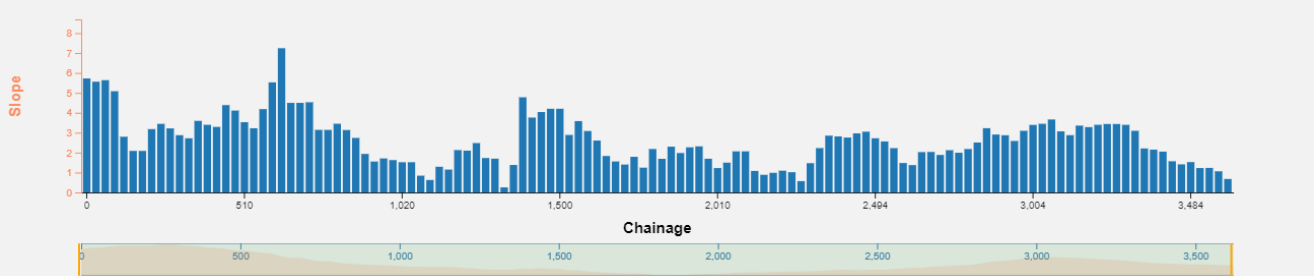


River Flood risk – Climate Change

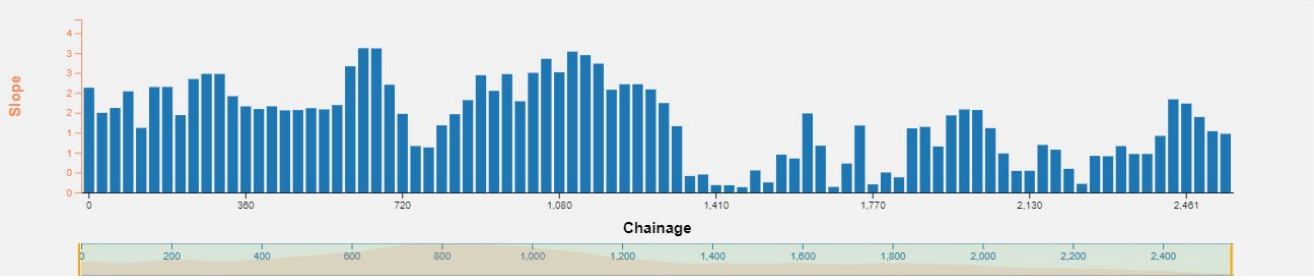
Surface water flood risk – 1 in 200 year SEPA

Appendix 1.2-F Slope

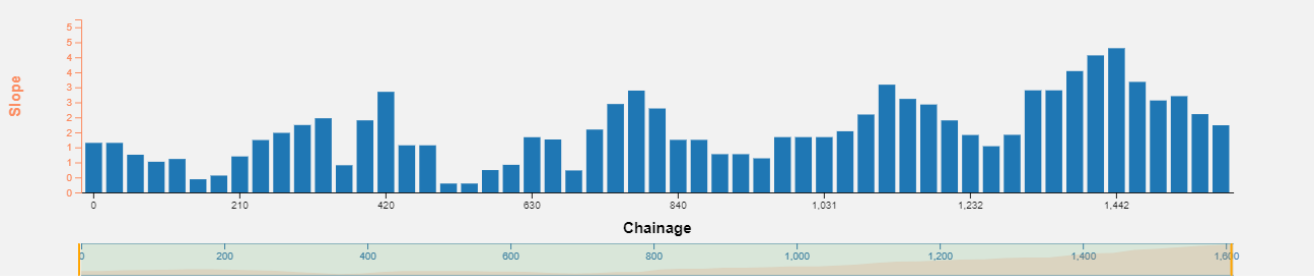
Option T1A



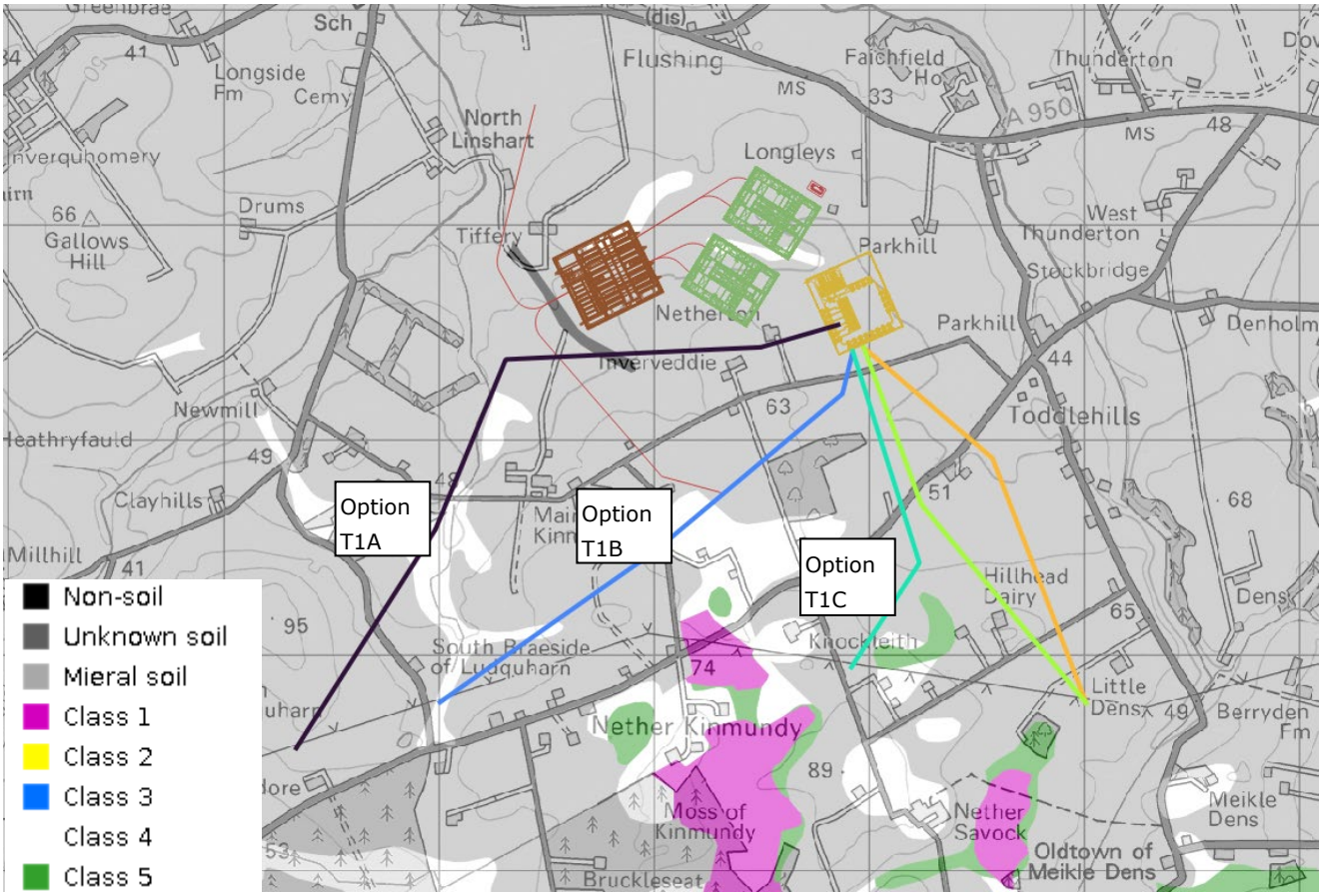
Option T1B



Option T1C



Appendix 1.2-G Peatland



Scottish & Southern Electricity Networks
TRANSMISSION

APPENDIX 1.3: TIE-IN ALIGNMENT APPRAISAL DETAIL - ECONOMIC

1.1 Capital

The estimate capital cost is primarily based on length of OHL. Key findings are summarised as below.

1.1.1 Construction

Alignment Option	RAG	Site Comparison Notes
Alignment T1A	R	Alignment T1A was the highest capital cost for this section, predominantly since it is the longest alignment. There would be increased construction costs due to a higher number of towers and conductors required. Costs are over 140% of lowest cost option, alignment is red rated.
Alignment T1B	A	Alignment T1B is the second longest option so has higher construction costs than alignment T1A. Costs are between 120-140% of lowest cost option, alignment is amber rated.
Alignment T1C	G	Lowest cost option.

Further Assessment:

From a Capital cost perspective, alignment T1C is preferred. T1C is the shortest and most direct alignment into the substation and therefore the cheapest.

1.1.2 Diversions

Alignment Option	RAG	Site Comparison Notes
Alignment T1A		
Alignment T1B		
Alignment T1C		

Further Assessment:

1.1.3 Public Road Improvements

Alignment Option	RAG	Site Comparison Notes
Alignment T1A		
Alignment T1B		
Alignment T1C		

Further Assessment:

1.1.4 *Tree Felling*

Alignment Option	RAG	Site Comparison Notes
Alignment T1A		

Alignment T1B		
Alignment T1C		

Further Assessment:

1.1.5 *Land Assembly*

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A		
Alignment T1B		
Alignment T1C		

Further Assessment:

1.1.6 *Consent Mitigations*

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A		
Alignment T1B		
Alignment T1C		

Further Assessment:

1.2 Operational

1.2.1 *Inspections*

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A		
Alignment T1B		
Alignment T1C		

Further Assessment:

1.2.2 *Maintenance*

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T1A		

Alignment T1B		
Alignment T1C		

Further Assessment:

1. APPENDIX 2.1: TIE-IN ALIGNMENT APPRAISAL DETAIL – ENVIRONMENTAL

1.1 Natural Heritage

1.1.1 Designations

Designated sites for Natural Heritage have been identified within the following study areas to account for potential connectivity between designated sites, their qualifying interests, and the alignment options.

- International or European designations e.g., Special areas of Conservation (SAC), Special Protection Areas (SPA), Wetlands of International Importance (Ramsar sites) – 10 km, extended to 20 km for SPA designated for greylag goose and pink-footed goose.
- National designations e.g., Sites of Special Scientific Interest (SSSI), National Parks, National Nature Reserves – 2 km.
- Regional designations e.g., Local Nature Reserves, Local Nature Conservation Sites, Wildlife Sites – 1 km.
- Ancient Woodland (identified from a review of the Ancient Woodland Inventory, Native Woodland Survey of Scotland, 1st Edition maps, and any available site-specific field data) – within the option or appears connected.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	A	International or European designations: Buchan Ness to Collieston Coast SPA is located approximately 5.4 km east of the connection point for all alignment options and is designated for breeding fulmar, guillemot, herring gull, kittiwake, shag and seabird assemblage. These species are reliant upon the coastal habitat within and connected to the SPA, and the land associated with each Alignment (arable, inland) would unlikely represent supporting or functionally linked habitat. Similarly, Buchan Ness to Collieston SAC is located approximately 6.5 km from the alignment options and is designated for vegetated sea cliffs which are not connected / functionally linked to the habitat along the alignment options. Loch of Strathbeg SPA and Ramsar (approximately 12 km north of the alignment options), and Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar (approximately 12.1 km south of the Alignments) qualifying interest include pink-footed goose. The arable farmland within and surrounding the footprint of the alignment options potentially provides suitable foraging habitat for pink-footed goose and is within the foraging range of qualifying populations from the two designated sites based on studies[28]. Therefore, there is potential for effects from the Project on qualifying populations of pink-footed geese through disturbance and displacement during construction and collision risk during operation. National designations: None within 2km[29]. Regional designations: none[30].
Alignment T2B	A	

[28] Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.

[29] Hill of Longhaven SSSI is approx. 1 km south of Alignments 2A and 2B however it is designated for geological interests and not considered within the biodiversity section.

[30] Skelmuir Hill, Stirling Hill, Dudwick LNCS overlaps with Alignments 2A and 2B however it is designated for geological interests and not considered within the biodiversity section.

Alignment Option	RAG	Alignment Comparison Notes
		Ancient Woodland: none.

Further Assessment:

Based on the potential effects to qualifying populations of pink-footed geese highlighted above, all the alignment options are given an Amber rating. With regards to European protected areas, there is little to differentiate between them considering the extent of suitable foraging habitat for geese incorporating the alignment options and the wider area and considering the mobile nature of the species involved.

Flight activity surveys to inform the Project and goose field use surveys for a related project, LT360 Aberdeenshire HVDC Connection S2P, will inform on goose activity in the Project's Zone of Influence. When a Potential Alignment is identified and further information on construction methods and programme are available, a Habitats Regulations Appraisal (HRA) Screening exercise will be undertaken to determine if the Project could result in Likely Significant Effects upon a European site, either alone or in combination with other plans or projects.

1.1.2 Protected Species

Data available from surveys for protected species for the Netherton Hub project and Eastern Green Link 3 (EGL3) project have been reviewed to inform this appraisal where the study areas overlap. This includes data for:

- Badgers – coverage available for part of the alignment options because surveys have extended 1km beyond the Netherton Hub site and surrounding the EGL3 site.
- Bats – coverage available for residential properties and trees in proximity to the alignment options.
- Otter and water vole – coverage available for watercourses within and up to 200 m beyond the Netherton Hub and EGL3 sites which partially overlap with the alignment options.

For other species, a habitat suitability assessment has been undertaken from a review of habitat data, with reference to the known distribution of species from publicly available datasets (e.g., red squirrel[31,32], great crested newt revised geographic zones[33], pine marten distribution map[34]), and professional experience of undertaking other ecological surveys in the same geographical region.

The following species have been considered for this exercise, with reference to their protection and conservation status e.g., European Protected Species (EPS) protected under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), species protected under national legislation such as the Wildlife and Countryside Act 1981 as amended (WCA), Protection of Badger Act 1992 (PBA), Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 (SFFA), and priority species on the Scottish Biodiversity List (SBL).

