Dunoon to Loch Long 132 kV OHL Rebuild Alignment Consultation Document

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Scottish & Southern Electricity Networks

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GLOSSARY

Term	Definition
Alignment	A centre line of an overhead line OHL, along with location of key angle structures.
Alignment (preferred)	A centre line of an overhead line (OHL), along with location of key angle structures taken forward to stakeholder consultation following a comparative appraisal of alignment options.
Alignment (proposed)	A centre line of an overhead line (OHL), along with location of key angle structures taken forward following stakeholder consultation to the EIA stage of the overhead line routeing process.
Amenity	The natural environment, cultural heritage, landscape and visual quality. Also includes the impact of SHE Transmission's works on communities, such as the effects of noise and disturbance from construction activities.
Conductor	A metallic wire strung from structure to structure, to carry electric current.
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.
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.
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.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Kilovolt (kV)	One thousand volts.
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.
Micro-siting	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 Scenic Area (NSA)	A national level designation applied to those landscapes considered to be of exceptional scenic value.
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.
Riparian Woodland	Natural home for plants and animals occurring in a thin strip of land bordering a stream or river.
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.
Route (preferred)	A route for the overhead line taken forward to stakeholder consultation following a comparative appraisal of route options.
Route (proposed)	A route taken forward following stakeholder consultation to the alignment selection stage of the overhead line routeing process.

Term	Definition
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.
Scheduled Monument	A monument which has been scheduled by the Scottish Ministers as being of national importance under the terms of the 'Ancient Monuments and Archaeological Areas Act 1979'.
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
Site 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 Argyll and Bute Council 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 (Directive 79/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981.
Stakeholders	Organisations and individuals who can affect or are affected by SHE Transmission works.
Study Area	The area within which the corridor, route and alignment study takes place.
Terminal Structure	A structure (tower or pole) required where the line terminates either at a substation or at the beginning and end of an underground cable section.
The National Grid	The electricity transmission network in the Great Britain.
Volts	The international unit of electric potential and electromotive force.
Wayleave	A voluntary agreement entered into between a landowner upon whose land an overhead line is to be constructed and SHE Transmission
Wild Land Area (WLA)	Those areas comprising the greatest and most extensive areas of high wildness. It is not a statutory designation, but wild land areas are considered nationally important.

PREFACE

This Consultation Document has been prepared by WSP UK Ltd. on behalf of Scottish Hydro Electric Transmission plc (SHE Transmission plc) to seek comments from all interested parties on the Preferred Alignment identified for the proposed Dunoon to Loch Long 132 kV replacement overhead line between the existing Dunoon substation and Tower 15 to the west of Loch Long.

The Consultation Document is available online at the project website:

www.ssen-transmission.co.uk/projects/dunoon

Under normal circumstances, consultation on the project would involve public engagement events held in the local area. However, as a result of the COVID-19 pandemic this has not been possible.

To continue engagement on the project SHE Transmission has developed an online consultation tool, to enable the local community to experience the full exhibition from home on a computer, tablet or mobile device. The online exhibition has been designed to look and feel like a real consultation in a community hall, with exhibition boards, maps, interactive videos and the opportunity to share views on the proposals.

Visitors will be able to engage directly with the project team, via a live chat function, where they can ask any questions they might have about the project and share their feedback on the current proposals.

The virtual consultation events will be taking place via the project website at the following times:

- Wednesday 25th August 10am – 1pm
- Thursday 26th August 5pm – 7pm
- Wednesday 8th September 5pm – 7pm

Comments on this Consultation Document should be sent to:

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All comments are requested by Friday 24th September 2021.

EXECUTIVE SUMMARY

The town of Dunoon is currently connected to the wider electricity grid network by a twin-circuit 132 kV double circuit Overhead Line (OHL), supported on steel lattice towers between the existing Whistlefield substation, located north-west of Garelochhead, and the existing Dunoon substation located west of Sandbank, on Holy Loch, a short distance north of Dunoon.

The existing OHL west of the Loch Long crossing is supported by an old design suite of metal lattice towers which are coming towards the end of their operational life. The OHL route crosses some very steep and exposed terrain, and has a very high fault rate associated with it during high winds due to the design of tower used in the original build.

SHE Transmission have established a requirement to rebuild the OHL between the existing Dunoon substation and Tower 15 to the west of the Loch Long crossing.

Due to the requirement to maintain a 132 kV electricity supply to Dunoon during construction, the replacement OHL will require development on a different alignment to the existing OHL. To ensure secure supply and meet current clearance standards the replacement OHL will utilise different support structures to the existing OHL. Once the new OHL is constructed and in service, the existing OHL will be dismantled and removed.

SHE Transmission's OHL Routeing Guidance is being followed to determine the most appropriate alignment for the replacement OHL. This process includes stakeholder consultation at various stages, of which this document forms part.

A preliminary study area, or corridor, was identified within which the identification and assessment of route options could be completed. The corridor was developed to encompass a range of feasible route options between the two connection points which were then assessed and a Preferred Route selected. Consultation was undertaken on the Preferred Route between November and December 2020, following which the Preferred Route was taken forward as the Proposed Route, within which the identification and assessment of alignment options could be completed. This staged process lead to the eventual identification of an indicative Preferred Alignment for the OHL.

Alignment options were identified which provided feasible areas for the replacement OHL to be developed, from which a Preferred Alignment has been selected which provides an optimum balance of environmental, technical and economic factors. This Consultation Document invites comments from all interested parties on the Preferred Alignment identified for the replacement OHL.

Moving forward, confirmation of the Preferred Alignment will be informed by this consultation exercise and through further detailed surveys, which may identify any as yet unknown engineering, environmental or land use constraints. The Preferred Alignment will then be referred to as the Proposed Alignment. On identification of a Proposed Alignment, Section 37 consent under the Electricity Act 1989 will be applied for the replacement OHL from the Energy Consents Unit of the Scottish Government.

It is anticipated that an application for consent for a Proposed Alignment will be submitted in spring 2022.

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

- Has the requirement for the Dunoon 132kV Overhead Line Rebuild Project clearly explained?
- In your opinion, has a clear overview of the required project elements been provided?
- Do you agree with the preferred technology solution (L7c tower) that has been identified?
- Have we explained the approach taken to select the preferred alignment adequately?

- Do you agree with our preferred alignment for the following sections:
    - Section 1
    - Section 2
    - Section 3
    - Section 4
    - Section 5
    - Section 6
- Are there any identified alignments you feel should NOT be progressed?
- Are there any factors, environmental features or important points that you believe have not been considered and should be brought to our attention?

1. INTRODUCTION

1.1 Purpose of the Document

This Consultation Document invites comments from all interested parties on the Preferred Alignment identified for the replacement 132 kilovolt (kV) double circuit overhead line (OHL) between the existing Dunoon substation and Tower 15 to the west of Loch Long (**Figure 1.1**), a distance of approximately 16.4 km (hereafter referred to as the 'Proposed Development').

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

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

1.2 Document Structure

This report is comprised of seven sections as follows:

1: Introduction – setting out the purpose of the Consultation Document;

2: The Proposals – describes the need for the proposals, the proposed technology solution and the typical construction methods;

3: Route and Alignment Selection Process – sets out the route and alignment selection process and methodology that has been applied to date to derive a Preferred Alignment;

4: Comparative Appraisal – sets out the alignment options that have been identified and provides a summary of the analyses of alignment options against environmental, technical and economic considerations to arrive at a recommendation for the Preferred Alignment; and

5: Consultation on the Proposals – invites comments on the alignment assessment process and identification of Preferred Alignment.

The main body of this document is supported by a series of figures (see **Appendix 1**).

1.3 Next Steps

A Report on Consultation will be produced which will document the consultation responses received, and the decisions made in light of these responses.

Following the identification of a Proposed Alignment, further technical and environmental surveys will be undertaken to support a Section 37 consent under the Electricity Act 1989. It is anticipated that an application for consent for a Proposed Alignment will be submitted in spring 2022.

2. THE PROPOSALS

2.1 The Need for the Project

Scottish Hydro Electric Transmission PLC (SHE Transmission) is a wholly owned subsidiary of the SSE plc group of companies. SHE Transmission owns and maintains the electricity transmission network across the north of Scotland and holds a license under the Electricity Act 1989 to *'develop and maintain an efficient, co-ordinated and economical electricity transmission system in its licensed area'*.

Dunoon is currently connected to the wider electricity grid network by a twin-circuit 132 kV double circuit OHL, supported on steel lattice towers between the existing Whistlefield substation, located north-west of Garelochhead, and the existing Dunoon substation located west of Sandbank, on Holy Loch, a short distance north of Dunoon (**Figure 1.1**).

The existing OHL crosses Loch Long by a 1.4 km span, with four special structures, two either side, forming the crossing. This crossing is to be reconductored, replacing the wires which carry the current and the associated fittings and fixtures, but reusing the four existing special structures which support the Loch Long crossing span. The refurbishment and reconductoring of the crossing will be the subject of a separate study and therefore is not considered further in this report.

As the existing OHL crosses Loch Long it passes between Transmission Network Operator areas. The transmission line to the west of the Loch Long crossing connecting to Dunoon substation is within SHE Transmission's licenced area, whilst the OHL on the east of the Loch Long crossing is maintained and operated by Scottish Power Energy Networks.

Reconductoring the existing Loch Long crossing and replacement of the earth wire for several spans of the existing OHL to the east of the Loch Long crossing are part of the project's wider scope. However, as no rebuild of the OHL is required for these components they are not part of routeing process and are therefore outwith the scope of this this report.)

The existing OHL west of the Loch Long crossing is supported by an old design suite of metal lattice towers which are coming towards the end of their operational life. The OHL route passes some very steep and arduous terrain and has a very high fault rate associated it during high winds due to the design of tower used in the original build.

A capability study, undertaken in February 2019, of the OHL to see if it was suitable for upgrading with larger conductors was previously carried out, associated with a Transmission connection request to Dunoon Grid Supply Point (substation) which has subsequently been withdrawn. The outcome of this study shows that almost half of the towers were in an unsatisfactory condition. Records for the existing OHL circuits show poor performance in terms of electrical faults that even refurbishing and reconductoring the existing OHL would not resolve. Therefore, in order to ensure security of supply and meet current clearance standards, a new double circuit OHL is proposed to be constructed to replace the existing OHL.

SHE Transmission have established a requirement to rebuild the OHL between the existing Dunoon substation and Tower 15, to the west of the Loch Long crossing, using different support structures (replacing the old design suite of metal lattice towers) to ensure security of supply.