- Bats (EPS, SBL);
- Otter (EPS, SBL);
- Wildcat (EPS, SBL);
- Great crested newt (EPS, SBL);
- Badger (PBA, SBL);
- Red squirrel (WCA, SBL);
- Pine marten (WCA, SBL);
- Water vole (WCA, SBL);
- Reptiles (WCA, SBL);
- Freshwater pearl mussel (WCA, SBL); and

[31] Saving Scotland's Red Squirrels (online). Available at: https://scottishsquirrels.org.uk/squirrel-sightings/

[32] Scottish Forestry, Red Squirrel Stronghold Areas (online). Available: https://forestry.gov.scot/publications/21-map-of-red-squirrel-stronghold-areas

[33] O'Brien, D. Hall, J., Miró, A., & Wilkinson, J. (2017). Testing the validity of a commonly-used habitat suitability index at the edge of a species' range: great crested newt Triturus cristatus in Scotland. Amphibia-Reptilia 38: 265-273.

[34] Vincent Wildlife Trust, Pine Marten (online). Available: https://www.vwt.org.uk/species/pine-marten/

- Migratory salmonids (SFFA, SBL).

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	A	European protected species: There are watercourses (some field drains) across all alignment options which could support otter. There are residential, farm and industrial buildings in proximity to all alignment options which may have suitability to support roosting bats; however, it is assumed that the OHL would be constructed with a standoff distance from buildings such that the risk of disturbance would be minimal. There are also trees along the minor road at the connection to Netherton Hub site which were recorded to have potential roost features however no evidence of use has been recorded during EGL3 surveys. Negligible suitability for Scottish wildcat. Based on aerial imagery there appear to be no ponds within 250 m of both alignment options. Great crested newts are unlikely to be present. Nationally protected species: Badgers are active in the general area. Badger setts in current use and mammal burrows which showed no signs of current use by badgers have been identified in proximity to both alignment options (locations undisclosed due to sensitivity) and are likely to occur in proximity to Alignment T2A and T2B due to the prevailing habitat suitability. All alignment options are likely to extend through the territories of badger social groups but the Project is unlikely to compromise the conservation status of badgers based on their likely high density in the North East region. However, it is acknowledged that the footprint of the Project will be minimal, and it should be feasible to microsite the tower locations away (minimum 30 m) from known badger setts and construction works should be localised to tower bases (i.e., not close off the full length of the OHL which would otherwise create a barrier to movement of mammals). Potential effects may be mitigated and are unlikely to be significant. Water voles may use the drainage ditches and tributary burns crossed the alignment options. The watercourses in the general area appeared relatively modified (drainage ditches) and are likely to have limited suitability for migratory salmonids – although migratory salmonids may be present in watercourses connected to the Ugie catchment including Burn of Faichfield which would be spanned by all alignment options (at different locations). The modified watercourses and drainage ditches are unlikely to support freshwater pearl mussels. In any case, it is likely that the infrastructure on the ground would be set back more than 10m from watercourses. Suitable resources for red squirrel and pine marten appear limited. No confirmed evidence of these species has been recorded during
Alignment T2B	A	

Alignment Option	RAG	Alignment Comparison Notes
		any surveys for the Netherton Hub and EGL3 projects – although opportunities for pine marten den sites and potential scat was recorded. As with badgers, it should be feasible to microsite the tower locations away from any confirmed features used by pine marten (if any) and the Project should not obstruct movement of terrestrial mammals. Generally, pine marten and red squirrel distributions appear to be more closely linked to more extensive areas of woodland and valleys in Aberdeenshire. Any potential effects may be mitigated and are unlikely to be significant. Suitable habitats for reptiles appear relatively limited in the modified landscape and this species is unlikely to be a material constraint because of the localised footprint of the towers. Overall, an Amber rating is applied to all Alignments as a precaution.

Further Assessment:

All alignment options have been assigned an Amber rating and there is no significant difference to distinguish a preferred option. Further surveys will be required to further assess the potential impacts.

Field surveys for protected species will be undertaken for the Potential Alignment to inform assessment of how the Project may affect species which use the area for foraging, resting, commuting etc. The scope of protected species will be defined upon selection of a Potential Alignment, but is likely to include surveys for badgers, otters, water vole and bats.

1.1.3 Habitats

A field survey was undertaken of Alignment Option 2A and 2B, where access allowed, to ground-truth the habitat mapping and collect site-specific data utilising UK Habitat Classification (UKHab) methodology. Where coverage was not possible during field surveys or prior ecology studies (Netherton Hub and EGL3), data were extrapolated using professional experience of the setting and land use across the rest of the alignment options as a desk-based exercise using the following information sources:

- Publicly available map resources and aerial photography.
- Carbon and Peatland 2016 Map[35] data to identify the presence of potentially irreplaceable peatland habitat (blanket bog/areas of deep peat). Class 1 and Class 2 peat are considered irreplaceable habitat.
- Habitat Map of Scotland[36] (HABMoS) data to identify priority habitats including Annex I habitats (listed in the Habitats Directive).

A separate BNG assessment has been undertaken to calculate the baseline Biodiversity Units (BU) for each Alignment Option and identify areas of irreplaceable and high distinctiveness habitats. This does not include linear features.

The RAG rating for Habitats is separated out below into Annex I habitats and Biodiversity (units), following SSEN Transmission Guidance. The Biodiversity RAG table is presented separately, as this provides a comparison between the alignment options.

Groundwater Dependent Terrestrial Ecosystems (GWDTE) are covered under Hydrology/Geology further below.

[35] NatureScot (2016). Carbon and Peatland 2016 Map. Available: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map

[36] NatureScot (2015). Habitat Map of Scotland. Available: https://www.nature.scot/landscapes-and-habitats/habitat-map-scotland

Habitats RAG Rating

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Habitats are broadly similar across all alignment options and were found to comprise mainly modified grassland grazed by livestock and arable land including non-cereal crops and winter cereal stubble, with minor areas of developed land (e.g., residential / farm buildings and roads). Watercourses, predominantly field drains or modified watercourses and hedgerows bisect all alignment options. A small stand of coniferous woodland (plantation origin) was noted within the centre of Alignment Option 2A. Areas of mixed scrub, along with gorse scrub were also present between areas of unmanaged land within agricultural areas. There are no areas of overlapping Class 1 or Class 2 peatland visible from the Carbon and Peatland 2016 Map. Based on desk based and field studies, there are unlikely to be any Annex I habitats within the alignment options. According to SSEN Transmission Guidance, all alignment options are assigned a Green rating due to perceived lack of Annex I habitats.
Alignment T2B	G	

Biodiversity RAG rating:

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	When compared to the alternative Alignment Option T2B this Alignment Option has a marginally lower BU value of 85.21 BU; and a relative BU value of 1.99 BU/ha.
Alignment T2B	G	When compared to the alternative Alignment Option T2A, this Alignment Option has a marginally higher BU value of 87.36 BU. It does however have a relative BU value of 1.97 BU/ha, which is comparatively lower than in Alignment Option T2A.

Further Assessment:

In terms of potential effects to habitats of elevated conservation importance, all alignment options have been assigned a Green rating due to perceived lack of Annex I habitat types.

For Tie-Out options, the BNG assessment identified Alignment Option T2A to have the lowest BU value. However, Alignment Option T2B has the lower relative BU/ha. Therefore, as both options have only marginally different BUs, there is no distinguishing factor for a preferred option in BNG terms, with both alignment options being rated Green.

Upon selection of the Potential Alignment, areas not subject to initial field surveys will be ground-truthed at a future date to update UKHab classification and habitat condition assessment to support final BNG assessments of the Project. A full BNG assessment should be undertaken to provide compensation estimates for achieving a net gain in biodiversity for whichever Alignment Option is taken forward. This should use field-based evidence, be accurate to the footprint of the Project (i.e., tower bases and access routes), and also account for any linear habitat features for which impacts would be unavoidable.

1.1.4 Ornithology

A high-level habitat suitability assessment of the Project's broad corridor options for legally protected and notable species of conservation concern (referred to hereafter as 'Target Species') has been undertaken, informed by professional judgement and survey findings from a related Proposed Development with overlapping survey areas, Peterhead Hub. Target Species are those which correspond to any of the following criteria, in accordance with the relevant NatureScot[37, 38] and Scottish Hydro Electric Transmission[39] guidance:

- Listed on Annex I of the EU Directive on the Conservation of Wild Birds 79/409/EEC (the 'Birds Directive') (Annex I);
- Listed on Schedule 1 (including Schedule T1A and/or A1) of the Wildlife and Countryside Act (1981) (Schedule 1);
- Listed as 'Red' Birds of Conservation Concern 2021 (BoCC5); and
- Listed on the Scottish Biodiversity List (SBL).

In addition, flight activity surveys have been undertaken across breeding and non-breeding seasons between 2023 – 2024.

All alignment options incorporate similar habitat mainly comprising agricultural land (grazing pasture and arable land). Bird surveys undertaken for a related project, Netherton Hub, indicate all alignment options are of low value for ornithological interests in the breeding season. Species recorded during May to July 2023 have included a range of typical farmland passerines (songbirds) in addition to grey partridge and oystercatcher. Grey partridge is a declining Red List species within Birds of Conservation Concern[40] (BoCC5) and listed within SBL. However, given the relatively localised nature of the alignment options and the extent of suitable habitat in the wider area, this species is unlikely to be significantly affected by the Project.

All alignment options occupy mainly agricultural habitat potentially used by foraging geese and swans. The same habitat could also support wintering populations of waders such as curlew and golden plover. Both species are listed within SBL, curlew is a Red List species within BoCC5, and golden plover is an Annex I species. These species will be recorded during ongoing flight activity surveys to inform the Alignment and Project and as incidental observations during field use surveys for the related project, LT360 Aberdeenshire HVDC Connection S2P.

There was an incidental record for barn owl during the ecology surveys for the related Netherton Hub project; the individual bird was disturbed from a roost site in a hedge. The roost site was not suitable for breeding, although buildings within the Netherton Hub site are potentially suitable for breeding barn owl. If barn owls are present, then they may forage within the Alignment. The potential for collision risk is considered low given that barn owls typically forage close to ground level (typically 0-3m).

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T2A	A	The arable farmland within and surrounding the alignment options potentially provides suitable foraging habitat for species potentially sensitive to disturbance and collision risk such as geese and waders during the non-breeding season. Therefore, there is potential for effects from the Project on these species. All alignment options have been given an Amber rating. There is little to differentiate between the alignment options considering the extent of suitable foraging habitat for these species incorporating
Alignment T2B	A	

[37] SNH (2016). Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. Version 1, July 2016.

[38] SNH (2017). Recommended bird survey methods to inform impact assessment of onshore windfarms. Version 2, March 2017.

[39] Coleman, M., Fitchet, A., Seller, J., Williams, F. & Wright, P. (2016). SHE Transmission Ornithology Workshop – Ornithology Methods for Transmission Developments. SHE Transmission

[40] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.

Alignment Option	RAG	Alignment Comparison Notes
		the alignments and the wider area and considering the mobile nature of the species involved.

Further Assessment:

All alignment options have been assigned an Amber rating and there is little to differentiate between the alignment options. Flight activity surveys to inform the Project and goose field use surveys for a related project, Aberdeenshire HVDC Connection S2P, have recorded very low activity from Target Species within the Project's Zone of Influence.

1.1.5 Hydrology, Geology and Hydrogeology

Hydrology, Geology and Hydrogeology receptors have been considered within a 1 km Study Area in relation to all alignment options.

Scottish Environment Protection Agency (SEPA)'s guidance on assessing the impacts of developments on groundwater abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTE) (LUPS-GU31) requires assessment of groundwater abstractions and potential GWDTE located within 250 m of excavations greater than 1 m and within 100 m of excavations less than 1 m. Therefore, the 'GWDTE Study Area' includes the area within 250 m of the Site. Abstractions within 250 m of the Site have also been identified.

Consultation has been undertaken with Aberdeenshire Council in February 2024, in request for private water supply (PWS) information. Locations of PWS sources and infrastructure have not yet been verified. Further investigation through consultation and site survey, if required, may identify locations within the Alignment / LOD.

The Scottish Water asset database (December 2024) has been consulted for information relating to public water supplies.

In response to consultation for another SSEN project, Scottish Water (SW) provided Drinking Water Protected Areas (DWPA) data, which are considered as part of this appraisal.

Consultation has been undertaken with SEPA regarding licensed abstractions within all alignment options.

Habitat survey information was not available at the time of this appraisal in order to establish potential GWDTE. In the absence of this information, it has been assumed that GWDTEs are present for the purpose of this appraisal.

A desk study and data search has been undertaken to identify the baseline environment, including information on solid and drift geology, surface water and groundwater and designated sites. Available information has been used from the following sources:

- SEPA Water Classification Hub (River Basin Management Plan interactive web map)[41];
- Ordnance Survey (OS) 1:50,000 scale mapping;
- British Geological Survey (BGS) Geoindex Onshore Hydrogeological Map of Scotland 1:625,000 scale (interactive web map)[42];
- NatureScot SiteLink[43] (interactive web map); and
- SEPA DWPAs – Scotland River Basin District Maps (via The Scottish Government online) - Scotland river basin district maps [44].

[41] Water Classification Hub (interactive web map), SEPA. Available at: https://www.sepa.org.uk/data-visualisation/water-classification-hub/ [Accessed July 2023]

[42] The British Geological Survey – Hydrogeology. Available at: https://mapapps2.bgs.ac.uk/geoindex/home.html [Accessed July 2023]

[43] NatureScot Sitelink (interactive web map). Available at: Available at: https://sitelink.nature.scot/map [Accessed September 2023]. [Accessed July 2023]

[44] Scottish Government Drinking water protected areas - Scotland River basin district [online]. Available at: Scottish Government. Drinking water protected areas - Scotland river basin district [online]. Available at: https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/ [Accessed July 2023]

According to SEPA DWPAs, most of Scotland is located within SEPA DWPA for groundwater, including the area in which the alignment options are located; however, each Alignment Option has been considered in relation to SEPA DWPA for surface waters.

According to NatureScot Sitelink, there are no Protected Areas, designated for their hydrological or geological features, within 1 km of any of the alignments.

As the Limit of Deviation (LOD) for each alignment is 100 m, all distances are measured from the LOD at the closest point for each alignment option.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	A	Alignment T2A crosses an unnamed tributary of Faichfield Burn (ID: 23217). Alignment T2A is underlain by an unnamed igneous intrusion (Ordovician to Silurian) and Southern Highland group, low productivity aquifers, where small amounts of groundwater may be present in the near surface weathered zone and in secondary fractures. Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T2A. None of which are indicated within the LOD; however, there is one within 250 m of the LOD. SEPA data indicates that there are no registered abstractions within 1 km of Alignment T2A. SW data indicates that there are no SW abstractions within 1 km of Alignment T2A. Alignment T2A is not located within a SEPA DWPA for surface water. Alignment T2A is located entirely within SW DWPA of River Ugie which supplies Forehill WTW. Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T2A, this option has been assigned an Amber rating.
Alignment T2B	A	Alignment T2B crosses an unnamed tributary of Faichfield Burn (ID: 23217). Alignment T2B is underlain by an unnamed igneous intrusion (Ordovician to Silurian), an unnamed igneous intrusion (Late Silurian to Early Devonian) and Southern Highland group, low productivity aquifers, where small amounts of groundwater may be present in the near surface weathered zone and in secondary fractures. Aberdeenshire Council data indicates that there are numerous PWS within 1 km of Alignment T2B. None of which are indicated within the LOD; however, there are two within 250 m of the LOD. SEPA data indicates that there are no registered abstractions within 1 km of Alignment T2B. SW data indicates that there are no SW abstractions within 1 km of Alignment T2B. Alignment T2B is not located within a SEPA DWPA for surface water.

Alignment Option	RAG	Alignment Comparison Notes
		Alignment T2B is located entirely within SW DWPA of River Ugie which supplies Forehill WTW. Based on the presence of watercourses, PWS, SW DWPA and the likely presence of GWDTEs within 1 km of Alignment T2B, this option has been assigned an Amber rating.

Further Assessment:

All of the Out alignment options have been assigned an Amber RAG rating, as each of the alignment options may compromise the quality and / or quantity of surface waters or groundwater. However, Alignment T2A is more preferable as there is one less PWS within 250 m of the LOD.

1.2 Cultural Heritage

Baseline information on known Designations and Cultural Heritage Assets was gathered for the following study areas:

- Inner Study Area: all recorded Designations and Cultural Heritage Assets held in the Scottish National Record of the Historic Environment Record (SNRHE) within each Alignment Option.
- Outer Study Area: Designations and Cultural Heritage Assets (i.e. Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes and Inventory Historic Battlefields) within 2 km of each Alignment Option.

1.2.1 Cultural Heritage Designations

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	There are no World Heritage Sites, Gardens and Designed Landscapes (GDL), Inventory Battlefields, or SMR entries within the study areas. Cairn Catto Long Cairn (SM3276) is located approximately 1.7 km south-east of Alignment Option T2A. There is potential for impacts through changes within the setting of the heritage asset, but these impacts are not likely to lead to significant effects due to the presence of the existing OHL adjacent to the monument and the existing OHL in the same direction, as well as intervening buildings and vegetation. Based on the low potential for significant effects on Designations, the alignment option has been assigned a RAG rating of Green.
Alignment T2B	G	There are no World Heritage Sites, Gardens and Designed Landscapes (GDL), or Inventory Battlefields within the study areas. Cairn Catto Long Cairn (SM3276) is located approximately 1.7 km south-east of Alignment Option T2B. There is potential for impacts through changes within the setting of the heritage asset, but these impacts are not likely to lead to significant effects due to the presence of the existing OHL adjacent to the monument and the existing OHL in the same direction, as well as intervening buildings and vegetation.

Alignment Option	RAG	Alignment Comparison Notes
		There is one SMR entry within Alignment T2B, comprising a post-medieval house that is no longer extant. Based on the low potential for significant effects on Designations, the alignment option has been assigned a RAG rating of Green.

Further Assessment:

None of the alignment options would have the potential to result in significant effects on Designations, so have both been assigned a Green RAG rating.

The preferred Alignment Option is T2A as it does not contain any SMR entries within the LOD.

There is the potential for unknown archaeological remains to exist within each Alignment option.

1.2.2 Cultural Heritage Assets

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	There are no Listed Buildings, Conservation Areas, or Non-Inventory Gardens and Designed Landscapes within the study areas. Based on the low potential for significant effects on Cultural Heritage Assets, the alignment option has been assigned a RAG rating of Green.
Alignment T2B	G	There are no Listed Buildings, Conservation Areas, or Non-Inventory Gardens and Designed Landscapes within the study areas. Based on the low potential for significant effects on Cultural Heritage Assets, the alignment option has been assigned a RAG rating of Green.

Further Assessment:

None of the alignment options would have the potential to result in significant effects on Cultural Heritage Assets, so have both been assigned a Green RAG rating.

There is no preference for either alignment option in relation to Cultural Heritage Assets.

1.3 People

1.3.1 *Proximity to Dwellings*

See **Appendix 2.2 Section 2.11.1 Proximity** within the Engineering Assessment for an appraisal of proximity to dwellings.

1.4 Landscape and Visual

1.4.1 *Designations*

The potential for effects on national designations and on wild land areas is excluded as they lie beyond 10km of the alignment options. The potential for effects on regional designations is noted when these lie within approximately 5km of the alignment options. Gardens & Designed Landscapes are considered in Section **2.2 Cultural Heritage.**

Assumptions:

- It is assumed that the existing towers and associated cables of the existing New Deer OHL would be removed between the stemming-off and rejoining points of the tie-in connection.
- The angle towers required for changes in direction of the new alignment would have an increased bulk in comparison with the regular support towers.
- The tie-in section towers would be SSEN 400 kV with triple conductors, approximately 57m in height which would have a greater bulk than the existing New Deer 400kV SSEN standard 275 kV towers, 45m in height.

Designations: Comparison of Options T2A and T2B

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	There are no National Parks or National Scenic Areas within 10 km of Alignment T2A. The North East Aberdeenshire Coast Special Landscape Area lies between 5 to 6 km east of Alignment T2A and is unlikely to be affected.
Alignment T2B	G	There are no National Parks or National Scenic Areas within 10 km of Alignment T2B The North East Aberdeenshire Coast Special Landscape Area lies between 4 to 5km east of Alignment T2B and is unlikely to be affected.

Further Assessment:

All alignment options have been allocated a RAG Rating of Green as it is very unlikely for any of the alignment options to compromise any of the key attributes and qualities of any landscape designation.

Landscape designations are not considered to constrain the options considered.

Designations: Cumulative Comparison of Alignment Options

For the cumulative assessment, the preferred option for the Rebuild, R2 is assumed. The table below considers the following combined cumulative options: Tie OUT 2A, 2B + Tie IN 1A, 1B, 1C + with B2P (Beauly to Peterhead 400kV OHL) + Rebuild R2, with the existing New Deer 400kV OHL removed from the Tie-In Tower 76 to Peterhead Substation. With Rebuild R2, near to Peterhead Substation, a temporary diversion of a small section of OHL would be required. Refer to **Figure 4: Landscape and Visual** for Site Plan showing location of the different alignment options with the removal of existing OHL at near to the existing and proposed Substations at Peterhead.

Alignment Option	RAG	Site Comparison Notes
T2A + T1A + R2 + B2P	G	There are no National Parks or National Scenic Areas within 10 km of any alignment option or the B2P OHL The North East Aberdeenshire Coast Special Landscape Areas lie between 5 to 10km east of Alignment T1A and is unlikely to be affected.
T2A + T1B + R2 + B2P	G	
T2A + T1C + R2 + B2P	G	
T2B + T1A + R2 + B2P	G	
T2B + T1B + R2 + B2P	G	
T2B + T1C + R2 + B2P	G	

Further Assessment:

All alignment options have been allocated a RAG Rating of Green as it is unlikely for any of the alignment options to compromise any of the key attributes and qualities of any landscape designation. Landscape designations do not constrain the options considered.

1.4.2 Landscape Character

Effects on Landscape Character consider the potential for effects on nationally defined landscape character areas. Effects are noted when these character areas lie within or adjacent to the alignment options.

All alignment options lie within the Landscape Character Area (LCA): Nature Scot SNH National Landscape Character Assessment: Aberdeenshire 17 Coastal Agricultural Plain

Key features of this LCA applicable to this Option Appraisal are:

- *low lying gently undulating landform;*
- *mixed farmland with occasional residential and farmsteads;*
- *occasional coniferous plantation often on elevated land;*
- *existing overhead lines, telecommunication towers. Peterhead Power station, windfarms and single wind turbines are features of the local landscape.*

Consideration is also given to potential effects on the local landscape character with an assumption of a potential area of effect of 3km. All options lie within a rural landscape characterised by the features listed above and below:

- *small to medium sized fields with fences and hedgerows as field boundaries;*
- *woodland copse, tree belts and occasional conifer plantation;*
- *local windfarm on Gallows Hill with distant views of other wind development as single turbines or windfarm*
- *existing high and low level transmission lines within the locality;*
- *views of local disused airfield with various commercial uses, large industrial sheds and large agricultural storage sheds in farmsteads.*

Landscape Character: Comparison of Options T2A and T2B

Alignment Option	**RAG**	**Site Comparison Notes**
Alignment T2A	A	Alignment T2A begins at Tower 76 at approximately +65m AOD, rises to +70m AOD and then passes down a gradual north facing slope until it reaches the Netherton Hub at approximately +55m AOD. The land is mixed farmland of medium sized fields with trimmed hedges and fences as boundaries. Settlement consists of occasional individual residential properties. The existing 400kV Peterhead to Aberdeen OHL is visible on the horizon to the south.
Alignment T2B	A	Alignment T2B begins at Tower 76 at approximately +65m AOD and passes northwards down a gradual north facing slope until it reaches the Netherton Hub at approximately +55m AOD. The land is mixed farmland of medium sized fields with trimmed hedges and fences as boundaries. The scattered settlement of Toddlehill lies directly to the east consisting of a line of individual residential properties. Close to Tower 76 on the higher ground, the existing 400kV Peterhead to Aberdeen OHL is visible on the horizon to the south.

Further Assessment:

Alignments T2A and T2B lie on high ground, and both pass through a similar landscape character with overhead lines present as existing features in the locality. Alignment T2B lies on slightly lower ground while Alignment T2A passes over higher ground and would be slightly more visually prominent. Alignment T2B lies closer to residential settlement. Both routes T2A and T2B would compromise the local landscape character and are given an Amber rating. The selection of which is the preferred alignment becomes clearer when the potential cumulative effects with other routes are considered below.

Designations: Cumulative Comparison of Alignment Options

Alignment Option	RAG	Site Comparison Notes
T2A + T1A + B2P+R2	A	Option T2A runs south then south east from the Netherton Hub, separated both in distance and direction from Option T1A+B2P. Option T1A +B2P would run close parallel from Tower 65, as described in the landscape character table above. A section of New Deer – Peterhead 400kV OHL would be removed from the T1A to T2A on high ground. Two distinct infrastructure corridors would be created, T1A + B2P to the west side of the Hub and Option T2A to the south side, providing a 'neat' alignment of overhead lines. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17), but the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating.
T2A + T1B + B2P + R2	R	Option T2A runs south then south east from the Netherton Hub. Option T1B runs from Tower 67 of the existing New Deer OHL as described in the landscape character table above, to enter the substation from the south. Three infrastructure corridors would be created, converging on the Netherton Hub, with Option T1B passing over locally high ground south of Mains of Kinmundy, with the risk of creating a cluttered 'wirescape' to the surrounding the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local landscape character is rural. The introduction of several 400 kV OHLs converging on the Hub from different directions is likely to adversely affect the local landscape character so has been given a Red RAG rating.
T2A + T1C + B2P + R2	A	Option T2A runs south then southeast from the Netherton Hub, close and near parallel to Option T1C for approximately a kilometre. Option T1C runs from Tower 73 of the existing New Deer OHL as described in the landscape character table above. Two distinct infrastructure corridors would be created close to the Netherton Hub, the B2P line to the west and Option T1C and Option T2A to the south. In addition, the retained towers of the existing New Deer line to the south would remain on elevated land. Four

Alignment Option	RAG	Site Comparison Notes
		bulky angle towers close to each other, on locally high ground, would be required to form the turn-in to the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating
T2B + T1A + B2P + R2	A	Option T2B runs south east then south from the Netherton Hub. Two distinct corridors of overhead line created providing a 'neat' solution minimising wirescape in the locality The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but they do not characterise the landscape locally to the Netherton Hub, but the overall local character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating.
T2B + T1B + B2P + R2	R	Option T2B runs south east then south from the Netherton Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) the overall local landscape character is rural. The introduction of several 400 kV OHLs converging on the Hub from different directions is likely to adversely affect the local landscape character so has been given a Red RAG rating.
T2B + T1C + B2P + R2	A	Option T2B runs south east then south from the Netherton Hub, close and near parallel to Option T1C for approximately a kilometre. Four bulky angle towers close to each other, sited on the existing New Deer OHL, the T1C and T2B, on locally high ground, would be required to form the turn-in to the Hub. The presence of transmission lines is recognised as characteristic of the wider landscape (LCT17) but they do not characterise the landscape locally to the Netherton Hub the overall local landscape character is rural. The introduction of several 400 kV OHLs risks adversely affecting the local landscape character so has been given an Amber RAG rating

Further Assessment:

Both T2A and T2B combined with the Tie-In options, the B2P OHL and Rebuild R2 have the potential to compromise the landscape character of the LCT17 Coastal Agricultural Plain - Aberdeenshire at a local level in the vicinity of the Netherton Hub. The degree to which each of the options combined with the B2P OHL would affect landscape character varies with benefits derived from removal of existing towers of the New Deer OHL which is sited on high ground in this location.