2.2 Alternative Options and Preferred Technology Solution

Following the 2019 capability study, a study was undertaken in September 2020 to assess the feasibility of underground cable and subsea cable options to provide a new connection. Due to the terrain of the area the installation of these solutions would prove challenging and result in increased risks compared to rebuilding the existing OHL. These solutions would also introduce maintenance challenges when compared to the rebuilding of the existing OHL; in the event of a fault on an OHL, the fault can be detected and rectified in a matter of days whereas a fault in an underground or subsea cable could potentially take months to fix which may compromise an electricity supply to Dunoon. The costs associated with these alternative solutions would be significantly greater than

the costs associated with the rebuilding of the existing OHL. Taking this into account SHE Transmission has determined that a new double circuit OHL is the preferred technological solution for this project[1], replacing the existing double circuit OHL.

2.3 Proposals Overview

SHE Transmission is proposing to construct a replacement double circuit 132 kV OHL between the existing Dunoon substation and Tower 15, the tower on the west side of Loch Long crossing. On energisation of the Proposed Development, the existing OHL will be removed.

Further assessment has been undertaken to determine the optimal design of the support structures for the new double circuit OHL. The results of this assessment have determined that the optimal design of the support structures is Standard L7(c) Suspension Tower. It is assumed that standard spans of approximately 300 m would be achievable with these replacement structures and generally, this would allow for longer spans than the existing line (which has an average span of 220 m), meaning fewer support structures are likely to be required for the replacement OHL. The height of the replacement structures, including potential extensions, is between 26-44 m, compared to the height of the existing structures of approximately 22-35m. The height range is due to extensions that can be added to allow clearance of topographical features on the ground, and to maintain necessary ground clearance of conductors under all operation and weather conditions.

The proposed structures will support six conductors (wires) on six cross-arms (three on each side) and an earth wire between the peaks, typical design can be seen on **Plate 2.1**.

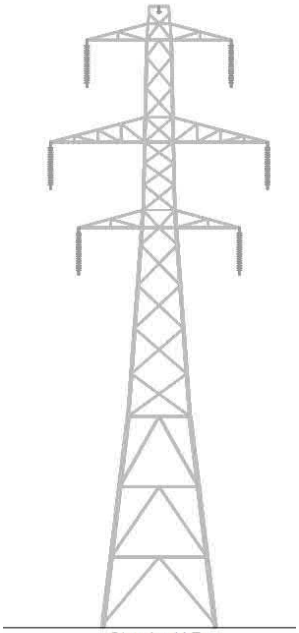

Plate 2.1 – Typical steel lattice tower design

2.3.1 Construction Activities

Construction activities are generally divided into seven phases, which include:

- alterations to the existing transmission and distribution network (if required);
- enabling work (forestry clearance and establishment of temporary accesses and construction compound(s));
- erection of support structures;
- conductor stringing (including construction of temporary scaffolding);
- inspections and OHL commissioning;
- removal of existing OHL; and
- removal and reinstatement of any temporary access tracks.

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

2.3.2 Forestry Removal

Any woodland removal which may be required prior to the construction work will be identified and described after a proposed alignment has been identified. The methods of woodland removal and management of timber would be described as part of the application for consent under Section 37 of the Electricity Act 1989, as amended.

[1] The consideration of other technology options may be required in areas where particular physical or environmental constraints are identified.

2.3.3 Access during Construction

Vehicle access is required to each support structure location during construction to allow excavation and creation of foundations and erection of the support structure. Existing tracks would be used where possible and upgraded as required. Preference will be given to lower impact access solutions including the use of low pressure tracked personnel vehicles and temporary track solutions in boggy / soft ground areas to reduce any damage to, and compaction of, the ground. These journeys would be kept to a minimum to minimise disruption to habitats along the route. Temporary access panel solutions may also be used to protect the ground; however, temporary stone tracks are likely to be necessary in some areas depending on existing access conditions, terrain and altitude. Helicopters may also be used to reduce access requirements. All temporary tracks would be removed upon completion of the Proposed Development with land being reinstated to its former condition.

Access requirements for the Proposed Development will be dependent upon the type of OHL support chosen. Consideration of impacts will be undertaken at alignment stage once the preferred support type has been confirmed. A more detailed plan for access during construction will be prepared once a Proposed Alignment has been identified and the preferred support structure type selected.

2.3.4 Programme

It is anticipated that construction of the project would take place over a period of approximately 30 months, following the granting of consents, although detailed programming of the works would be the responsibility of the Contractor in agreement with SHE Transmission. Construction is anticipated to start in 2023 with completion in 2025.

3. ROUTE AND ALIGNMENT SELECTION PROCESS

3.1 Background

The approach to alignment selection, in identifying and assessing alternative OHL routes, is informed by SHE Transmission's Routeing Guidance[2]. By following the guidance, SHE Transmission has ensured compliance with 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 overall aim of the route selection process is to develop a Proposed Alignment in a systematic manner, which is technically feasible, economically viable and could be anticipated to cause the least disturbance to the environment and those living in it, working in it, visiting or using it for recreational purposes.

The guidance sets out a process which aims to balance environmental, technical and economic considerations throughout the alignment options process.

The guidance splits a project into the following stages:

- Pre-Routeing Activities: Selection of proposed connection option;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection;
- Stage 3: Alignment Selection; and
- Stage 4: EIA and consenting.

Each stage in the SHE Transmission routeing process is iterative, bringing environmental, technical and economic considerations together in a way which seeks the best balance at each stage with the aim to an alignment with the optimum balance of technical, economic and environmental considerations.

Route Selection has been completed and a Proposed Route was selected based on earlier studies and consultation[3]. This report summarises the Alignment Selection from the guidance[2], which seeks to find a proposed alignment.

In consideration of these principles, the method of identifying a preferred route and a preferred alignment in this study has involved the following four key tasks:

- identification of the baseline situation;
- identification of alternative options;
- environmental, technical and economic analysis of options; and
- identification of a preferred route/alignment.

On finalisation of the Alignment Selection process, the project will progress onto the EIA and consenting stage.

[2] Scottish & Southern Electricity Networks, 2017. PR-NET-ENV-501: Procedures for Routeing Overhead Lines of 132 kV and above

[3] SSEPD (2021): LT193 – Dunoon to Loch Long 132kV OHL Replacement Route Selection Study Report

3.2 Route Identification and Selection

A preliminary study area, hereafter known as the 'corridor', was identified within which the identification and assessment of route options could be completed. This corridor encompassed a range of feasible route options between the existing Dunoon substation and Tower 15 (the crossing tower to the west of Loch Long).

Desk-based studies focussed within the corridor, although consideration was given to potential receptors outside of this area (e.g. environmental designations, visual receptors or cultural heritage sites). Route options (see **Plate 3.1**) were identified as part of the desk-based studies considering the most notable constraints. Considerations included a review of the steps outlined in the Holford Rules and SHE Transmission's Routeing Guidance[2].

It was recognised that finding an acceptable alignment across the settled valleys of Glen Finart and Strath Eachaig would be particularly challenging. In these areas 'nodes' were identified where further detailed study at Stage 3 (alignment selection) was deemed to be required to minimise potential environmental effects. For ease of assessment and interpretation, the corridor was divided into three 'Zones' (Zone A, B and C) for the definition of route options on the basis of these 'nodes' with the route options described within each zone.

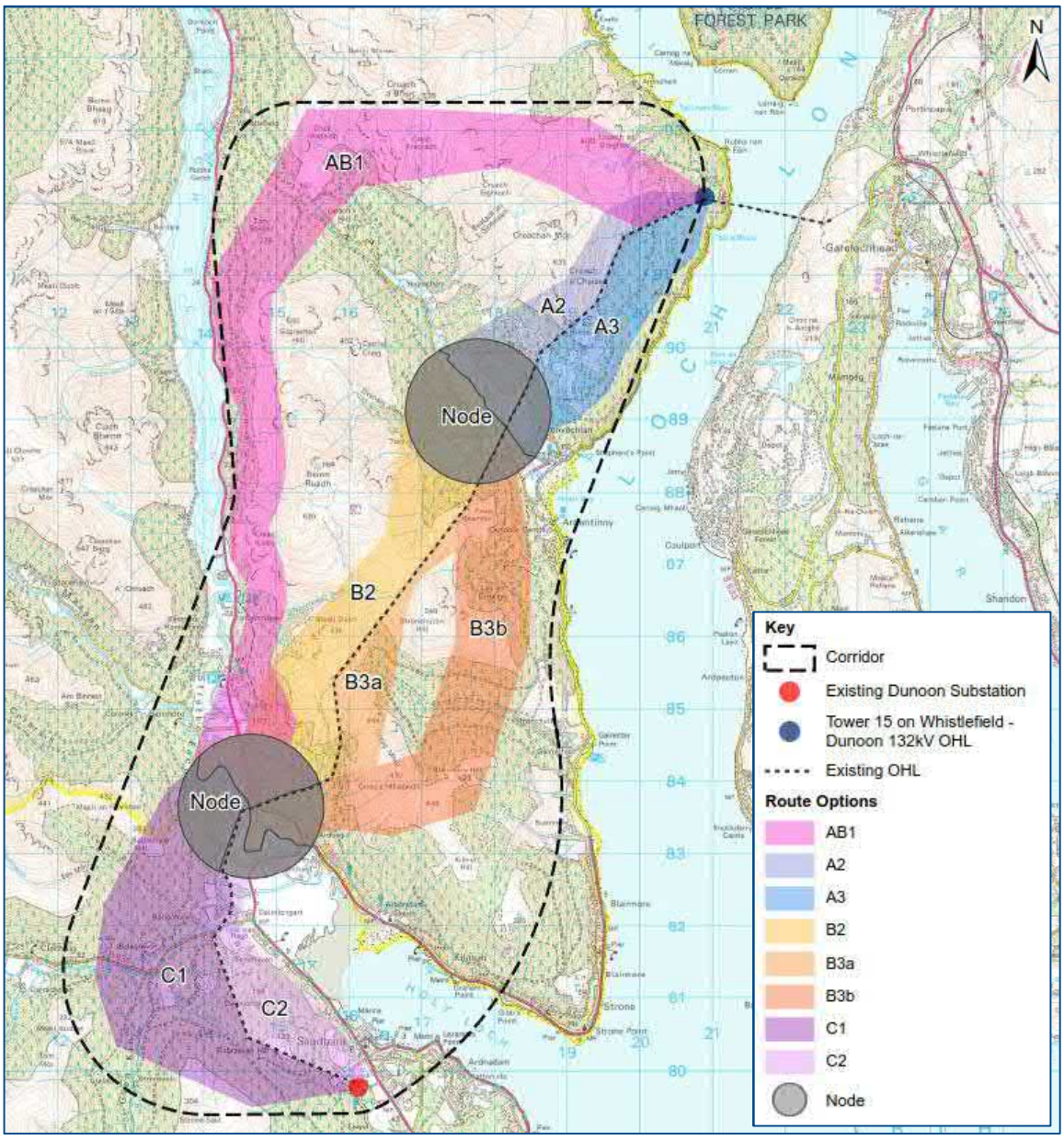

Plate 3.1: Route Options

A route options appraisal was undertaken in 2020. The appraisals were informed by desk studies and walkover surveys. Workshops integrating engineering, economic and environmental considerations were then held to select a Preferred Route as the starting point for developing an OHL alignment. A combination of Route Options A2, B2 and C1 was selected as the Preferred Route as it:

- avoided the introduction on an OHL into landscapes not currently affected by one, the greater risk of visual effects crossing both Glen Finart and Strath Eachaig to the east of the existing OHL, the potential effects on Loch Eck SSSI;
- provided greater opportunities for a reasonable landscape fit, greater accessibility for construction and maintenance and opportunities for minimising potential effects;
- passed through a smaller section of Class 4.1 agricultural land; and
- was located at a greater distance from the Holy Loch LNR and LNCS.