With either Option T2A or T2B combined with T1A or T1C there is an opportunity to create two distinct infrastructure corridors entering Netherton Hub, although the combination with T1A is preferred as this allows T1A to be aligned in parallel with the B2P from the west. This also has the benefit of the largest number of towers to be removed on the existing New Deer OHL to the south located on higher ground. The alignment option with T1B is not preferred as this

introduces a third OHL corridor into the Hub, thereby increasing the wirescape. It also involves removing fewer towers from the existing line than T1B.

There is a marginal preference for Option T2A compared to Option T2B as the alignment is more linear with less of an angle change, thereby a less bulky tower would be used.

1.4.3 Visual

In this section the potential for effects on visual receptors (both individual and groups) are noted when the visual receptors have potentially clear visibility of the Alignment Option. Potential visual receptors are considered within 1-2km of the alignment options, although this could extend further as all alignment options pass over elevated ground with open views particularly to the west north and east towards Peterhead.

There would be close up views during the construction phase of contractors' compounds, earthworks and the installation of the towers, cables access tracks and entrances. These works would be temporary.

Visual receptors present include isolated farmsteads and individual residential properties, users of minor highways and recreational routes such as the public footpaths providing access to local schools. There is a potential visual impact from the regional route, the Formantine and Buchan Way located 3 – 4 km to the north. It is considered potential visual effects of the Proposed Development at this distance would not be significant due to the intervening topography and vegetation.

Both alignment options pass across gently undulating topography with mixed farmland of medium sized fields with low hedges, walls or fences as field boundaries. There are open long-distance views in all directions as the OHL crosses higher ground for both alignment options, consequently both alignment options would be visible at distance on the horizon from some locations within the surrounding area. There would be a cumulative visual effect with the B2P OHL entering the Netherton Hub from the west and the Rebuild Alignment R2 from the south in addition to the retained sections of existing New Deer 400kV OHL.

There are visual detractors present such as industrial sheds at Longside Airfield, Gallows Hill Windfarm to the east, Peterhead Power Station and the existing Peterhead to Aberdeen 400kV OHL to the south, however these are isolated features present in different directions and minimal in their visual impact with the local character being predominantly rural, with open views of the surrounding farmland and forestry.

At this stage of the assessment, it is assumed that offsite planting of hedgerow trees, hedgerows and woodland plantations would not be possible. The assessment assumes the worst-case scenario with little planting present.

Visual: Comparison of Options T2A and T2B

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	A	Alignment T2A passes over a rise from Tower 76 and then falls northwards to the Netherton Hub down the north facing slope across open farmland, with one slight change in direction. There are limited residential properties with a close-up view. The farmstead, West Toddlehills, would have a partial view. Hill Head Dairy with a north facing aspect would have a view of a line of towers. Residential properties at Toddlehill with a west facing aspect would have a view of Alignment T2A in the middle distance on the horizon.
Alignment T2B	R	Alignment T2B passes from Tower 76 down a north facing slope, east of the farmstead of West Toddlehills to Netherton Hub with one change in direction. The residential properties at Toddlehill with a west facing aspect (potentially 11No) would have a wide horizontal angle of view

Alignment Option	RAG	Site Comparison Notes
		altered by Alignment T2B, visible in the middle distance from south to north, from Tower 76 to the Netherton Substation.

Further Assessment:

Alignments T2A and T2B pass from the high ground falling towards Netherton Hub with potential views from the nearby west facing residential properties at Toddlehill. Alignment T2B lies on slightly lower ground however it lies closer to the residential properties. Alignments T2A and T2B would be highly visible in the middle distance and on the horizon. Alignment T2A is the preferred choice as it lies further from a greater number of residential properties and therefore would have less of an effect on the local visual amenity. Alignment T2B would have a detrimental effect on local visual amenity to the nearby residential properties at Toddlehills.

Visual: Cumulative Comparison of Alignment Options

Alignment Option	RAG	Site Comparison Notes
T2A + T1A + B2P + R2	A	Alignment T2A, Rebuild R2 and the alignment of T1A with B2P offer the potential to create two distinct infrastructure corridors entering Netherton Hub, thereby creating a neater solution and reducing potential wirescape. There would be a beneficial effect to residential properties with a north facing aspect at the hamlet of Nether Kinmundy with the removal of existing towers on the New Deer – Peterhead OHL from Tower 66 eastwards, which are located on high ground from +65 m to +80 m AOD.
T2A + T1B + B2P + R2	R	Three distinct infrastructure corridors of overhead line would be created coming into the Netherton Hub, the B2P line to the west, Tie IN Option T1B and Tie OUT Option T2A plus Rebuild Option R2 to the east. A group of receptors around Mains of Kinmundy would be 'boxed-in' such that they would have OHLs visible at close quarters in all directions This combination would create a clutter of wirescape in the locality for visual receptors in nearby residential properties and users of local highways.
T2A + T1C + B2P + R2	R	From residential properties at Toddlehills and Parkhill with a west facing aspect there would be a combined cumulative visual effect of the two alignments of overhead lines in the far and near distance for a wide horizontal angle of view. Tie IN T1C and B2P line with the existing New Deer OHL would be visible on the horizon to the south along with Tie OUT option T2A and Rebuild R2. A larger group of receptors from Mains of Kinmundy to Hillhead Dairy would be 'boxed-in' with OHLs visible in all directions in all directions. Overall, this solution creates a cluttered wirescape with localised views from nearby residential properties and local highways.
T2B + T1A + B2P + R2	A	Alignment T2A, Rebuild R2 and the alignment of T1A with B2P offer the potential to create two distinct infrastructure corridors entering

Alignment Option	RAG	Site Comparison Notes
		Netherton Hub, thereby creating a neater solution and reducing potential wirescape. There would be a beneficial effect to residential properties with a north facing aspect at the hamlet of Nether Kinmundy with the removal of existing towers on the New Deer – Peterhead OHL from Tower 66 eastwards, which are located on high ground from +65 m to +80 m AOD. Two distinct infrastructure corridors are created, T1A + B2P and Tie Out Options T2B + R2, thereby creating a neater appearance and minimising the wirescape.
T2B + T1B + B2P + R2	R	Three distinct infrastructure corridors of overhead line would be created coming into the Netherton Hub, the B2P line to the west, Tie IN Option T1B, Tie OUT Option T2A and Rebuild R2 to the east. A group of receptors around Mains of Kinmundy would be 'boxed-in' such that they would have OHLs visible at close quarters in all directions This combination would create a clutter of wirescape in the locality for visual receptors in nearby residential properties and users of local highways.
T2B + T1C + B2P + R2	R	From residential properties at Toddlehills and Parkhill with a west facing aspect there would be a combined cumulative visual effect of the two alignments of overhead lines in the far and near distance for a wide horizontal angle of view. Tie IN T1C and B2P line with the existing New Deer – Peterhead OHL would be visible on the horizon to the south along with Tie OUT option T2B and Rebuild R2. A larger group of receptors from Mains of Kinmundy to Hillhead Dairy would be 'boxed-in' with OHLs visible in all directions in all directions. Overall, this solution creates a cluttered wirescape with localised views from nearby residential properties and local highways.

Further Assessment:

All alignment options would have a cumulative effect with the existing New Deer OHL and the B2P alignment and Rebuild R2, although this varies in extent for each. The difference between T2A and T2B for visual receptors when considered cumulatively is less of a factor in distinguishing a preferred option as both 'Out' options and the Rebuild R2 leave the Hub on similar alignments at approximately the same distance from Option T1A (Potential Alignment option for the Tie IN).

Each of the alignments has advantages and disadvantages in relation to visual amenity, however there is a preferred design solution in selecting T2A and T1A in combination with the B2P and Rebuild R2 option. Alignment T2A overall is preferred in comparison to Alignment T2B as T2A is located at a greater distance from the sensitive residential receptors and users of local highways and consequently visual effects would be less. This combination offers a neater solution with less visual impact to nearby sensitive visual receptors.

Should rebuild option R1 be selected (the preferred rebuild option in terms of landscape and visual effects) the conclusions of this tie-in appraisal would remain unchanged.

1.5 Land Use

1.5.1 Agriculture

Effects on agricultural land consider the potential for effects on land capability for agriculture. Effects are noted when land capable of producing an average to wide range of crops is located adjacent to or within the alignment options.

The wider area is characterised by largely LCA rating of 3.2 ("Land capable of average production though high yields of barley, oats and grass can be obtained"). Land capability for agriculture decreases further south of the Project (down to an LCA rating of 6.1).

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	Alignment T2A passes through agriculture land with an LCA rating of 3.2 and below. This option has therefore been allocated a Green RAG Rating.
Alignment T2B	A	Alignment T2B is situated adjacent to an LCA rating of 3.1. Land here is classified as capable of producing consistently high yields of a narrow range of crops and / or moderate yields of a wider range. Despite this, it is not anticipated that the option would compromise the functionality / viability of the land, but on a conservative basis this alignment has been assigned an Amber RAG rating.

Further Assessment:

Alignment T2A was assigned a Green RAG rating. As this alignment does not pass through, nor is adjacent to, agricultural land with an LCA rating of 3.1 or above, it is the preferred option. Alignment T2B is situated adjacent to higher quality agricultural land and is thus slightly more constrained, making it the less preferable option.

1.5.2 Forestry

Constraints in relation to forestry, per the SSEN Guidance Document, relate specifically to potential to compromise the commercial viability of forestry operations. Forestry constraints related to natural heritage are considered earlier in this Appendix.

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	This alignment option does not pass through any areas of identified commercial forestry. There may be minimal removal of individual roadside trees or other vegetation required, but otherwise this option is not considered to be constrained by forestry and has been afforded a Green RAG rating.
Alignment T2B	G	As above.

Further Assessment:

Neither alignment option is considered to be constrained by forestry, and both have been allocated a Green RAG rating. No clear preference has been identified for either option in this regard.

1.5.3 Recreation

Effects on recreation consider the potential for effects on receptors including national cycle networks and public core paths. Effects are noted when these recreational receptors are located adjacent to or within the alignment options.

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	These alignments are not located near any national cycle network routes or public core paths. These alignments do not interact with any area known to be used for commercial sporting activities. These alignments have therefore been allocated a **Green** RAG Rating.
Alignment T2B	G	

Further Assessment:

Both alignment options have been assigned a RAG rating of Green. As such, there is no preferred option with regard to recreation.

1.6 Planning

1.6.1 Policy

National Policy

National Planning Framework 4 (NPF4) was adopted by the Scottish Government in February 2023 and is a long-term plan looking to 2045 that guides spatial development, sets out national planning policies, designates national developments and highlights national and regional spatial priorities.

In contrast to previous National Planning Frameworks, NPF4 places national policy at the heart of planning decision making as it is part of the statutory Development Plan along with Local Development Plans. Upon the adoption of NPF4 in February 2023, NPF3, Scottish Planning Policy (SPP) and all Strategic Development Plans ceased to have any relevance to planning decision making in Scotland. NPF4 encapsulates the National Planning Framework, and National Planning Policy in the same document for the first time.

NPF4 identifies a number of National Developments which are significant developments of national importance that will help to deliver the spatial strategy. Statements of need are set out in NPF4 that describe the development to be considered as a national development for consent handling purposes. Amongst the national developments identified is National Development 3: Strategic Renewable Electricity Generation and Transmission Infrastructure which includes:

b) New and/or replacement upgraded on and offshore high voltage electricity transmission lines, cables and interconnectors of 132kv or more; and

c) New and/or upgraded Infrastructure directly supporting on and offshore high voltage electricity lines, cables and interconnectors including converter stations, switching stations and substations.

As stated above, NPF4 contains National Planning Policies, and these policy positions are to be taken into account in land use planning decision making. The NPF4 policies that are of the most relevance to the development are:

- Policy 1 – Tackling the Climate and Nature Crises. The intent is to encourage, promote and facilitate development that addresses the global climate emergency and nature crisis.
- Policy 2 – Climate Mitigation and Adaptation. Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible and adapt to current and future risks from climate change.
- Policy 3 – Biodiversity. Development proposals need to contribute to the enhancement of biodiversity and integrate nature based solutions. Proposals requiring an EIA will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity.
- Policy 4 – Natural Places. Development proposals which by virtue of type, location or scale will have an unacceptable impact on the natural environment will not be supported. Development Proposals that are likely to have a significant effect on an existing or proposed European Site, and are not directly connected with or necessary to their conservation management, are required to be subject to an appropriate assessment of the implications to conservation objectives. Development proposals that will not compromise

the designation status/overall integrity of a National Park, National Scenic Area, SSSI, Natural Nature Reserve, local conservation site, or local landscape area. Development proposals that are likely to have an adverse effect on species protected by legislation will only be supported where the proposal meets the relevant statutory tests. If there is reasonable evidence to suggest that a protected species is present on a site or may be affected by a proposed development, steps must be taken to establish its presence.