SHE Transmission consulted on the Preferred Route in November 2020[4]. Following consultation on the Preferred Route, a Proposed Route was confirmed as the basis for subsequent alignment selection.

3.3 Alignment Identification and Selection

The development of alignment options within the Proposed Route has been an iterative process involving SHE Transmission, the engineering consultant and the environmental consultant. Initially the engineering consultant developed an alignment options within the Proposed Route and between the two connection points as part of the desk-based studies considering the most notable constraints.

Following identification of the alignment options within the Proposed Route, 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.
- Workshops held with SHE Transmission and engineering consultants to review preliminary alignment options and suggested alternatives.
- UK Habitat Classification (UKHab) surveys of the alignment options, aimed at identification of habitats along alignment options and sensitive habitats including Annex 1[5] and United Kingdom Biodiversity Action Plan (UKBAP)[6] priority habitats.
- Protected species suitability surveys, aimed to classify the suitability of habitats and watercourses to support: bat species; badger; red squirrel; pine marten; reptile species and riparian mammals: otter; and water vole.
- Ornithology surveys were undertaken, including Flight Activity Surveys and Winter Walkover Surveys (WWO). Surveys are also ongoing to support application the next stages of the project and consent under Section 37 of the Electricity Act 1989.
- Review of ornithology data, provided by external stakeholders including the Royal Society for the Protection of Birds (RSPB) and the Argyll Raptor Study Group (ARSG), and Digital Terrain Models (DTM) to identify altitudinal ranges and topographical features of relevance to priority bird species.
- Review of golden eagle *Aquila chrysaetos* range reports provided by NatureScot to determine potential effects of Alignments on golden eagle territories.

[4] SHE transmission 2020. Dunoon to Loch Long 132 kV OHL Rebuild Consultation Document. October 2020. 70065799-LT193_CD.

[5] European Union Habitats Directive 92/43/EEC Annex I.

[6] BRIG (2011). UK Biodiversity Action Plan – Priority Habitat Descriptions. Joint Nature Conservation Committee (JNCC), Peterborough.

- Review of NatureScot Commissioned Report 376 *The Special Qualities of the Loch Lomond and The Trossachs National Park*[7] [8].
- Review of undesignated heritage assets through the Scottish National Record for the Historic Environment (SNRHE) and of the West of Scotland Archaeological Service (WoSAS) Historic Environment Record (HER) Data to determine potential effects on cultural heritage interests.
- Review of comments received from stakeholders following publication of the Dunoon to Loch Long 132 kV OHL Replacement Project Consultation Document (October 2020) and public consultation events.
- Site visits by the project landscape architect, heritage specialists and SHE Transmission to review the alignment options on site and review environmental and technical considerations.
- Follow up workshops with SHE Transmission, and the engineering and environmental consultants to further discuss alignment options and agree on a preferred alignment.

Considerations included a review of the steps outlined in the Holford Rules and SHE Transmission's Routeing Guidance[2]. 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)[9].
- Avoid by deviation, smaller areas of high amenity value such as regional scenic areas.
- 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).
- Avoid the highest terrain, where climatic conditions can impose extra loading (wind and ice) on OHL conductors (technical constraint that aligns with the second part of Holford Rule 4, land over 500 m avoided where possible, over 600 m avoided absolutely).
- Target the alignment towards moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees (avoid slicing through landscape types and try to keep to edges and landscape transitions) (Holford Rule 5).
- 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.

For ease of assessment and interpretation, the Proposed Route has been divided into six 'Sections' (see **Figure 4.1**) for the definition of alignment options within each Section:

- Section 1, Tower 15 to Am Binnein;
- Section 2, between north of Glen Finart and north of Puck's Glen;
- Section 3, between Puck's Glen and River Eachaig;
- Section 4, between River Eachaig and Ballochyle;
- Section 5, between Ballochyle and Finbracken; and
- Section 6, Finbracken to Dunoon substation.

[7] Scottish Natural Heritage and Loch Lomond and The Trossachs National Park Authority (2010). The special landscape qualities of the Loch Lomond and The Trossachs National Park. Scottish Natural Heritage Commissioned Report, No.376 (iBids and Project no 648). Available at: https://www.nature.scot/naturescot-commissioned-report-376-special-landscape-qualities-loch-lomond-and-trossachs-national

[8] Scottish Natural Heritage. (2019). Scottish Landscape Character Types Map and Descriptions [online] Available at: https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions

[9] The Loch Lomond and Trossachs National Park is not included in this list as it is not possible to avoid this area.

3.4 Appraisal Method

Appraisal of alignments has followed the process defined in the SHE Transmission's Routeing Guidance[2], including the topics considered within. As stated above, for ease of assessment and interpretation, the Proposed Route has been divided into six sections. Environmental, engineering and economic criteria for each section are then considered in turn as part of the alignment options appraisal.

Table 3.1, below, lists the topic areas considered as part of the alignment options appraisal.

Table 3.1: Topic Areas Considered

Constraint Type	Topic	Specific aspect of the topic
Environmental	Landscape and Visual	Designations
		Landscape Character
		Visual amenity
	Natural Heritage	Designations
		Protected Species
		Habitats
		Ornithology
		Geology, Hydrology and Hydrogeology
	Cultural Heritage	Designations
		Cultural Heritage Assets
	Proximity to Dwellings	Residential Properties and other sensitive receptors
	Land Use	Agriculture
		Forestry
		Recreation
	Planning	Proposals
Engineering	Environmental Design	Major crossings
		Road crossings
	Ground Conditions	Terrain
		Peat
	Construction/ Maintenance	Access
		Angle towers
	Proximity	Clearance distance
Economic	Capital	Construction
		Diversions
		Public Road Improvements
		Felling
		Land Assembly
		Consents Mitigation
	Operational	Inspections
		Maintenance

3.4.1 Comparative Appraisal

Each alignment option in each section has been considered in terms of its potential interaction with the environmental characteristics, features and sensitivities. The alignments have then been

compared to determine which has the greatest and least capacity or potential to accommodate the Proposed Development.

In line with the criteria defined within the SHE Transmission's Guidance, each alignment option is then assigned a colour ranking reflecting its relative potential to accommodate infrastructure, green for greatest potential; red for least (see **Plate 3.1** below). In assigning a Red-Amber-Green (RAG) description, consideration has also been given to the relative importance or sensitivity of the environmental feature in question.

Most Preferred  Least Preferred	Low potential for the development to be constrained.
	Intermediate potential for the development to be constrained.
	High potential for the development to be constrained.

Plate 3.4: RAG Rating for Comparative Analysis

3.4.2 Identification of a Preferred Alignment

The overall objective throughout the appraisal of alignment options has been to take full consideration of all known environmental factors to minimise any potential adverse impacts on the environment whilst considering engineering and economic considerations. Alignments have been considered in combination to arrive at a Preferred Alignment for the Proposed Development.

4. COMPARATIVE APPRAISAL

This part of the Consultation Document describes the Preferred Alignment in each section, providing a brief summary of the key environmental considerations in each section, and detailing the technical considerations and alternative alignment options considered.

Figure 4.1, presented as A3 figures show the alignment options in the context of key environmental constraints and environmentally designated sites.

4.1 Section 1

Initially two options in Section 1 were considered, named 1A and 1B. These options slightly differed between Towers 15 and 22 to try and avoid impacting on areas of native woodland. Due to the similarities between the options (each likely to be within the limit of deviation to be applied to an eventual proposed alignment), and in part because there are no substantial issues that merit an alternative alignment being considered (neither could completely avoid native woodland), only one option was taken forward for Section 1. The majority of Section 1 is aligned to closely follow the alignment of the existing OHL being replaced for most of Section 1. The final proposed alignment will be derived by safety clearances with the existing line as well as ground conditions and habitats along this section. The positioning of Alignment 1 (see **Plate 4.1**) has been chosen to allow for stakeholder consultation and further environmental and engineering studies to inform any required micro-siting of infrastructure. Alignment 1 is 3.4km in length.