- Policy 5 – Soils. Development will only be supported if they are designed and constructed in accordance with mitigation hierarchy, and in a manner that protects soil from damage. Development proposals on prime agricultural land, or land of lesser quality that is culturally or locally important for primary use (as identified by the LDP), peatland, carbon-rich soils, and priority peatland habitat, will only be supported where it is for essential infrastructure and there is a specific locational need and no other suitable site. Where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required.
- Policy 6 – Forestry, Woodland and Trees. Development proposals that enhance, expand and improve woodland and tree cover will be supported. Development proposals will not be supported where they will result in any loss of ancient woodlands, ancient and veteran trees, or adverse impact on their ecological condition, native woodlands, hedgerows, individual trees of high diversity value, or identified for protection. Fragmenting or severing woodland habitat without appropriate mitigation will also not be supported. Development proposals involving woodland removal will only be supported where they will achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal. Where woodland is removed, compensatory planting will most likely be expected to be delivered. Development proposals on sites which include an area of existing woodland or land identified in the Forestry and Woodland Strategy as being suitable for woodland creation will only be supported where the enhancement and improvement of woodlands and the planting of new trees on the site (in accordance with the Forestry and Woodland Strategy) are integrated into the design.
- Policy 7 – Historic Assets and Places. Development proposals with a potentially significant impact on historic assets or places will be accompanied by an assessment which is based on an understanding of the cultural significance of the historic asset and/or place. Development proposals in or affecting conservation areas will only be supported where the character and appearance of the conservation area and its setting is preserved or enhanced. Development affecting SM will only be supported where direct and significant adverse impacts on the integrity of the setting are avoided, or exceptional circumstances have been demonstrated to justify the impact. Development proposals affecting nationally important Gardens and Designed Landscapes will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact on important views to, from and within the site, or its setting. Development proposals which sensitively repair, enhance and bring historic buildings, as identified as being at risk locally or on the national Buildings at Risk Register, back into beneficial use will be supported. Non-designated historic environment assets, places and their setting should be protected and preserved in situ wherever feasible. Where there is potential for non-designated buried archaeological remains to exist below a site, developers will provide an evaluation of the archaeological resource at an early stage so that planning authorities can assess impacts. Historic buildings may also have archaeological significance which is not understood and may require assessment.
- Policy 11 – Energy. To encourage, promote and facilitate all forms of renewable energy development onshore and offshore.
- Policy 12 – Zero Waste. Development proposals will seek to reduce, reuse, or recycle materials in line with the waste hierarchy.
- Policy 14- Design, quality and place - Development proposals will be designed to improve the quality of an area whether in urban or rural locations and regardless of scale. Development proposals will be supported where they are consistent with the six qualities of successful places and development proposals that are poorly designed, detrimental to the amenity of the surrounding area or inconsistent with the six qualities of successful places, will not be supported.
- Policy 18 – Infrastructure First. To encourage, promote and facilitate an infrastructure first approach to land use planning, which puts infrastructure considerations at the heart of placemaking.

- Policy 19 - Heating and Cooling - National and major developments that will generate waste or surplus heat and which are located in areas of heat demand, will be supported providing wider considerations, including residential amenity, are not adversely impacted. A Heat and Power Plan should demonstrate how energy recovered from the development will be used to produce electricity and heat.
- Policy 20 – Blue and green Infrastructure. Development proposals that result in fragmentation or net loss of existing blue and green infrastructure will only be supported where it can be demonstrated that the proposal would not result in or exacerbate a deficit in blue or green infrastructure provision, and the overall integrity of the network will be maintained. Development proposals for or incorporating new or enhanced blue and/or green infrastructure will be supported.
- Policy 22 – Flood Risk and Water Management. Development at risk of flooding or in a flood risk area will only be supported if they are for essential infrastructure. Developments will not increase the risk of surface water flooding, manage rain and surface water through SUDS, and seek to minimise the area of impermeable surface. Development proposals will be supported if they can be connected to the public water mains. Development proposals which create, expand or enhance opportunities for natural flood risk management, including blue and green infrastructure, will be supported.
- Policy 23 - Health and Safety - Development proposals that will have positive effects on health will be supported whilst development proposals which are likely to have a significant adverse effect on health will not be supported. A Health Impact Assessment may be required. Development proposals that are likely to raise unacceptable noise issues will not be supported. A Noise Impact Assessment may be required where the nature of the proposal or its location suggests that significant effects are likely. Development proposals within the vicinity of a major accident hazard site or major accident hazard pipeline (because of the presence of toxic, highly reactive, explosive or inflammable substances) will consider the associated risks and potential impacts of the proposal and the major accident hazard site/pipeline of being located in proximity to one another.
- Policy 25 - Community Wealth Building - Development proposals which contribute to local or regional community wealth building strategies and are consistent with local economic priorities will be supported. This could include for example improving community resilience and reducing inequalities; increasing spending within communities; ensuring the use of local supply chains and services and local job creation amongst other things.
- Policy 29 – Rural Development. Development proposals in rural areas should be suitably scaled, sited and designed to be in keeping with the character of the area. They should also consider how the development will contribute towards local living and take into account the transport needs of the development as appropriate for the rural location. Development proposals in remote rural areas, where new development can often help to sustain fragile communities, will be supported where the proposal can lead to local employment, and is suitable in terms of location, access, siting, design and environmental impact.

Local Policy

Local Development Plans (LDPs) cover all planning authority areas and provide detailed and site-specific planning policy for an area. The current development plan for the Aberdeenshire administrative area is the Aberdeenshire Local Development Plan, January 2023[45] (referred to as the LDP hereafter). The LDP lays out detailed policies which are used as a basis for determining planning applications on a local scale. As indicated above NPF4 now forms a part of the Development Plan and has replaced a number of predecessor planning policy documents at various levels. This includes Strategic Development Plans. Although a relatively recently adopted LDP, the Aberdeenshire LDP 2023 predates the adoption of NPF4 and has been formulated to interpret and implement the policy positions stated in the now superseded Aberdeen City and Shire Strategic Development Plan and as such some policy positions stated may be out of step with those contained in NPF4. The Town and Country Planning (Scotland) Act 1997 (as amended) makes it clear that where policy positions differ in this circumstance NPF4 policy positions will take priority. There are several policies that may be relevant in consideration of the Proposed Development. These include:

1.2 [45] https://www.aberdeenshire.gov.uk/planning/plans-and-policies/pldp-2020/

- R2 – Development Proposals Elsewhere in the Countryside- Permits development at appropriate locations in the countryside where there is a national requirement, and no suitable alternative site is available. Prefers brownfield redevelopment over greenfield development.
- P1 – Layout, Siting and Design- Major development (non-residential) may be required to participate in a design review process. Requires a masterplan that has been subject of public consultation to be prepared for employment sites >2ha. The Council will assess all development, whether on sites we have allocated or elsewhere, using a process that includes appropriate public consultation. Certain proposals for a national or major development should meet the prescribed criteria/level of public and stakeholder engagement, as outlined in Planning Advice- 1/2018, SP=EED® (Successful Planning = Effective Engagement and Delivery) – Planning Advice for development management and prospective applicants.
- Policy P2: Open Space and Access in New Development - All new developments must be accompanied by adequate public open space appropriate to the standards shown in the Aberdeenshire Parks and Open Spaces Strategy and should facilitate public access as appropriate.
- P4- Hazardous and Potentially Polluting Developments and Contaminated Land - In determining planning applications for development within the consultation zones for hazardous installations (including oil and gas pipelines), the council will consult with, and take full account of advice from the Health and Safety Executive (HSE), the Competent Authority (in the case of Control of Major Accident Hazardous sites) and the facility's owners and operators, and will seek to ensure that any risk to public safety is not increased.
- E1 – Natural Heritage - Generally protective towards sites designated for nature conservation interests at European, National, and local levels. Will not permit development where integrity of a protected site will be compromised.
- E2 – Landscape - states presumption against development that causes unacceptable effects through its scale, location or design on key characteristics, natural landscape elements, features or the composition or quality of the landscape character as defined in the Landscape Character Assessments produced by NatureScot whether impacts are alone or cumulatively with other recent developments.
- E3 – Forestry and Woodland - Generally protective towards woodland and the protection and enhancement of trees and woodlands in the planning and construction of built development.
- HE1 – Protected Listed Buildings, Scheduled Monuments and Archaeological Sites (including other historic buildings) - resistant to development that would have an adverse impact on the character, integrity or setting of listed buildings, or scheduled monuments, or other archaeological sites.
- PR1 – Protecting Important Resources - presumes against developments that have a negative effect on important environmental resources associated with air quality, the water environment, important mineral deposits, prime agricultural land, peat and other carbon rich soils, open space, and important trees and woodland.
- PR2 - Reserving and Protecting Important Development Sites - Safeguards land allocations from alternative development including sites to support the national developments identified in the National Planning Framework. Makes specific reference to High-voltage electricity transmission infrastructure, including cabling, substations, and converter stations and anticipates that they will be at a range of locations but are expected to include sites associated with the electricity substation south of Peterhead.
- C4 – Flooding - Requires FRAs to be undertaken in appropriate circumstances, requires climate change to be taken into account and presumes against development that increases flood risk vulnerability although does permit essential infrastructure in vulnerable locations if required to be located there for operational reasons where no alternatives are available.
- RD1 – Providing Suitable Services - Outlines developer responsibilities in relation to location and design of development that takes advantage of services that will support it. Covers transport, water/waste water management and supply etc.
- RD2 – Developer Obligations - Details that where, by itself or cumulatively, development would give rise to the need for new or improved infrastructure or services, and this is not to be directly provided as an integral part of the development, planning obligations or other appropriate means to secure such provision may need to be put in place. This could include contributions towards trunk road improvements.

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	From the perspective of national policy, all alignments comply broadly with national policy. The National Policy Framework (NPF4) details a plan for 'north-east revitalisation' with goals for both economic revitalisation and energy transition. In addition, the framework should support the development of domestic renewable energy. The Proposed Development would align with these objectives, helping to achieve energy transition away from fossil fuels, improving domestic energy supplies and specifically aligning with the actions to increase the provision and support of offshore renewable energy. The Proposed Development aligns with Policy 1 and 2 that tackles the climate and nature crisis with the intent to encourage and promote facilities that address the global energy crisis and minimise lifecycle greenhouse gases. None of the alignment options interact with any local policy allocations as part of the Aberdeenshire Local Development Plan and, in combination with evidence of compliance given above, has therefore been assigned a Green RAG rating.
Alignment T2B	G	

Further Assessment:

Both alignment options have been assigned a Green RAG rating and as such, there is no preference for Potential Alignment in relation to policy.

1.6.2 Proposals

Proposals have been identified via searching the Aberdeenshire Council planning portal for developments of a sufficient size and nature that have been submitted within the last five years. Planning applications that have been refused are not included within this appraisal. The below lists are not exhaustive, and are intended to inform comparative appraisal of alignment options – full cumulative lists and assessments will be undertaken at the EIA stage.

Alignment Option	RAG	Site Comparison Notes
Alignment T2A	G	The following SSEN projects transect both alignment options: • LT52 Eastern Green Link 3 HVDC UGC • LT360 Spittal to Peterhead HVDC UGC The alignment options are also in close proximity/connect into Netherton Hub which consists of: • LT52 Eastern Green Link 3 HVDC Converter Station • LT360: Spittal to Peterhead Link HVDC Converter Station • LT429: HVDC Switching Station • LT444: Netherton 400kV Substation • LT474: Netherton 132kV Substation In addition to the above transmission projects, a Battery Energy Storage System with an installed capacity of 300MW has been proposed at Wellbank Farm, Boddam to the southeast of th e
Alignment T2B	G	

Alignment Option	RAG	Site Comparison Notes
		No other projects of a sufficient scale or nature likely to result in an adverse effect on receptors are located within or in close proximity to each Alignment. Both alignment options have been allocated a Green RAG rating.

Further Assessment:

Both alignment options have been assigned a Green RAG rating and as such, there is no Potential Alignment in relation to proposals.

1. APPENDIX 2.2: TIE-IN ALIGNMENT APPRAISAL DETAIL - ENGINEERING

1.1 Infrastructure Crossings

Infrastructure creates a constraint on an overhead line often requiring additional clearance, enhanced reliability and protection provision to the infrastructure during construction and maintenance. Each crossing of infrastructure in an Option thus has the potential to constrain the routeing.

1.1.1 *Major Crossings (132 kV, 275 kV, 400 kV HVDC, Rail, bridges, rivers, canals, oil and gas pipelines or hydro pipelines)*

Major crossings include other OHLs of 132kV and above, Railways, rivers / loch 200m+, navigable waterways, motorways and other major roads, major pipelines and other significant infrastructure. These crossing require specific OHL solutions and can greatly constrain a design.

The main challenge with crossing of pipelines is the potential of any AC interference between the metallic pipeline and the overhead line. Typically, where OHL's cross perpendicular to the pipeline the AC interference is negligible however if this angle becomes more shallow or there is some parallelism before and after the crossing this can result in interaction that needs to be studied to determine if any mitigations are required.

In addition to this there is also the physical constraint from a tower spotting perspective whereby the pipelines will have a servitude associated with them ranging from 12m for the lower pressure SGN pipelines to 24.4m for the higher-pressure National Grid pipelines.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T2A	A	Intermediate pressure (2-7bar) SGN pipeline crossing National Grid transmission pipeline (70bar), St Fergus to Aberdeen crossing 20 Inch St Fergus to Mossmorran NGL pipeline (50bar) 6 Inch St Fergus to Cruden Bay Condensate Pipeline (4bar)
Alignment T2B	A	Intermediate pressure (2-7bar) SGN pipeline crossing National Grid transmission pipeline (70bar), St Fergus to Aberdeen crossing 20 Inch St Fergus to Mossmorran NGL pipeline (50bar) 6 Inch St Fergus to Cruden Bay Condensate Pipeline (4bar)

Further Assessment:

Due to the short length of each of these options there are not any major crossings except for numerous gas pipelines operating within the area. Alignments T2A and T2B both have four pipeline crossings each and therefore have been ranked Amber as this is a significant number for the short distance. Pipeline maps with the alignments overlayed are included in **Appendix 2.2-A**.