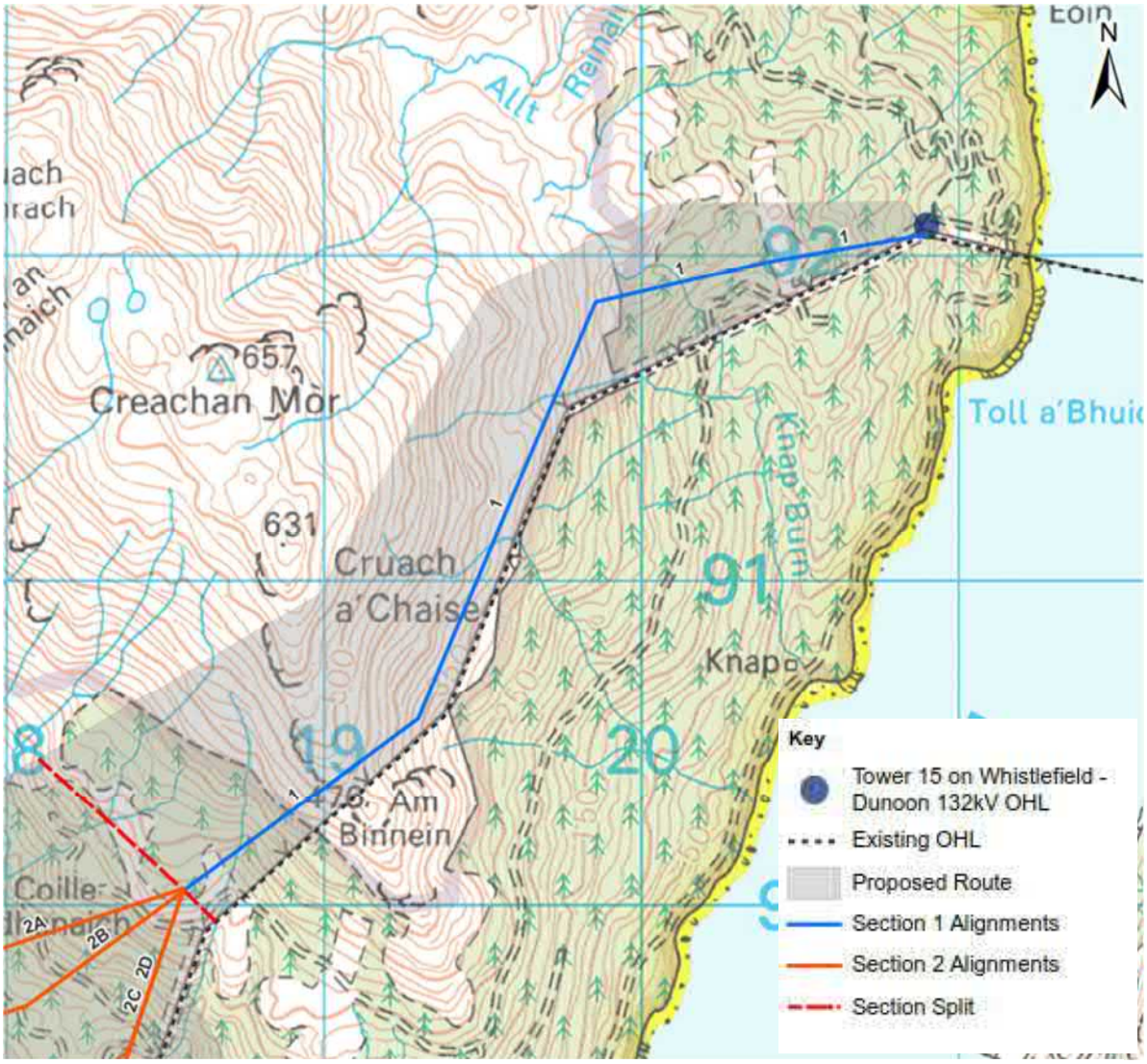

Plate 4.1: Section 1, Alignment 1

As there is only one alignment option within Section 1, an appraisal of the potential for the development to be constrained was undertaken. The principal environmental and engineering constraints for Alignment 1 are outlined below. The main economic considerations for Section 1 include those related to the construction of the alignment.

4.1.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape and visual impacts; particularly in relation to the Loch Lomond and The Trossachs National Park (the "National Park"), the Argyll Forest Park, and for sensitive receptors e.g. residential properties at Glen Finart and Ardentinny where the line crosses the ridge above Am Binnein and at the break of slope on the north side of Glen Finart.
- Minimising potential impacts on suitable habitat for protected species (with habitat suitability moderate to high) including bat, badger, red squirrel, pine marten and reptiles.
- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve No Net Loss (NNL) or Net Gain (NG). A Biodiversity Net Gain (BNG) report[10] to inform the comparative appraisal of alignments shows that Alignment 1 has total Biodiversity Units of 497.8 and a total Biodiversity Units per hectare (BU/ha) of 14.5. The Linear Unit measure per kilometre (LU/km) is 5.3.
- Minimising potential impacts on ornithological interests, in particular golden eagle, hen harrier, black grouse and barn owl.
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.1.2 Technical Considerations

Section 1 is not located close to any main centres of population and therefore the level of access available from existing roads and tracks is limited. The terrain in this section is very challenging, with slopes of a high gradient throughout most of the alignment length, such that it would be deemed a difficult task to establish access and may require use of alternative access methods such as the use of helicopters. However, it is noted that most of the majority of the alignment option is close to the existing OHL, crossing similar terrain with existing forestry accesses which run along the hill at various levels beneath the existing OHL.

4.1.3 *Alternative Alignments Considered*

As outlined above, due to the similarities between the options and in part because there are no substantial issues that merit an alternative alignment being considered, only one option was taken forward for Section 1. The positioning of Alignment 1 has been chosen to allow for stakeholder consultation and further environmental and engineering studies to inform any required micro-siting of infrastructure.

4.2 Section 2

There are four alignment options in Section 2; alignment options 2A to 2D, shown in **Plate 4.2**. Alignment options 2A, 2B, 2C and 2D are 5.6 km, 5.5 km, 5.1 km, and 5.0 km in length respectively.

[10] SSEN (2021). LT193 Dunoon to Loch Long – Biodiversity Net Gain Alignment Report, April 2021.

The four options within Section 2 deviate from one another where they cross Glen Finart, and adjoin with Section 1 to the north and Section 3 to the south. South of Glen Finart, the alignment of all options in Section 2 are the same, approximately following the alignment of the existing OHL which is being replaced, with the final alignment likely constrained by distance from the existing line where it can safely be built, ground conditions and habitats.

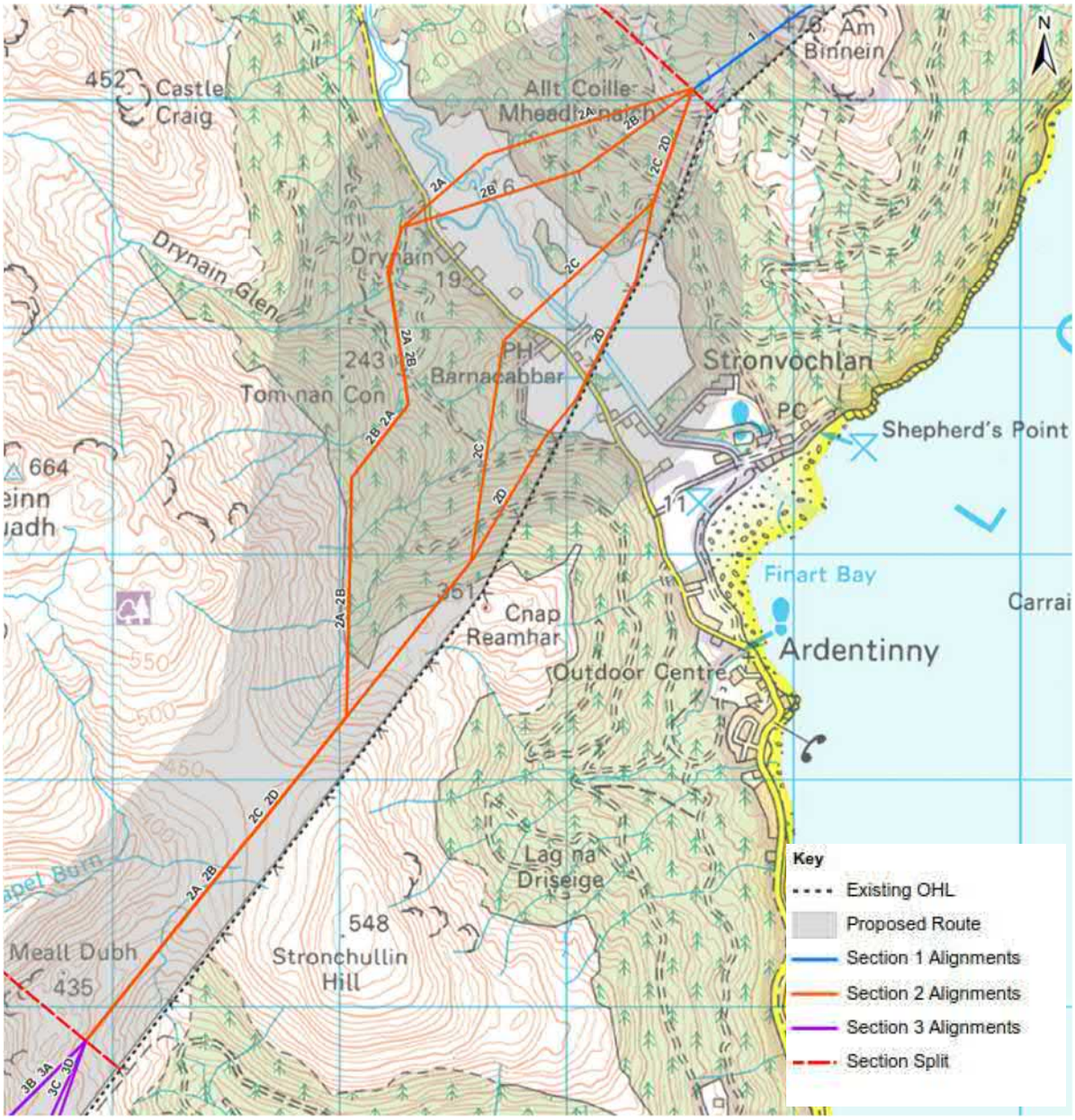

Plate 4.2: Section 2, Alignment options 2A, 2B, 2C and 2D

The Preferred Alignment in Section 2 is Alignment 2D.

4.2.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape, visual (including Setting), and recreational impacts; particularly in relation to the National Park, the Argyll Forest Park, and for sensitive receptors e.g. residential properties at Glen Finart and Ardentinny.
- Avoiding the Craighoyle Woodland SSSI.
- Minimising potential impacts on suitable habitat for protected species such as (with habitat suitability moderate to high) bat, badger, red squirrel, pine marten, reptiles, otter and water vole.

- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve No Net Loss or Net Gain.
- Minimising potential impacts on ornithological interests, in particular golden eagle, hen harrier, black grouse and barn owl.
- Avoiding, and minimising potential impacts, on Cultural Heritage assets, in particular the Scheduled Monument at Dun Daraich Fort, Glen Finart (SM9190).
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.2.2 Technical Considerations

The key engineering considerations in this Section relate to the terrain, availability of access, presence of peat and retaining clearance distances from properties:

- The terrain in this section is challenging, with areas of slope gradients greater than 40% north and south of Glen Finart, although it is noted that most of the existing OHL crosses similar terrain.
- There are several forest tracks, which may require upgrading for use in construction works, and one public road in this Section. These are predominantly located north and south of Glen Finart, with the availability of access at the southern end of the Section limited. Due to the severity of the terrain, both in terms of slope gradients and the changing direction of the slopes in certain areas, there are likely to be challenges associated with extending access across an alignment option in this Section such that use of alternative access methods may be required.
- An area of Class 2 peat, as identified from the SNH Carbon and Peatland Map, is located between the southern extent of the Section and south of Gleann Ban.
- Section 2 is predominantly undeveloped, however along Glen Finart there are a small number of properties spread across the width of the Section.