1.1.2 *Road Crossings*

Road crossings include all road crossing except those considered under major crossings. Private tracks and driveways may also be included where the need for access to be maintained is present or where relatively high traffic volumes are anticipated. Whilst the impact on OHL design is less for these crossings, measures are still required and collectively they can greatly constrain an Option.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	3 Minor road crossings
Alignment T2B	G	3 Minor road crossings

Further Assessment:

PR-NET_ENV-501 advises that where a route option has 200% more crossings than the least option it should be rated Amber. However, due to how few of crossings there actually are, it is considered that this is not a significant enough difference to rank one option worse than another. All options have therefore been ranked green and are considered equal from a road crossing perspective.

1.2 Environmental Design

The terrain, land features and atmosphere all have the potential to constrain the design of an OHL. In particular the ease and safety of routeing, construction and maintenance can all be impacted. Furthermore, the environment can impose long term risk from pollution and flooding. Options with multiple or significant environmental features have a large risk of constraint in the routeing. Impacts on the environment from the OHL are considered outside this document and are not included in this section.

1.2.1 Elevation

High elevations increase wind and ice loading on the lines resulting in the need for shorter spans or stronger structures. This can constrain routeing options and increase cost. Additionally, access for construction and maintenance tends to be more difficult at altitude and the risk of severe weather is greater.

Due to the type of arable terrain these alignments pass over the elevations for all routes doesn't vary significantly and remains low between 50m and 100m for all options. Elevation plots are included within **Appendix 2.2-B**.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Length Through 50.0m to 100.0m – 1975m Max Elevation: 72m Min Elevation: 52m
Alignment T2B	G	Length Through 50.0m to 100.0m – 1498m Max Elevation: 71m Min Elevation: 46m

Further Assessment:

Options T2A and T2B start at a slightly higher elevation where the alignments turn off the existing line and gradually decrease in elevation all the way to the proposed substation location.

1.2.2 *Atmospheric Pollution*

The atmospheric pollution has been checked based from the data gather from National Atmospheric Emission Inventory (NAEI: https://naei.beis.gov.uk/emissionsapp/). The NAEI provides information on the following pollutants that are deemed to affect the performance of OHLs.

- Carbon dioxide
- Nitrogen Dioxide
- Nitrogen Oxide

- Sulphur Dioxide
- and Particulate matters (10um,2.5um, 1um & 0.1um)

Based upon the pollution maps and due to the proximity to the coast, all alignment options will require very heavy pollution insulators. This is due to the increased risk of flashover due to the build-up of pollutants on the insulator discs and very heavy insulators mitigate this risk by having an increased creepage distance. A map is shown in **Appendix 2.2-C** showing the region within 10km of the coastline.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	A	All route options are within 10km of the coast so will require very heavy pollution insulators.
Alignment T2B	A	All route options are within 10km of the coast so will require very heavy pollution insulators.

Further Assessment:

No further assessment required.

1.2.3 *Contaminated Land*

Contaminated land poses a significant health risk to construction and maintenance operatives, and is potentially expensive to mitigate, dispose of or remediate. As such, the presence of contaminated land in an Option would be a significant constraint. For assessment purposes, the presence of unexploded ordnance, is also considered in this section as it has similar implications.

Based on initial high-level studies, there is no known contaminated land within any of the routes. A search has been done that considers past and present landfill sites and areas registered as COMAH (Control of Major Accident Hazard) sites. Further information if available will be obtained from landowners once a preferred option has been identified.

Based on initial high-level studies, there is no known contaminated land within any of the routes. A search has been carried out that considers past and present landfill sites and areas registered as COMAH (Control of Major Accident Hazard) sites. Further information if available will be obtained from landowners once a Potential Alignment has been identified.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	No known contamination Initial UXO hazard sources greater than 1km away
Alignment T2B	G	No known contamination Initial UXO hazard sources greater than 1km away

Further Assessment:

An initial UXO assessment has been carried out for the full areas under consideration for the different ASTI schemes. The purpose of this assessment was to identify known UXO hazard areas within the routes from historical information. A further assessment is now in progress that aims to enhance the detail of the preliminary investigation and quantify the possible risks associated with it. The output of these studies is shown in in **Appendix 2.2-D**.

The initial survey has identified possible source of UXO relating to multiple aircraft crash sites and airfields in the area east of the proposed alignments including Longside airfield. These sites are all greater than 1km from the alignments under review however this will be refined in the next UXO assessment which will provide more granularity on the risk in this area.

1.2.4 *Flooding*

Areas vulnerable to flooding pose a potential risk during construction, may prevent maintenance and can pose a physical risk to structures during flood events. As such, Options with large areas vulnerable to flooding would have a high risk of constraint.

The SEPA flood maps for surface water and river flooding have been used to carry out the assessment on the alignments. The surface flooding data uses the present-day low likelihood of flooding which equates to a 1-in-200 year return period. This data has also been adjusted to apply a 20% increase in rainfall intensity to attempt to capture the impacts of climate change for the 2080's in the absence of SEPA's full climate change data which is not available for this layer. Further detail on this can be seen within the SEPA guidance[46].

The river flooding data does have a climate change layer available that covers the impacts on flooding for the 2080's. The likelihood of flooding for this data set is classified as medium but this still equated to 1-in-200 year return period. Similarly additional explanation of this data set is available within the SEPA guidance.[47]

An overlay of the two datasets above have been included within **Appendix 2.2-E**.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	No surface water or river flood risks.
Alignment T2B	G	No surface water or river flood risks.

Further Assessment:

No further assessment required as flood risk for all alignments is not significant.

1.3 Ground Conditions

Ground topography and condition can directly impact the ease of routing, access, construction and maintenance. Options with large areas of difficult ground conditions are more likely to be significantly constrained.

1.3.1 *Terrain*

Steep or mountainous slopes present a significant difficulty for routeing, access, construction and maintenance. Options with a large proportion of steep or mountainous slopes are more likely to be constrained and thus more difficult and costly to build and maintain.

The terrain has been assessed by the reviewing the average gradient and maximum gradients of the terrain along the route using OS DTM 50 data, see **Appendix 2.2-F**.

All route options pass through arable farmland with very gradual rolling terrain, none of the slopes observed in these alignments pose any significant concern from a construction and maintenance perspective.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Length through 0° to 5° slope – 1,855m Length through 5° to 10° slope - 120m Max slope: 7°
Alignment T2B	G	Length through 0° to 5° slope – 1,919m Length through 5° to 10° slope - 90m Max slope: 6°

[46] https://www.sepa.org.uk/media/594528/surface_water_summary_v3.pdf
[47] https://www.sepa.org.uk/media/594527/river_summary_v3.pdf

Further Assessment:

No further assessment required.

1.3.2 *Peatland*

Peat, particularly deep peat, represents a significant difficulty for access, construction and maintenance. Options with a large proportion peatland are more likely to be constrained and thus more difficult and costly to build and maintain. Peatland is also an important habitat and construction of new OHLs can cause lasting damage.

A range of sources including British Geological Survey (BGS) and NatureScot has been utilised to determine the potential areas of peatland along the alignment, these are shown in **Appendix 2.2-G**.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	No areas of peatland
Alignment T2B	G	No areas of peatland

Further Assessment:

The overhead alignments do not pass through any designated areas of peatland and the BGS soil data for the area also confirms this.

1.4 Construction / Maintenance

Overhead lines should be routed considering the needs of construction and maintenance as the choice of Option can have a significant impact on the safety and cost of the project throughout its lifetime.

1.4.1 *Access*

Construction of temporary access for construction are a significant project cost and an Option that is remote from existing tracks and the public road network has the potential to incur large access costs. Furthermore, access for inspection and maintenance is necessary throughout the life of the asset. An Option remote from existing access routes represents a significant risk and has a high potential to be constrained.

All the alignment options under consideration have a good network of access tracks within the surrounding area. No portion of the alignments is greater than 1km from an existing access with the majority being situated between 100 and 300m from an existing form of access.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Length through 50m to 100m from access roads – 303m Length through 100m to 300m from access roads – 1,195m Length through 300m to 1000m from access roads – 120m
Alignment T2B	G	Length through 50m to 100m from access roads – 305m Length through 100m to 300m from access roads – 1,013m Length through 300m to 1000m from access roads – 300m

Further Assessment:

All routes also pass through arable farmland where future operational access can likely be obtained by 4x4 and construction can be done via temporary tracks or trackway matting.

1.4.2 *Angle Supports*

OHLs with a high number of angle supports tend to be more difficult to construct, due to the number of angle pull throughs, and often require more extensive access. As such, an Option with a large number of angle supports is at a greater risk of being constrained.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	2 angle towers
Alignment T2B	G	2 angle towers

Further Assessment:

The PR-NET-ENV-501 guidelines suggests that any option that exceeds the option with the least number of towers by under 10% be rated amber and then anything greater than 10% red. Due to the short length of this diversion this is not an overly practical method of appraisal and as the variation between the options is only two towers it is considered not to be significant.

1.5 Proximity

Existing features can constrain an Option often requiring the features to be avoided to reduce or avoid impact. These include properties, windfarms, telecommunications masts, urban area and metallic pipes.

1.5.1 *Clearance*

Dispersed buildings and properties are a common feature of the Scottish landscape. Placing OHLs in close-proximity to these features is rarely well received and best avoided. Options with numerous areas in close-proximity to buildings and properties have significant risk of constraining routing.

In addition to constraining the alignment, a suitable distance must be kept from residential properties from an audible noise perspective. When overhead lines are energised, a phenomenon called corona discharge can occur which is when the air surrounding the overhead line conductor becomes ionised. Conductors are designed to minimise this corona discharge however it can be impacted by other factors such as surface irregularities on the conductor or raindrops sitting on the conductor. This corona discharge can result in an audible crackling sound or a low frequency hum.

To determine the possible impact noise studies are carried out to determine suitable offsets to remain from residential properties. These studies are in process at the moment however an initial separation of 170m is the preference at this stage and it is likely that this can be reduced once these studies have been concluded.

The Ordnance Survey Address Base Premium data set has been used to identify the location of a residential and commercial building in the area surrounding the alignments. In addition to this local planning applications have also been reviewed to identify any possible future developments in close-proximity to the alignments.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	A	1 residential property within 170m. 1 historic building within 100m.
Alignment T2B	G	No buildings in close proximity.

Further Assessment:

Alignment T2A has been designated amber due to slightly encroaching on a 170m buffer. It may be possible to slightly adjust this however an offset was being kept from the “historic building” which appears in satellite imagery as

multiple sheds in poor condition. To increase the 170m this area would likely need cleared to maintain electrical clearance from the buildings. On completion of the noise studies, it may be possible to reduce T2A to green.

Alignment T2B has no properties or buildings within 170m and therefore is designated green.

1.5.2 *Windfarms*

Windfarms pose a risk to OHLs due to disruption of airflows.

When turbines are placed in close proximity to an OHL it impacts upon the airflow around the conductors and fittings potentially causing aeolian vibration or turbulent buffeting. This in turn can impact the conductor's lifespan due to accelerated fatigue of the components. Current industry guidance states that where a turbine is situated greater than three rotor diameters from an overhead line the airflow has returned to normal and the impact becomes negligible.

The planning applications in this area have been reviewed to confirm possible turbine locations. No turbines have been identified within three rotor diameters and therefore all options are classified as green.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T2A	G	No known turbines within close proximity
Alignment T2B	G	No known turbines within close proximity

Further Assessment:

No further assessment required.

1.5.3 *Communication Masts*

OHLs can block existing line of sights for telecommunication masts and thus the line of sights from mast can constrain structure locations.

The OS map and cell mapper website (https://www.cellmapper.net/) have been assessed to check if any communication masts are present near the proposed Options.

Using data from Ofcom's Spectrum Information System, the location of transmitting and receiving devices that are registered with a licence can be identified. The locations of these transmitters, receivers and associated fixed links have been assessed to determine if any are in close-proximity or cross the alignments.

Alignment Option	**RAG**	**Alignment Comparison Notes**
Alignment T2A	G	No fixed links crossed
Alignment T2B	A	BT fixed link crossed twice (Possibly related to MOD)

Further Assessment:

Alignment T2B crosses a fixed link that is registered with BT, but the mast appears to be located within a Ministry of Defence site so may be particularly sensitive. Further clarity on this link would be required to ensure that this option is considered acceptable however typically as long as a tower is not situated directly on the link the interference is negligible.

1.5.4 *Urban Development*

As with dispersed buildings and properties, urban areas represent a significant constraint that will often need to be routed around.

The alignment options are not close to any major urban developments and are more located within a rural area however some of the options do have clusters of properties nearby that can be distinctly seen on the OS maps so have been mentioned.

Alignment T2B has these group of properties that can be identified as being in close proximity to the alignments. From an engineering perspective this is not considered to be a significant issue as they are considered an acceptable distance away in terms of noise however visually more properties are affected in these areas.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	No significant developments
Alignment T2B	A	Cluster of properties at Toddlehills lining the road.

Further Assessment:

As mentioned above alignment T2B has larger groups of properties surrounding it and therefore has been designated Amber. As per PR-NET-ENV-501 if between 10% and 50% of the route is within an urban development it should be designated Amber. It could be debated if these areas classify as urban development but to signify the existence of a small settlement they have been classified as amber.

1.5.5 *Metallic Pipes*

Metallic pipes have to be both avoided by individual supports, as they are often expensive to reroute, and, ideally, the final alignment should avoid running parallel, to avoid electrical impacts on the pipelines. As such it represents a constraint on routeing options.

The metallic pipelines in proximity to the alignment have already been considered under the major crossing sections. To ensure that the constraints to alignment options are not double counted they will also be noted here but not considered as a further crossing.