4.2.3 *Alternative Alignments Considered*

From an environmental perspective, Alignment 2C was less favoured compared to the Preferred Alignment due to its proximity to the Dun Daraich Fort Scheduled Monument and potential for direct and indirect effects upon this heritage asset. Alignment options 2A and 2B would remove the OHL from more open views, including those associated with the Dun Daraich Fort Scheduled Monument to the south-east and would be located furthest from existing dwellings. These alignment options were less favoured compared to the Preferred Alignment due to their potential for greater effects on the landscape, forestry, habitats, species and designated sites. Alignment options 2A and 2B would, compared to the Preferred Alignment:

- have a slightly greater landscape effect on the 'forested upland glen' character of Glen Finart (noted as a key feature of the Special Qualities of the National Park);
- would create an incongruous new broad 'ride' through the woodland on the north-east and south-west flanks of Glen Finart;
- would pass directly over (Alignment 2A) or within 50m of (Alignment 2B) the Craighoyle Woodland SSSI;
- would have the highest Biodiversity Units of the alignment options in this Section and the greatest amount of high distinctiveness watercourse Linear Units; and
- would pass through larger areas of forestry, which includes areas for long term retention, and woodland, including the greatest amount of ancient woodland of the alignment options. Although it was noted that the adverse effect on the forestry and landscape would be reduced if the final alignment is developed to tie in with the sanitation felling of the patches of larch in this forest.

From an engineering perspective there is little to differentiate the alignment options in Section 2. All options have no known major crossings, cross one public road and have the same length within an area identified as potentially class 2 peat. In addition, there is little difference between the number of angle towers (three between most and least) and levels of access from public roads and forest tracks. There is little difference between alignment options 2A and 2B, with both traversing more favourable terrain due to several 'pinch points' where the terrain is less severe than alignment options 2C and 2D. However, the difference between the options is not deemed to be considerable, with all alignment options crossing areas of terrain with slope gradients exceeding 40%.

Alignment 2A would appear to be the preferable option from an engineering perspective, with the main differentiator being the clearance distance from properties available in comparison to the other alignment options. Alignment options 2A and 2B pass properties/ buildings with a distance range of 100-250 m and alignment options 2C and 2D pass less than 100 m from a property/ building. However, for option 2D, the intention for this section of OHL would be to rebuild on the existing line alignment, or close to it. This is the primary reason that the option was included in the project.

From an economic perspective none of the alignment options is preferred over another at this stage.

Overall, it is acknowledged that the selection of preferred alignment in this section is largely based on the environmental constraints, rather than the engineering constraints. There is not a hugely significant difference between the options from an engineering perspective, with all crossing broadly similar terrain types and having similar levels of access from existing roads/ tracks. However, due to the there are numerous ecological, historical and landscape constraints to be considered, especially across the floor of Glen Finart. Therefore, Alignment 2D was preferred on the basis that it will allow the new OHL alignment to be constructed near, or on, the existing alignment through Glen Finart. However, it is noted that to construct the preferred alignment in this Section, either double circuit outages or single circuit outages with a temporary diversion would be required.

4.3 Section 3

There are four alignment options in Section 3; alignment options 3A to 3D, shown in **Plate 4.3**. Alignment options 3A, 3B, 3C and 3D are 2.6 km, 2.5 km, 2.9 km and 3.2 km in length respectively.

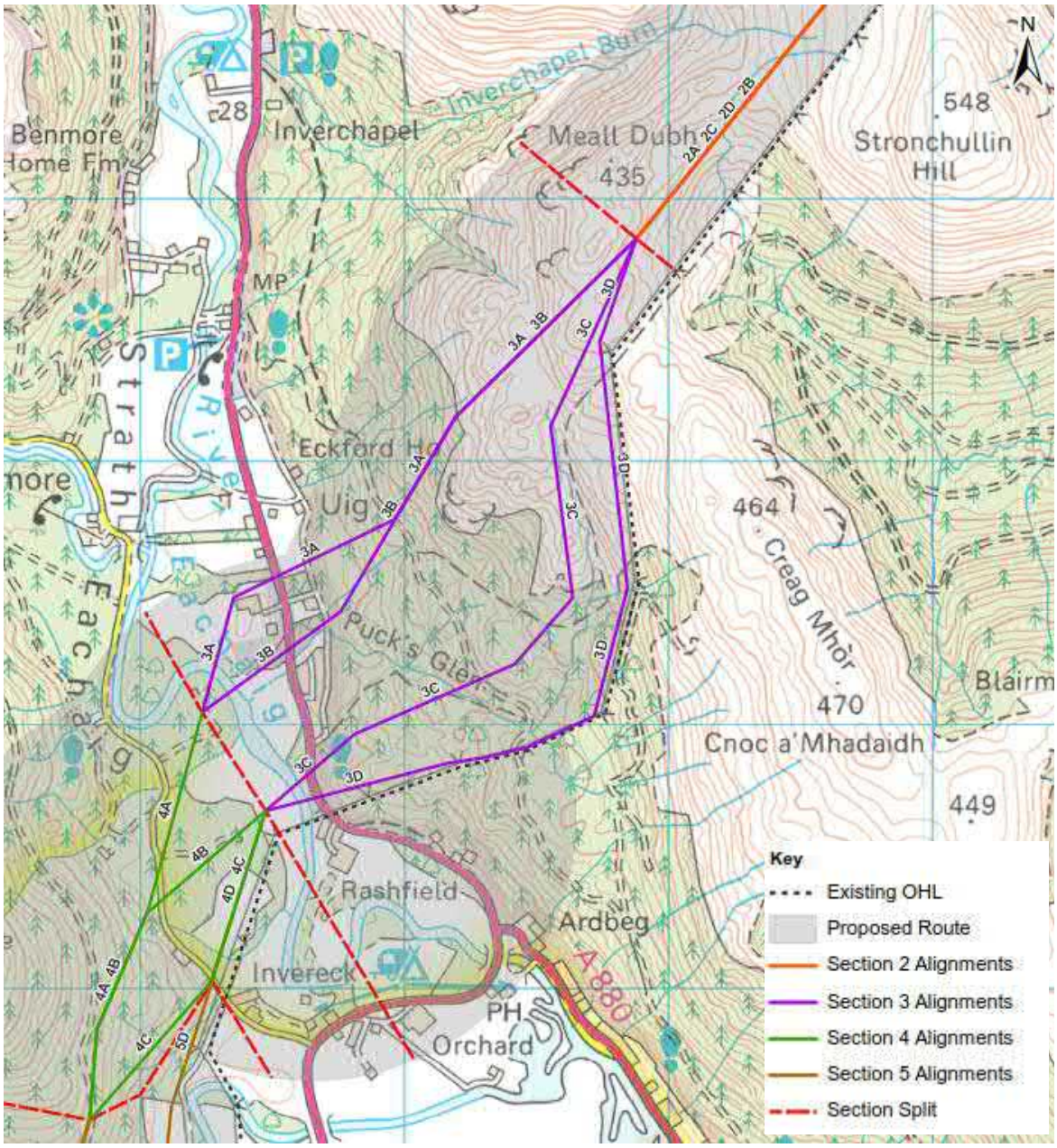

Plate 4.3: Sections 3 and 4, Alignment options 3A, 3B, 3C, 3D, 4A, 4B, 4C and 4D

The preferred alignment in Section 3 is Alignment 3D.

4.3.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape, visual (including Setting), and recreational impacts; particularly in relation to the National Park, the Argyll Forest Park, Benmore GDL, Pucks Glen, and for sensitive receptors e.g. residential properties along the A815 and A880.
- Minimising potential impacts on suitable habitat for protected species (with habitat suitability moderate to high) such as bat, badger, red squirrel, pine marten, reptiles, otter and water vole.
- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve No Net Loss or Net Gain.

- Minimising potential impacts on ornithological interests, in particular golden eagle, hen harrier, black grouse and barn owl.
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.3.2 Technical Considerations

The key engineering considerations in this Section relate to the terrain, availability of access, presence of peat and retaining clearance distances from properties:

- The terrain in this section is challenging, with areas of slope gradients greater than 40% east of the A815. It is noted that even when areas of higher gradient have been avoided, it has generally been necessary to position the alignment options in narrow 'pinch points' with lower gradient terrain to achieve this, although it is noted that most of the existing OHL crosses similar terrain.
- There are several forest tracks, which may require upgrading for use in construction works, and the A815 road in this Section. These are predominantly located in proximity to the A815 of Glen Finart, with the availability of access at the northern end of the Section limited. Due to the severity of the terrain and limited access at the northern end of the Section, there are likely to be challenges associated with extending access across an alignment option in this Section such that use of alternative access methods may be required.
- An area of Class 2 peat, as identified from the SNH Carbon and Peatland Map, is located at the northern extent of the Section.
- Section 3 is predominantly undeveloped, however along the A815 there are a number of properties spread across the width of the Section.

4.3.3 Alternative Alignments Considered

From an environmental perspective, alignment options 3A and 3B was less favoured compared to the preferred alignment as it would be noticeably closer to the Benmore GDL (noted as a key feature of the Special Qualities of the National Park) than the existing OHL and would create an incongruous new 'ride' through the mature conifer woodlands on the lower slopes. Where these alignment options cross the break of slope at the top of the hillside at least one tower is likely to be silhouetted against the sky forming a prominent feature. In addition, alignment option 3B would pass over the 2020/0315/DET planning application. Alignment options 3C and 3D follow the name natural lane in the landscape however the preferred alignment would be more effectively 'backclothed' and is much less likely intrusive in views from Benmore Botanic Gardens. In addition, Alignment 3C compared to the preferred alignment:

- would introduce potential major effects on visitors to Puck's Glen;
- would overall potentially pass through larger areas with 'Moderate' and 'High' suitability for protected species;
- would pass over a larger area of High Value Habitat for golden eagle and passes directly over a Prominent Ridge; and
- would pass through a greater area of irreplaceable habitat (including Ancient Woodland) and combined proportion of Annex 1 and UKBAP priority habitats.

From an engineering perspective there is little to differentiate between the alignment options in Section 3 with regards major crossings, road crossings, peat and angle towers. There are no known major crossings, only one additional road crossing between alignment options, the length of potentially class 2 peat traversed by alignment options is similar and there is only a difference of three angle towers required between the alignment options.

The main differentiators are clearance distances, terrain and access. As Alignment 3A would pass over the Benmore Saw Mill (as noted on OS mapping) this alignment option would not be preferred from an engineering perspective. Of the other alignment options (3B, 3C and 3D), 3B would require

less angle towers and a lower percentage of its length through the area identified as potentially class 2 peat than alignment options 3C and 3D. However, Alignment 3B has an additional crossing of the minor road and a higher percentage of its length in challenging terrain. Given the challenges associated with terrain on this project and that notable further access works that would also be required in this Section. It is therefore deemed that alignment options 3C and 3D would be preferred over 3B from an engineering perspective. Between these two alignment options, 3C would be preferred as alignment option 3D would partly be constructed close to, or on, the existing OHL alignment and may therefore require either a double circuit outage or single circuit outages with a temporary diversion.

From an economic perspective Alignment 3D, due to its length and the need for a temporary diversion, is least preferred. However, it is acknowledged that the section of Alignment 3D which requires a temporary diversion may result in cost benefits from including reduced forestry and land assembly costs.

Overall, it is acknowledged that the selection between alignment options 3B, 3C and 3D is based on the environmental constraints and ability to achieve consent for the Proposed Development in this area, rather than engineering constraints. As Alignment 3C would cross Puck's Glen and Alignment 3B would move the line significantly closer to Benmore GDL, alongside other environmental constraints for each option they are not preferred. Alignment 3D is therefore preferred; however it is noted that to construction the preferred alignment in this Section would require a temporary diversion and associated additional outage management. In addition, the proximity of a covered reservoir, as shown on the OS mapping would need to be considered (although it is already located near the existing OHL) through discussions with the asset owner/ operator to confirm there would be no issues.

4.4 Section 4

There are four alignment options in Section 4; alignment options 4A to 4D, shown in **Plate 4.3**. Alignment options 4A, 4B, 4C and 4D are 1.6 km, 1.4 km, 1.4 km and 0.7 km respectively.

The preferred alignment in Section 4 is Alignment 4B.

4.4.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape, visual (including Setting), and recreational impacts; particularly in relation to the National Park, the Argyll Forest Park, Benmore GDL, listed buildings, and for sensitive receptors e.g. residential properties along the valley of Strath Eachaig.
- Minimising potential impacts on suitable habitat for protected species such as bat, badger, red squirrel, pine marten, reptiles, otter and water vole.
- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve NNL or NG.
- Minimising potential impacts on ornithological interests, in particular barn owl.
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.4.2 Technical Considerations

There are few engineering considerations in this Section; the key constraints are retaining clearance distances from Cardie House and Deargacha and terrain in the southern portion of the Section.

4.4.3 Alternative Alignments Considered

From both an environmental and an engineering perspective there is very little to choose between the alignment options in Section 4. As there are no major crossings, only a single road crossing for

all alignment options, no areas identified to potentially have class 1 or 2 peat, a similar level of access available from existing public roads and forest tracks, and only one angle tower difference between all alignment options, the preferred alignment has been chosen based on terrain and clearance distances.

Alignment options 4A and 4B would provide a greater level of clearance distance with, alignment options 4C and 4D within 100 m of Cardie House, although they would be located on slightly steeper terrain on the side of Ballochyle Hill. Due to their greater clearance distance either alignment option 4A or 4B would be preferred in Section 4.

From an economic perspective there is little to choose between the Alignment Options. Due to the significantly shorter length of Alignment 4D is it preferred.

Whilst there are differences in the effects between the alignment options in Section 4, they are of a much smaller magnitude that the differences between alignment options in Section 3 and Section 5, such that no alignment is considered better to accommodate the Proposed Development than another. Therefore, the selection between these alignment options has been based on the preferred alignments in Section 3 and Section 5, to provide a continuous connection between sections.

4.5 Section 5

There are four alignment options in Section 5; alignment options 5A to 5D, shown in **Plate 4.4**. Alignment options 5A, 5B, 5C and 5D are 2.9 km, 2.5 km, 2.5 km and 2.8 km in length respectively.

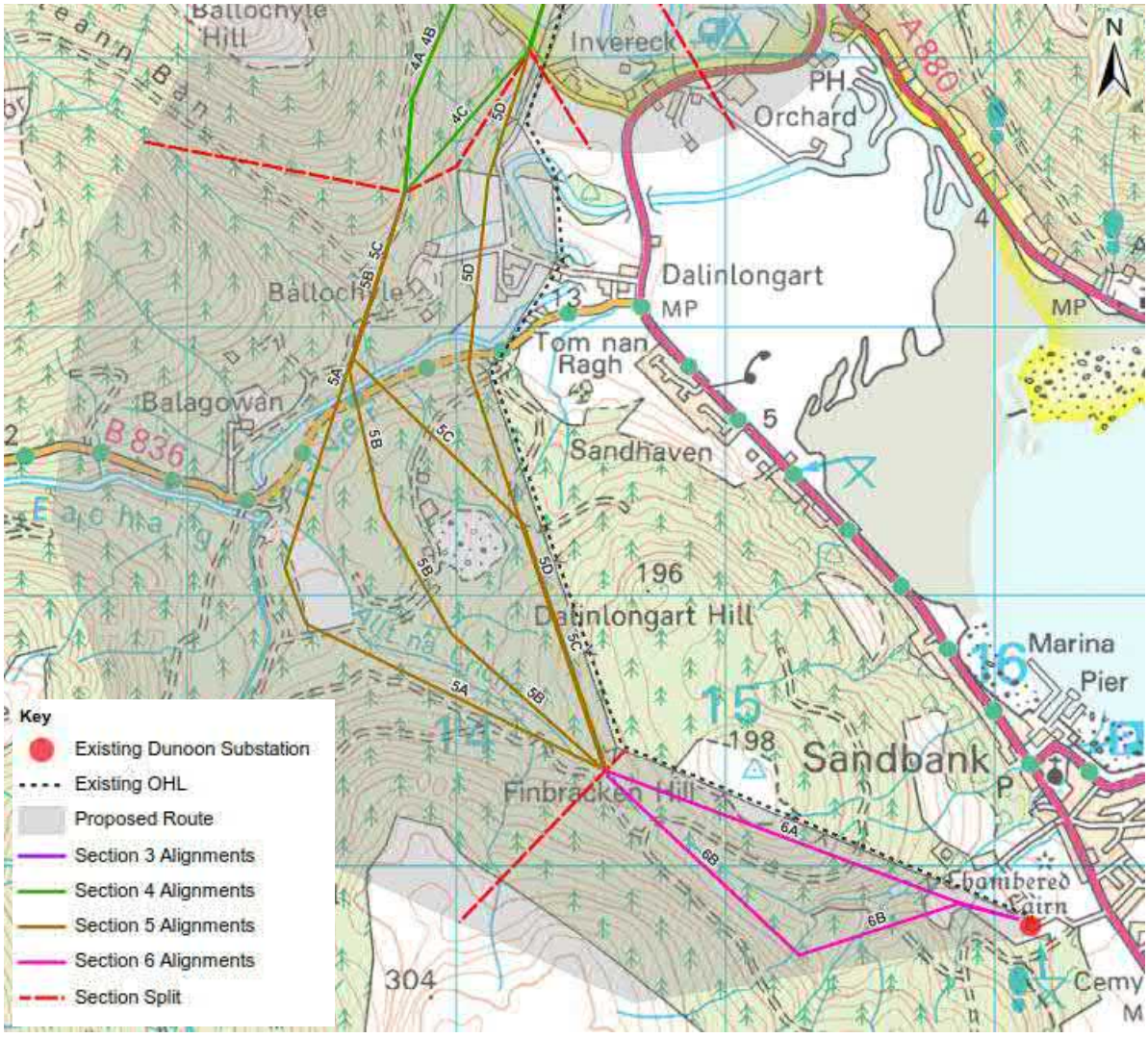

Plate 4.4: Sections 5 and 6, Alignment options 5A, 5B, 5C, 5D, 6A and 6B

The Preferred Alignment in Section 5 is Alignment 5C.

4.5.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape, visual, and recreational impacts; particularly in relation sensitive receptors such as the residential properties at Ballochyle.
- Minimising potential impacts on suitable habitat for protected species such as bat, badger, red squirrel, pine marten, reptiles, otter and water vole.
- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve NNL or NG.
- Minimising potential impacts on ornithological interests, in particular barn owl.
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.5.2 Technical Considerations

There are few engineering considerations in this Section; the key constraints are retaining clearance distances from properties at Ballochyle and the Dalinlongart Waste Disposal Facility, and terrain (predominantly in the southern portion of the Section).

4.5.3 Alternative Alignments Considered

From an environmental perspective, with the exception of Alignment 5D due to its visual intrusion and proximity to dwellings at Ballochyle, there is little difference between the alignment options in Section 5. Alignment options 5A, 5B and 5C would all introduce a built element into a part of the river valley not currently affected by obvious development however overall Alignment 5C is preferred. This alignment option was preferred as it starts on the hillside above ("behind") Ballochyle and crosses the Little Eachaig valley directly, travelling only a short distance in the National Park, has the least amount of Annex 1 habitat areas occurring within close proximity, the least amount of irreplaceable habitats and is marginally preferable regarding barn owl.

From an economic perspective Alignment 5A is the least preferred due to costs associated with its additional felling and land assembly costs, predominantly related to its overall length. There is no preference from an economic perspective between the other Alignment Options.

From an engineering perspective several categories there is little to differentiate the alignment options. There are no known major crossings, only a single public road (B836), no areas identified to potentially have class 1 or 2 peat, a similar level of access available from existing public roads and forest tracks and only one angle tower difference between the alignment options.

Alignment 5D would pass within 100 m of multiple properties at Ballochyle and within 200 m of several others. As there are properties on both sides of the alignment in this area, there is little flexibility to improve this significantly. This is the primary reason that option 5D is not taken forward. Of the other alignment options, 5A, 5B and 5C, Alignment 5B passes within 100 m of a building at Dalinlongart Waste Disposal Facility and the area west of these buildings appear to be (or have been) in use to some extent therefore it is not taken forward. From an engineering perspective there is little difference between alignment options 5A and 5C, which both pass around Dalinlongart Waste Disposal Facility, to the west and the east respectively. Alignment 5A would provide a greater level of clearance but would consequently be longer and would cross an disused tip (as identified on OS mapping) and therefore the more direct Alignment 5C is preferred from an engineering perspective. However, if it is perceived that there would be issues due to its proximity to the waste disposal facility, then Alignment 5A could alternatively be considered.

4.6 Section 6

There are two alignment options in Section 6; alignment options 6A and 6B, shown in **Plate 4.4**. Alignment options are 1.7 km and 1.9 km in length respectively.

The Preferred Alignment in Section 6 is Alignment 6B.