No other metallic pipelines except those identified as major crossings are present along the alignments. A water pipeline is present however it is made of PVC and therefore not susceptible to AC interference.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Intermediate pressure (2-7bar) SGN pipeline crossing National Grid transmission pipeline (70bar), St Fergus to Aberdeen crossing 20 Inch St Fergus to Mossmorran NGL pipeline (50bar) 6 Inch St Fergus to Cruden Bay Condensate Pipeline (4bar)
Alignment T2B	G	Intermediate pressure (2-7bar) SGN pipeline crossing National Grid transmission pipeline (70bar), St Fergus to Aberdeen crossing 20 Inch St Fergus to Mossmorran NGL pipeline (50bar) 6 Inch St Fergus to Cruden Bay Condensate Pipeline (4bar)

Further Assessment:

No further assessment is required.

1.6 Other Considerations

The considerations listed in this section are not engineering considerations in PR-NET-ENV-501; however, they are deemed to be significant enough that they require consideration in the alignment selection process.

1.6.1 *Route Lengths*

The length of the routes affects the numbers of structures/accesses required, the extent of visual impact from the OHL and project cost.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	1,975m (shortest option)
Alignment T2B	G	2,010m (102% of the shortest option)

Further Assessment:

No further assessment required.

1.6.2 *DNO Crossings*

Existing distribution (DNO) crossings are generally undergrounded or diverted to avoid creating a construction and maintenance hazard. There is a cost and programme requirement associated with this activity and alignments with a large number of DNO crossings could find minimising such crossing a significant routeing constraint.

Each of the alignments under review have been overlayed with the distribution network to determine the required crossings/undergrounding of each option. The alignments have been assessed based on the number and voltage of the crossings.

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	2 – 11kV crossings
Alignment T2B	A	4 – 11kV crossings

Further Assessment:

Alignment T2B has four 11kV crossings that would require multiple dips which increases cost and potentially programme, therefore has been awarded an amber RAG rating. Alignment T2A has been rated green as it has a minimal number of crossings which are considered reasonable for the length of the diversion.

1.6.3 *ESQCR Assessments*

The Electricity Safety Quality Continuity Regulations (ESQCR) assessment is not considered in PR-NET-ENV-501, however in this document a high level ESQCR assessment has been carried out for each Option as per the SSEN ESQCR guidance: PR-PS-311.

At this stage, tower positions are not known as no alignment has been selected as the preferred. For the purpose of this assessment indicative towers have been spotted at approximately 300m intervals and then an ESQC classification has been applied.

The conductors on transmission lines are not covered and there is no historic information relating to vandalism therefore the ESQC rating is only high if the surrounding land classification code is between A-H. Figure 1 uses satellite imagery overlayed with the indicative tower positions to determine the land classification.

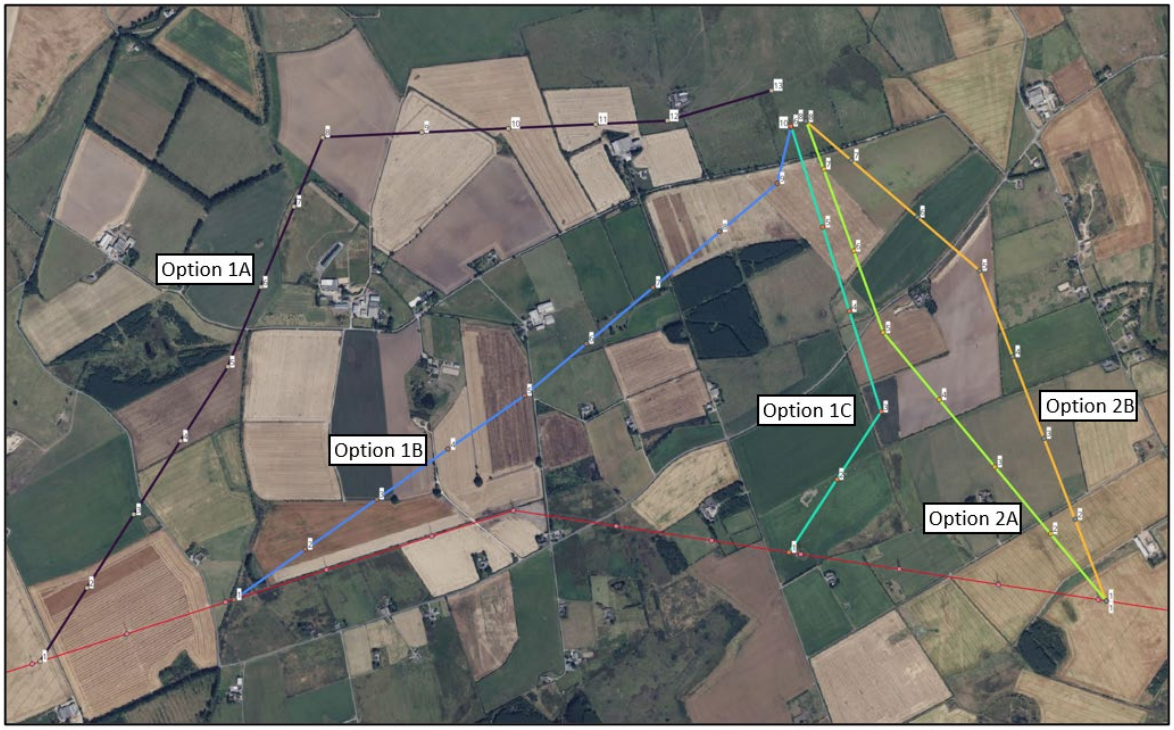
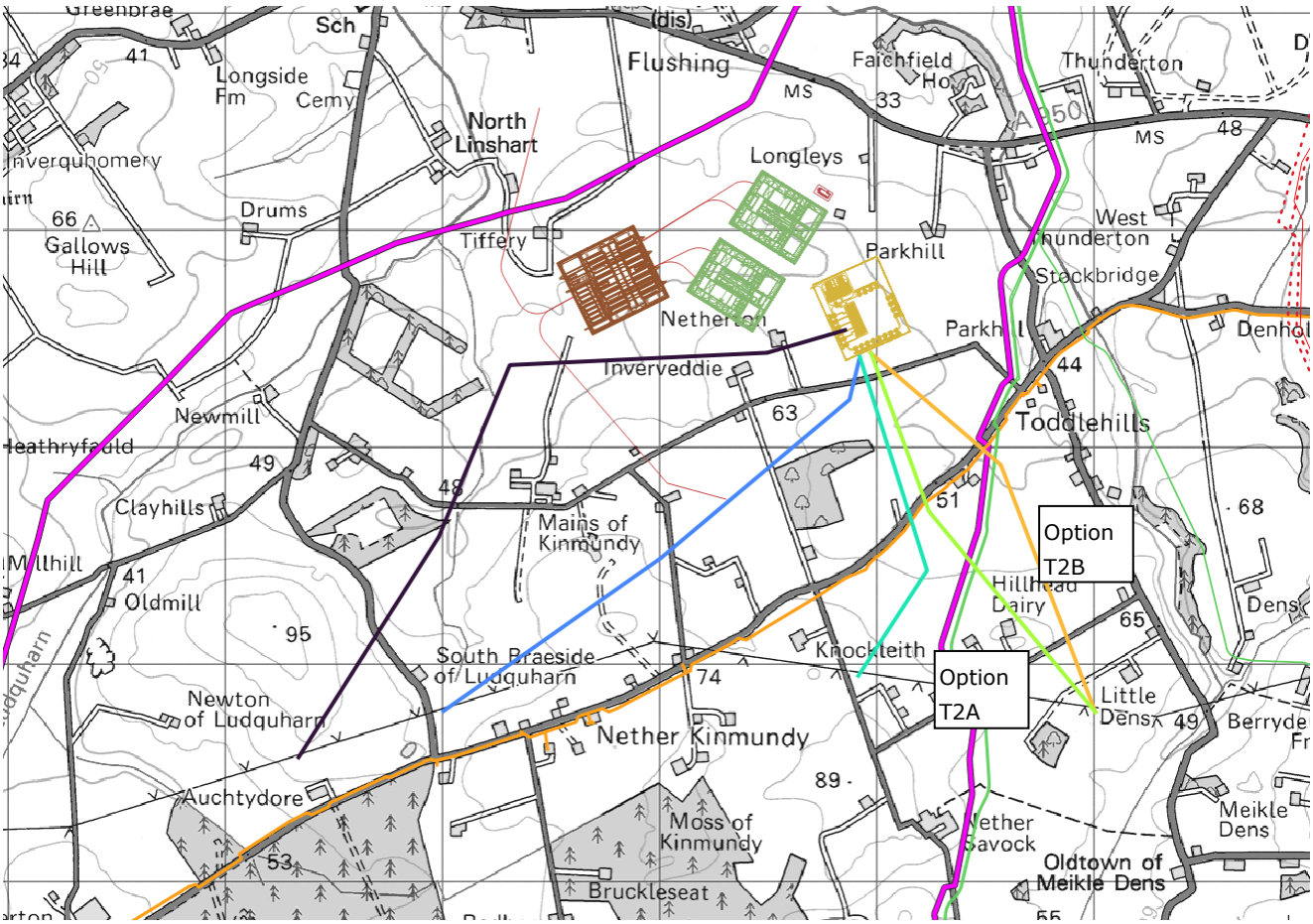


Figure 1 – ESQCR indicative tower placement

	Alignment T2A Land Classification	Alignment T2B Land Classification
Structure 1	**Arable Crops - N**	**Arable Crops - N**
Structure 2	**Arable Crops - N**	**Arable Crops - N**
Structure 3	**Arable Crops - N**	**Arable Crops - N**
Structure 4	**Arable Crops - N**	**Arable Crops - N**
Structure 5	**Arable Crops - N**	**Arable Crops - N**
Structure 6	**Arable Crops - N**	**Arable Crops - N**
Structure 7	**Arable Crops - N**	**Arable Crops - N**
Structure 8	**Arable Crops - N**	**Arable Crops - N**

All alignments have been classified as low risk from an ESQC perspective due to being situated mainly in arable crops. Structures 7 and 8 on alignment 1B are in proximity to some forestry but this still remains low risk.