4.6.1 Environmental Considerations

The key environmental considerations in this section include (see Appendix 1 for further details):

- Minimising potential landscape, visual (including Setting) and recreational impacts; particularly in relation to Adams Cave Chambered Cairn (SM6552) and sensitive receptors at Sandbank.
- Minimising potential impacts on suitable habitat for protected species such as bat, badger, red squirrel, pine marten, otter and water vole.
- Minimise potential impacts on sensitive and irreplaceable habitats (including areas of ancient and native woodland, Annex 1 and UKBAP priority habitats) and therefore increasing the ability for the Project to achieve NNL or NG.
- Minimising potential impacts on ornithological interests, in particular barn owl.
- Potential impacts on commercial woodland and the use of existing forestry tracks.

4.6.2 Technical Considerations

The key engineering constraint in this area is the terrain; in particular a small area of Finbracken Hill with slope gradients in the range of 40% - 50%.

4.6.3 Alternative Alignments Considered

From an engineering perspective Alignment 6B is deemed to be preferable as Alignment 6A crosses the side of Finbracken Hill, as well as some other small areas of challenging terrain to the southeast of this. Although Alignment 6B also crosses some areas with steep terrain the section to the west passes between two hills and therefore largely avoids the worst terrain in this area. In addition, Alignment 6A would potentially cross an area identified as a reservoir on OS mapping.

From an economic perspective there is no preference between either of the Alignment Options in Section 6, although it is noted that Alignment 6B may have slightly higher felling costs.

Although overall there is no significant difference between the two alignment options from an environmental perspective, Alignment 6B is preferred as it would have a substantially less effect on the landscape and on visual amenity, a lower total BU and high distinctiveness watercourse LU and is located further away from larger areas of High Value Habitat for barn owl.

4.7 Preferred Alignment

A Preferred Alignment has been identified following consideration of both environmental, engineering and cost considerations.

The analysis to date has concluded that alignment Options 1, 2D, 3D, 4B, 5C and 6B provide advantages over the other alignment options and could offer a viable alignment and solution for the project from an environmental, engineering and cost perspective.

On balance and based on current analysis, it is considered that Alignment Options 1, 2D, 3D, 4B, 5C and 6B are the Preferred Alignment Options as:

- For Section 1, there is only one alignment in part because there are no substantial environmental and engineering issues (those which are present predominantly relate to natural heritage including woodland and habitats to support protected species) that merit an alternative alignment being considered.
- For Section 2, there is little to differentiate the alignment options from an engineering and economic perspective with Alignment 2D preferred environmentally as it is likely to have fewer landscape and visual effects, less of an impact on natural heritage and on cultural heritage.
- For Section 3, there is little to differentiate the alignment options from an engineering perspective and although Alignment 3D is least preferred economically it is acknowledged

that the section requiring a temporary diversion may result in cost benefits from reduced forestry and land assembly costs. Alignment 3D is preferred from an environmental perspective as it is likely to have fewer landscape, visual and cultural heritage effects and it would also have fewer or very similar effects on natural heritage, people and land use compared to the other Alignment options.

- For Section 4, whilst there are differences in effect on environmental, engineering and economic factors between the alignment options, they are of much smaller magnitude than the differences between alignment options in Sections 3 and Section 5, such that no alignment considered better than another able to accommodate the Proposed Development. Alignment 4D was preferred due to its considerably shorter length however as it would not connect with the Preferred Alignment in Sections 3 and 5, and due to its proximity to Cardie House, the Preferred Alignment is Alignment 4B in this Section.
- For Section 5, there is little to differentiate the alignment options from an engineering and economic perspective and with the exception Alignment 5A (least preferred economically) and Alignment 5D (engineering least preferred). The differences in effect on environmental factors between the alignment options are of a similar nature, however, it is noted that alignment options 5B and 5C would be preferred. When considering the engineering, economic and environmental constraints the more direct Alignment 5C is preferred.
- For Section 6, Alignment 6B is preferred environmentally as it would have substantially less effect on the landscape and on visual amenity, a lower total Biodiversity Unit and high distinctiveness watercourse Linear Units, and is located further away from larger areas of High Value Habitat. It is also deemed to be preferable from an engineering perspective as it largely avoids the worst terrain in Section 6. There is no economic preference between either alignment option in Section 6.

The Preferred Alignment is illustrated on **Figure 6.1**.

The Preferred Alignment will require careful consideration during the EIA Stage of the project to achieve an acceptable final alignment with minimal environmental effects.

Should further site and desk-based analysis at the EIA stage identify a particular constraint, a further review of alignment options may be required prior to the identification of a final alignment.

5. CONSULTATION ON THE PROPOSALS

SHE Transmission plc 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.

5.1 Questions for Consideration by Consultees

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

- Has the requirement for the Dunoon 132kV Overhead Line Rebuild Project clearly explained?
- In your opinion, has a clear overview of the required project elements been provided?
- Do you agree with the preferred technology solution (L7c tower) that has been identified?
- Have we explained the approach taken to select the preferred alignment adequately?
- Do you agree with our preferred alignment for the following sections:
    - Section 1
    - Section 2
    - Section 3
    - Section 4
    - Section 5
    - Section 6
- Are there any identified alignments you feel should NOT be progressed?
- Are there any factors, environmental features or important points that you believe have not been considered and should be brought to our attention?

5.2 Next Steps

Virtual online consultation events will be held, as detailed in the preface of this document. The responses received from these consultation events, and those sought from statutory consultees and other key stakeholders, will inform further consideration and any refinement of the preferred alignment.

All comments are requested by Friday 24th September 2021. A Report on Consultation will be produced which will document the consultations received, and the decisions made in light of these responses.

Following the identification and confirmation of a Preferred Alignment, further technical and environmental surveys will be undertaken to identify a Proposed Alignment for the EIA stage and an application for consent under Section 37 of the Electricity Act 1989.

Consultation on the Proposed Alignment as part of the EIA stage will be undertaken in a similar manner to the identification of a Preferred Alignment. This is currently anticipated for autumn 2021.

APPENDIX 1 – FIGURES

Key

- 🟥 Existing Dunoon Substation
- 🟦 Tower 15 on Whistlefield - Dunoon 132kV OHL
- ---- Existing OHL

Client:

Scottish & Southern Electricity Networks

Project:

LT193 Dunoon to Whistlefield
132kV OHL Rebuild

Title

Figure 1.1
Location

Date:	25 March 2021			Scale:	70,000 @ A3
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Key

- Corridor
- Existing Dunoon Substation
- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing OHL

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 3.1 Corridor

Date:	25 March 2021			Scale:	60,000 @ A3
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Date Saved: 17/05/2021

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Key

- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing OHL
- Alignment Options
- Section Split
- Proposed Route
- Loch Lomond & The Trossachs National Park
- Site of Special Scientific Interest (SSSI)
- Marine Protected Area
- Ancient Woodland Inventory
- Native Woodland
- Near-native Woodland
- Scheduled Monument
- Listed Building (A, B and C)
- Undesignated Heritage Asset
- Residential Dwelling

0 0.5 1 km

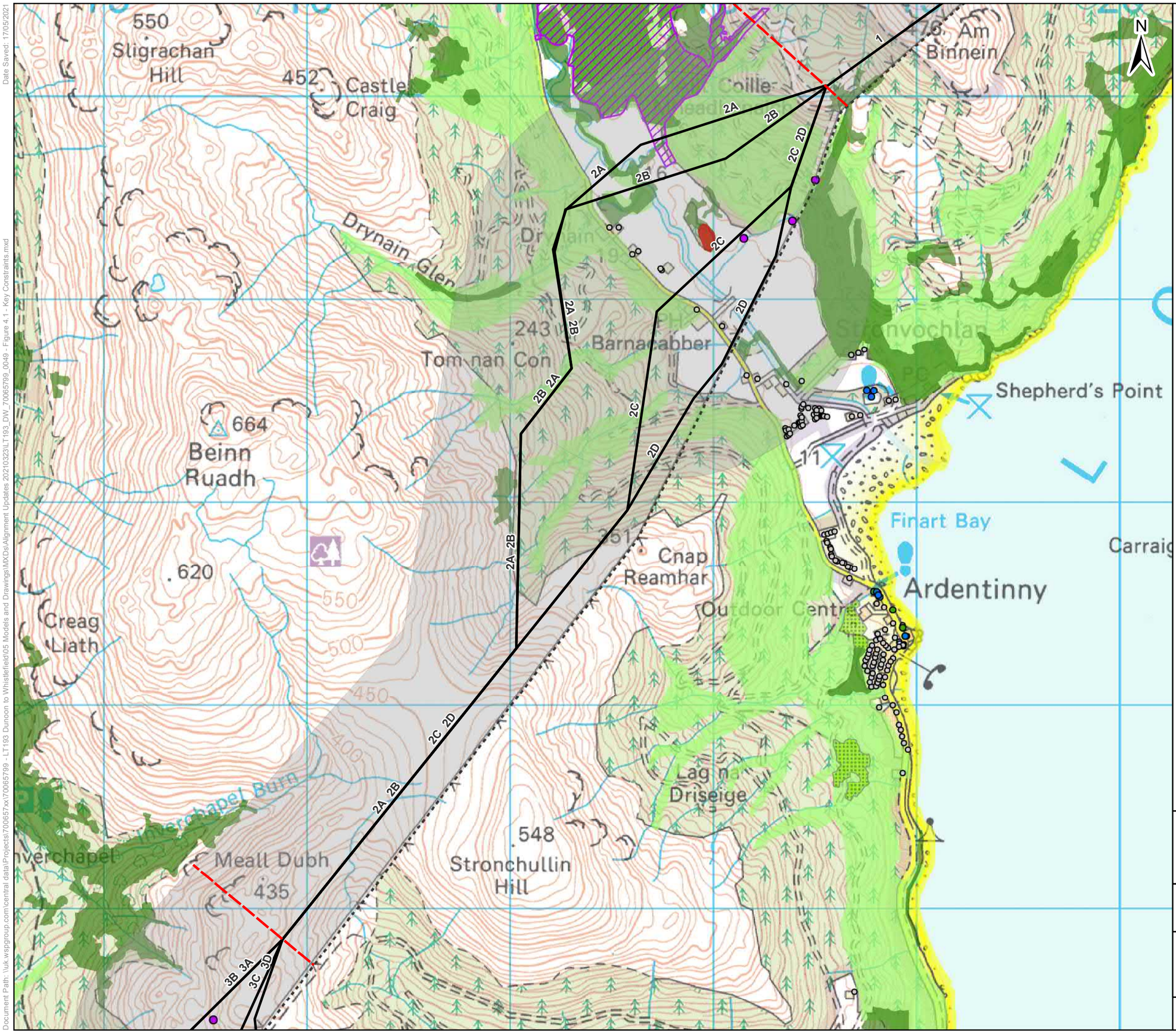
Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 4.1 Key Environmental Constraints Sheet 1 of 4