Appendix 2.2-A Pipeline Crossings



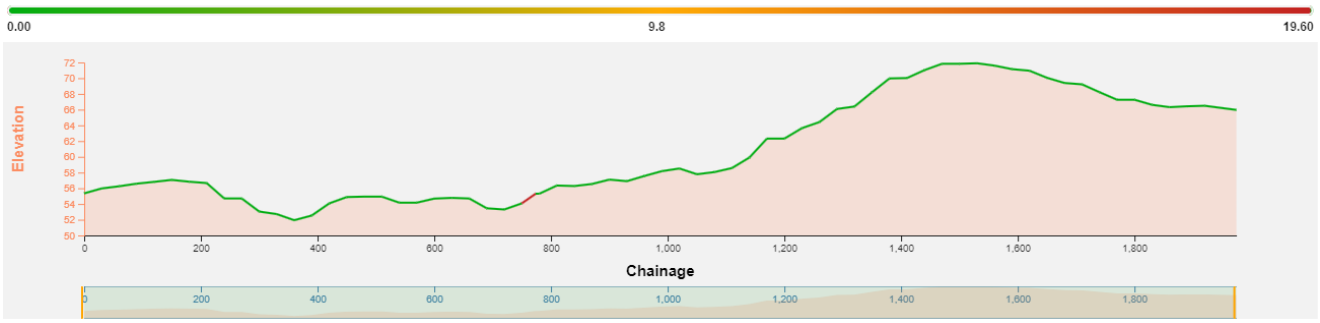
National Grid Pipelines

SGN Pipelines

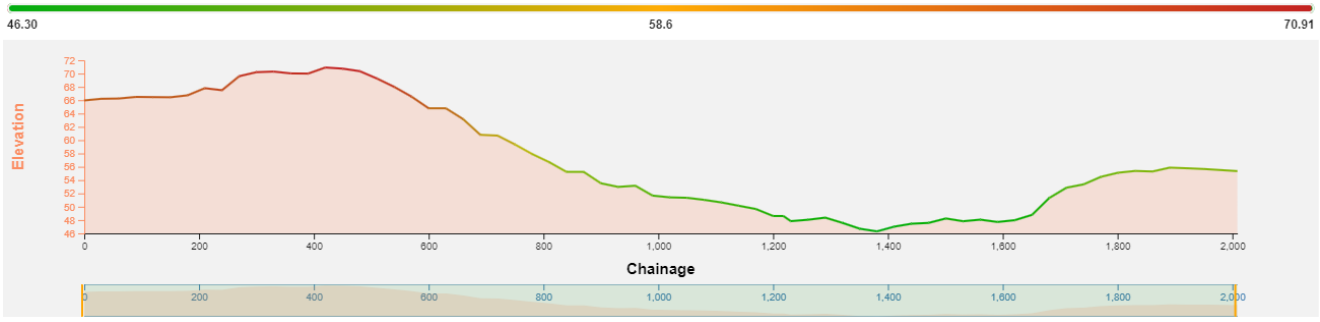
Shell Pipelines

Appendix 2.2-B Elevation Pots

Option T2A



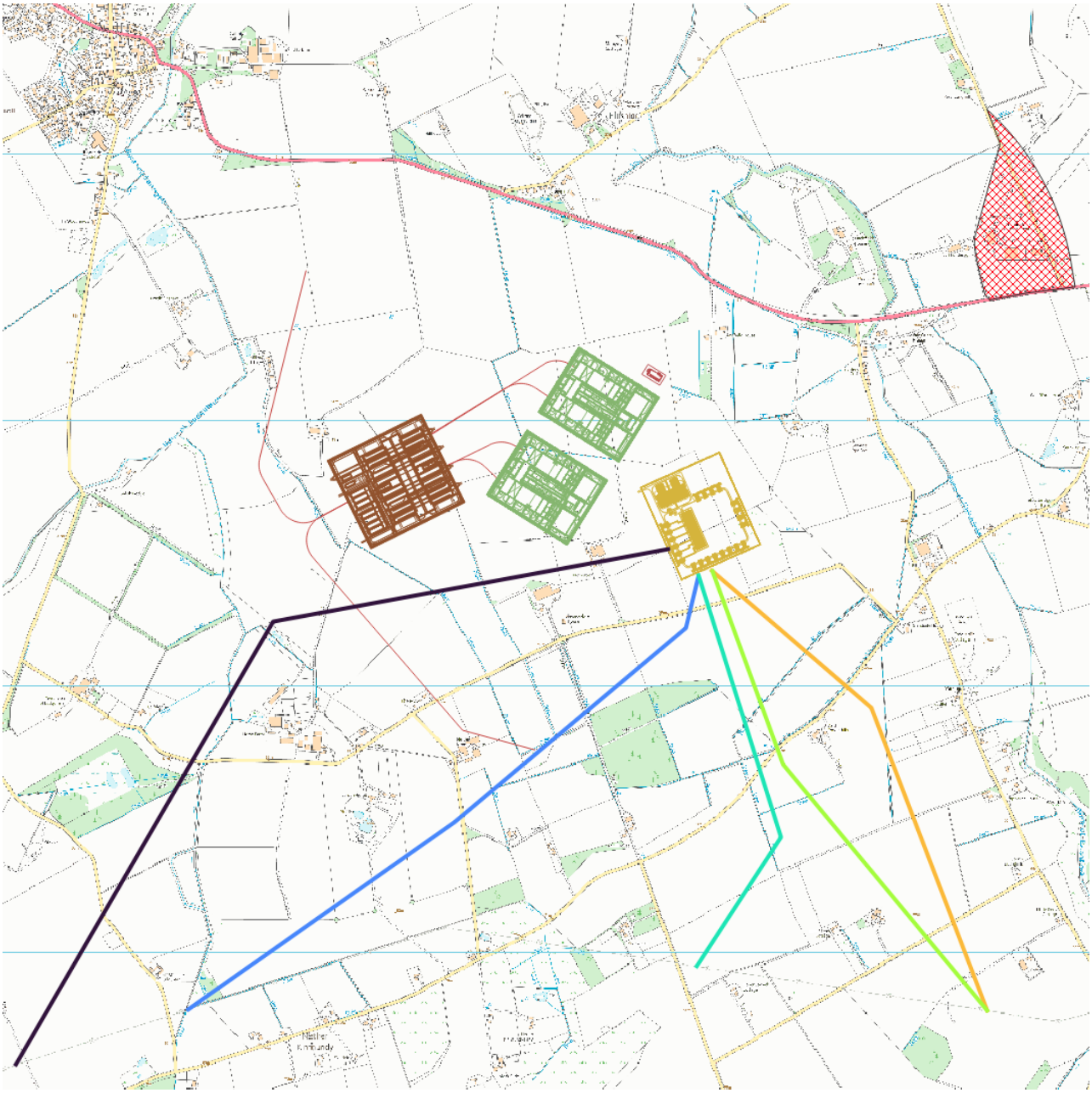
Option T2B



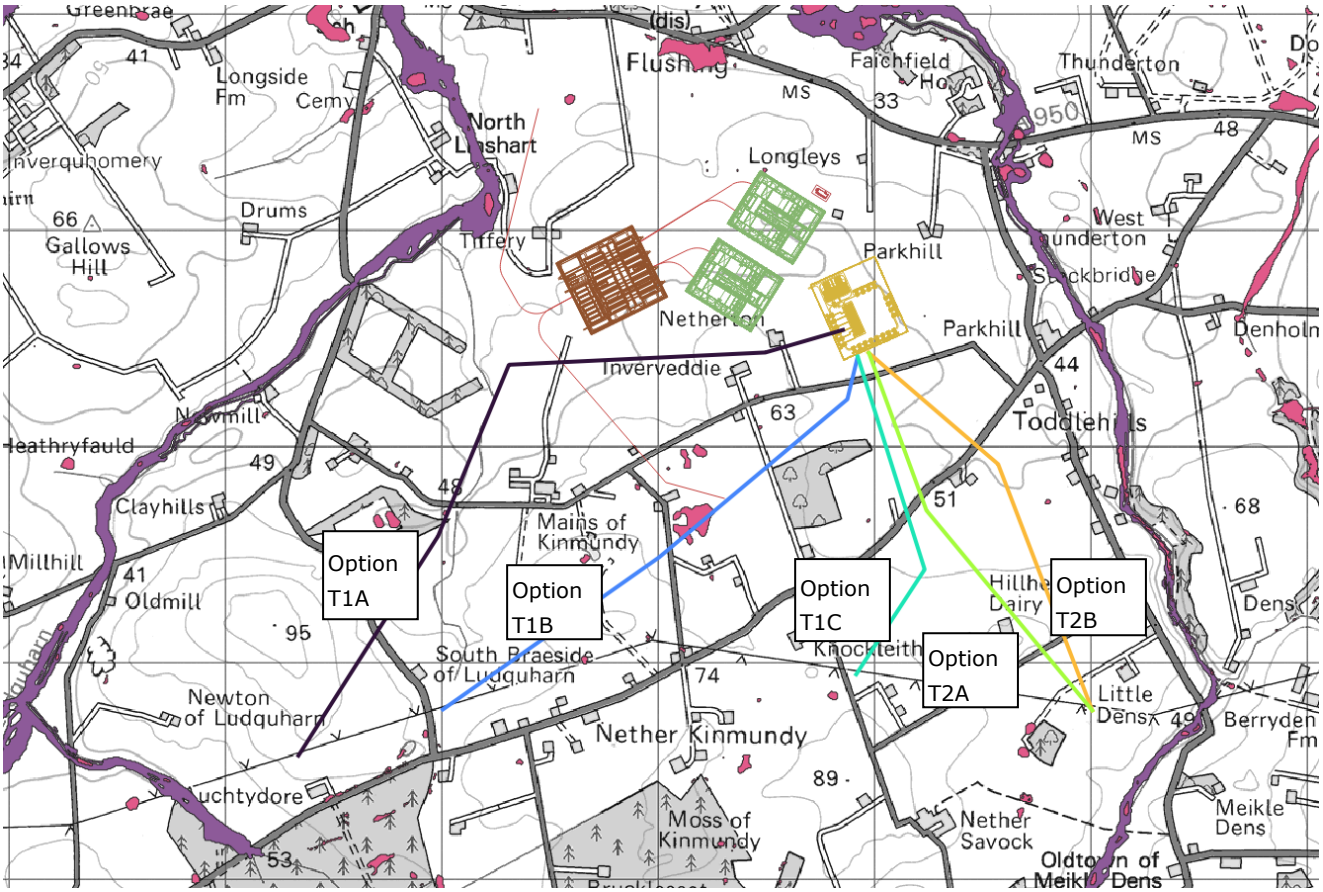
Appendix 2.2-C Coastal Region – Very Heavy Pollution

Area greater than 10km from coast

Appendix 2.2-D UXO Survey



Appendix 2.2-E Flood Risk

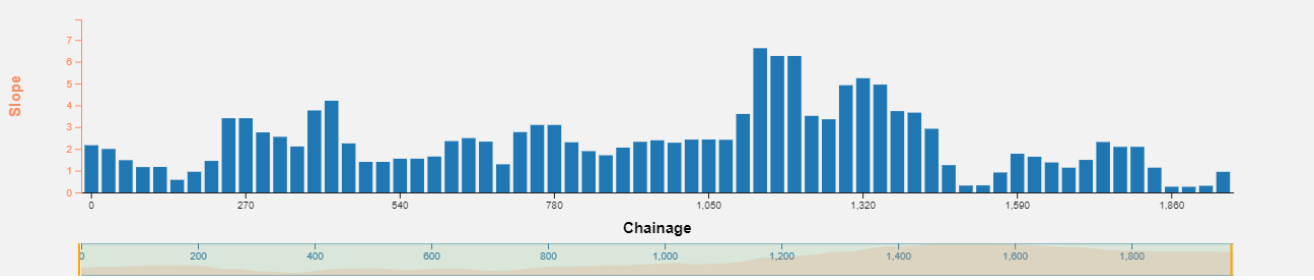


River Flood risk – Climate Change

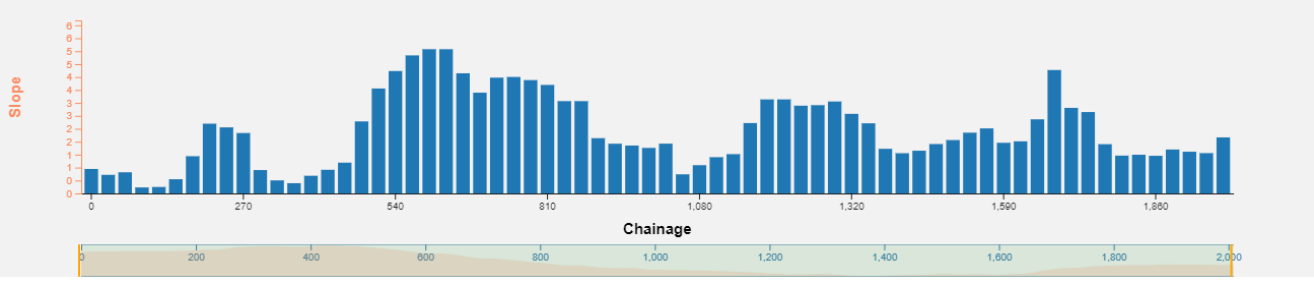
Surface water flood risk – 1 in 200-year SEPA

Appendix 2.2-F Slope

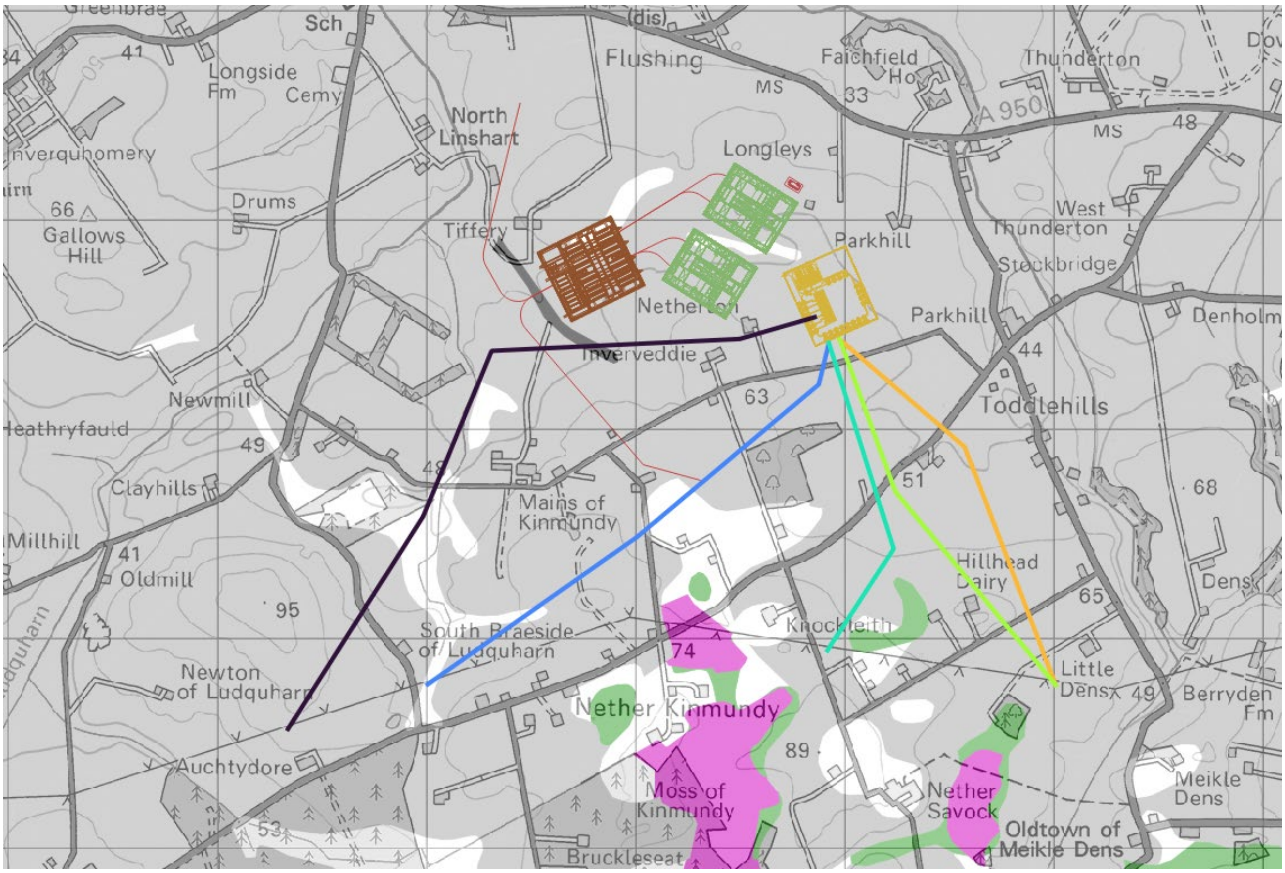
Option T2A



Option T2B



Appendix 2.2-G Peatland



1. APPENDIX 2.3: TIE-IN ALIGNMENT APPRAISAL DETAIL - ECONOMIC

1.1 Capital

The estimate capital cost is primarily based on length of OHL. Key findings are summarised as below.

1.1.1 Construction

Alignment Option	RAG	Alignment Comparison Notes
Alignment T2A	G	Lowest cost option.
Alignment T2B	G	T2B is the slightly longer of the 2 options, so has higher construction costs than alignment T2A. However, costs are between <120% of lowest cost option so alignment is Green rated.

Further Assessment:

From a Capital cost perspective, both alignments have similar lengths and therefore similar costs, making both alignments green rated. T2A is marginally preferred over option T2B due to its slightly shorter length.