Date: 20 May 2021 Scale: 18,000 @ A3

Drawn: EC Checked: CE Approved: JB



Key

- Existing OHL
- Alignment Options
- Section Split
- Proposed Route
- Loch Lomond & The Trossachs National Park
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory
- Native Woodland
- Near-native Woodland
- Scheduled Monument
- Listed Building (A, B and C)
- Undesignated Heritage Asset
- Residential Dwelling

0 0.5 1 km

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 4.1 Key Environmental Constraints Sheet 2 of 4

Date: 20 May 2021 Scale: 18,000 @ A3

Drawn: EC Checked: CE Approved: JB

Date Saved: 17/05/2021

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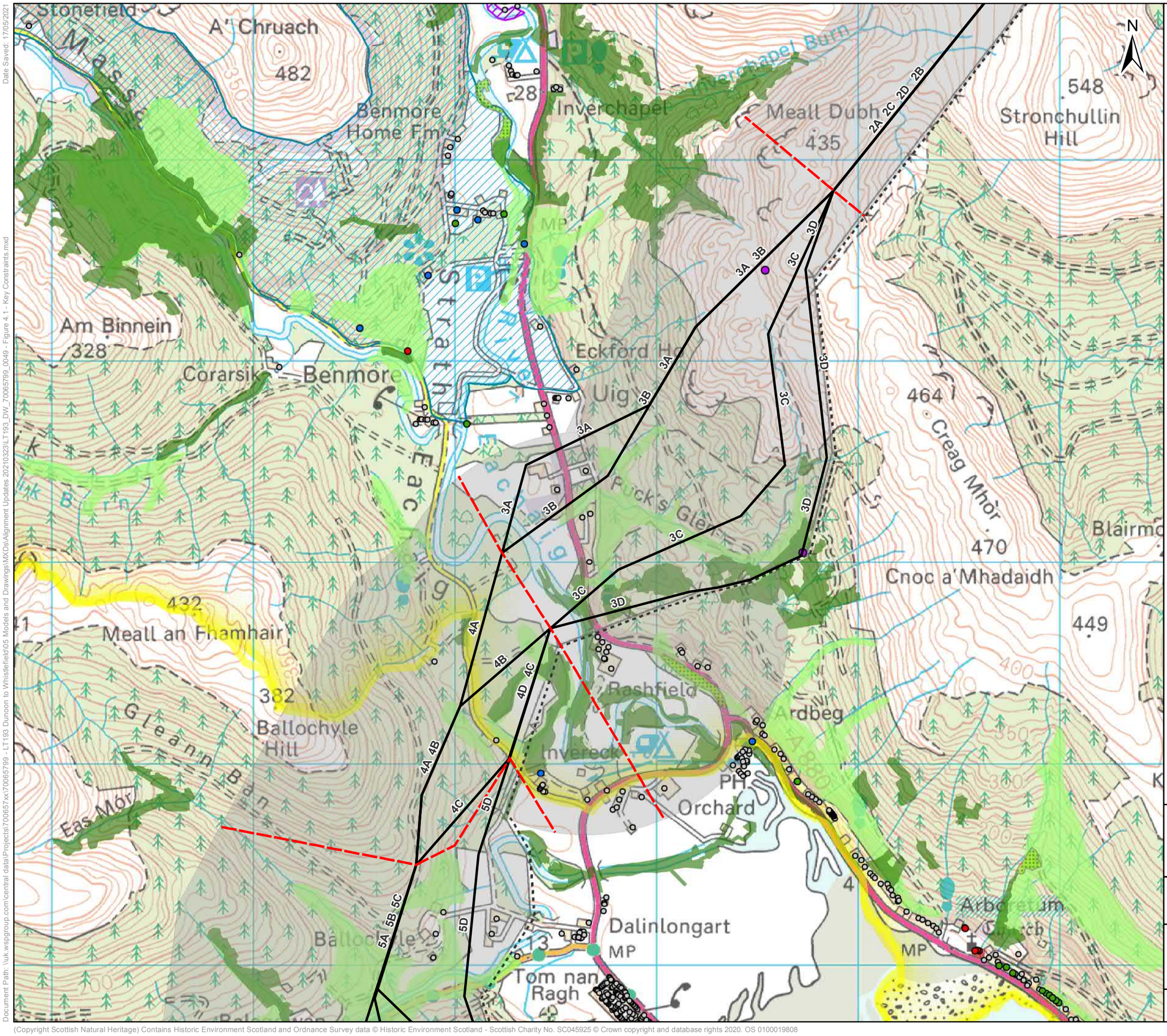

Key

- Existing OHL
- Alignment Options
- Section Split
- Proposed Route
- Loch Lomond & The Trossachs National Park
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland Inventory
- Native Woodland
- Near-native Woodland
- Scheduled Monument
- Garden and Designed Landscape
- Listed Building (A, B and C)
- Undesignated Heritage Asset
- Residential Dwelling

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 4.1 Key Environmental Constraints Sheet 3 of 4

Date:	20 May 2021			Scale:	18,000 @ A3
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Date Saved: 17/05/2021

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Key

- Existing Dunoon Substation
- Existing OHL
- Alignment Options
- Section Split
- Proposed Route
- Loch Lomond & The Trossachs National Park
- Ancient Woodland Inventory
- Native Woodland
- Near-native Woodland
- Scheduled Monument
- Listed Building (A, B and C)
- Undesignated Heritage Asset
- Residential Dwelling

N

0 0.5 1 km

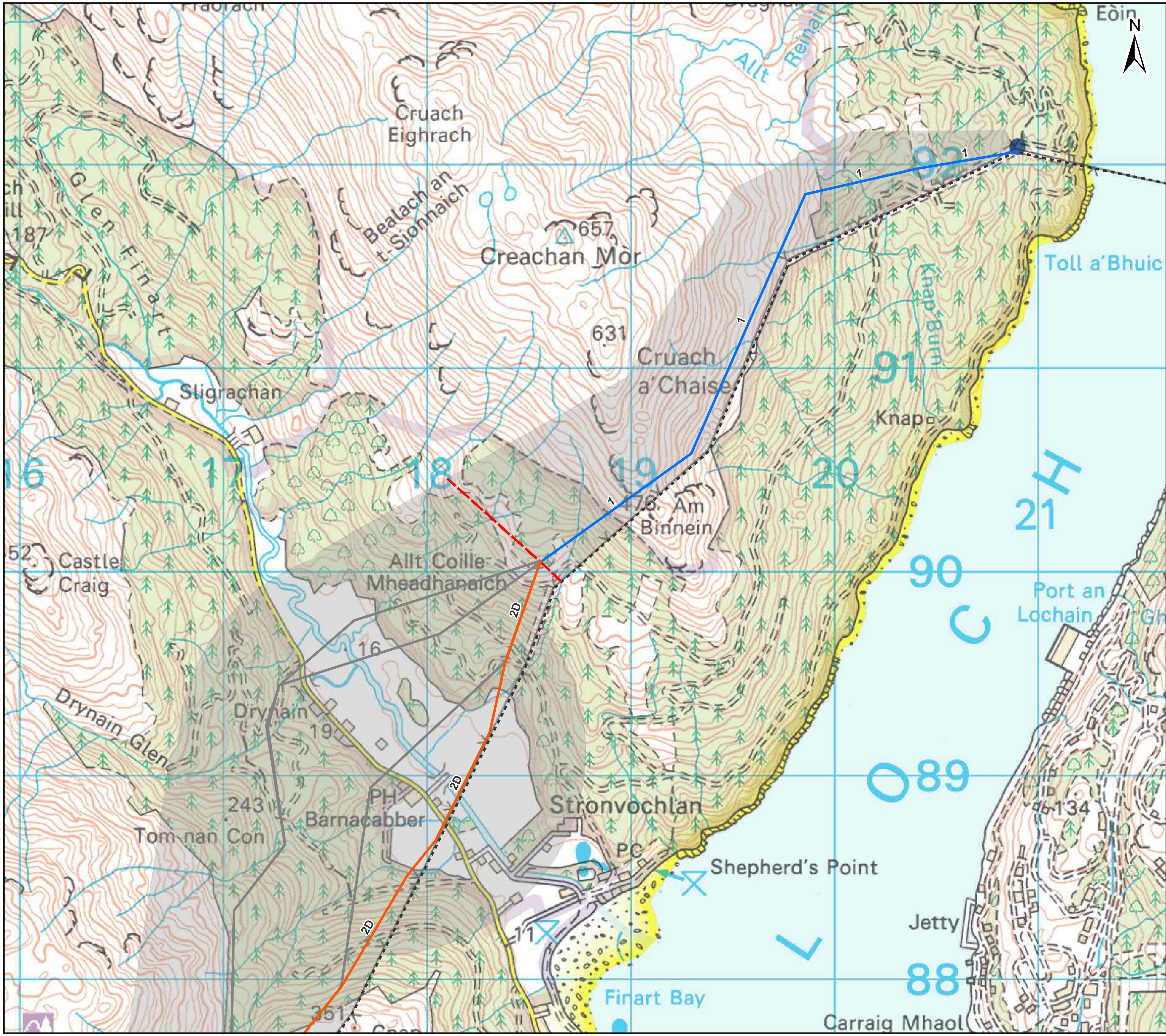
Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 4.1 Key Environmental Constraints Sheet 4 of 4

Date: 20 May 2021 Scale: 18,000 @ A3

Drawn: EC Checked: CE Approved: JB



Key

- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing Dunoon Substation
- Existing OHL
- Proposed Route
- Section 1 Preferred Alignment
- Section 2 Preferred Alignment
- Section 3 Preferred Alignment
- Section 4 Preferred Alignment
- Section 5 Preferred Alignment
- Section 6 Preferred Alignment
- Other Alignments
- Section Split

0 0.5 1 km

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 6.1 Preferred Alignment Sheet 1 of 4

Date:	20 July 2021	Scale:	18,000 @ A3
Drawn:	EC	Checked: CE	Approved: JB

Key

- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing Dunoon Substation
- Existing OHL
- Proposed Route
- Section 1 Preferred Alignment
- Section 2 Preferred Alignment
- Section 3 Preferred Alignment
- Section 4 Preferred Alignment
- Section 5 Preferred Alignment
- Section 6 Preferred Alignment
- Other Alignments
- Section Split

0 0.5 1 km

Client:

Scottish & Southern Electricity Networks

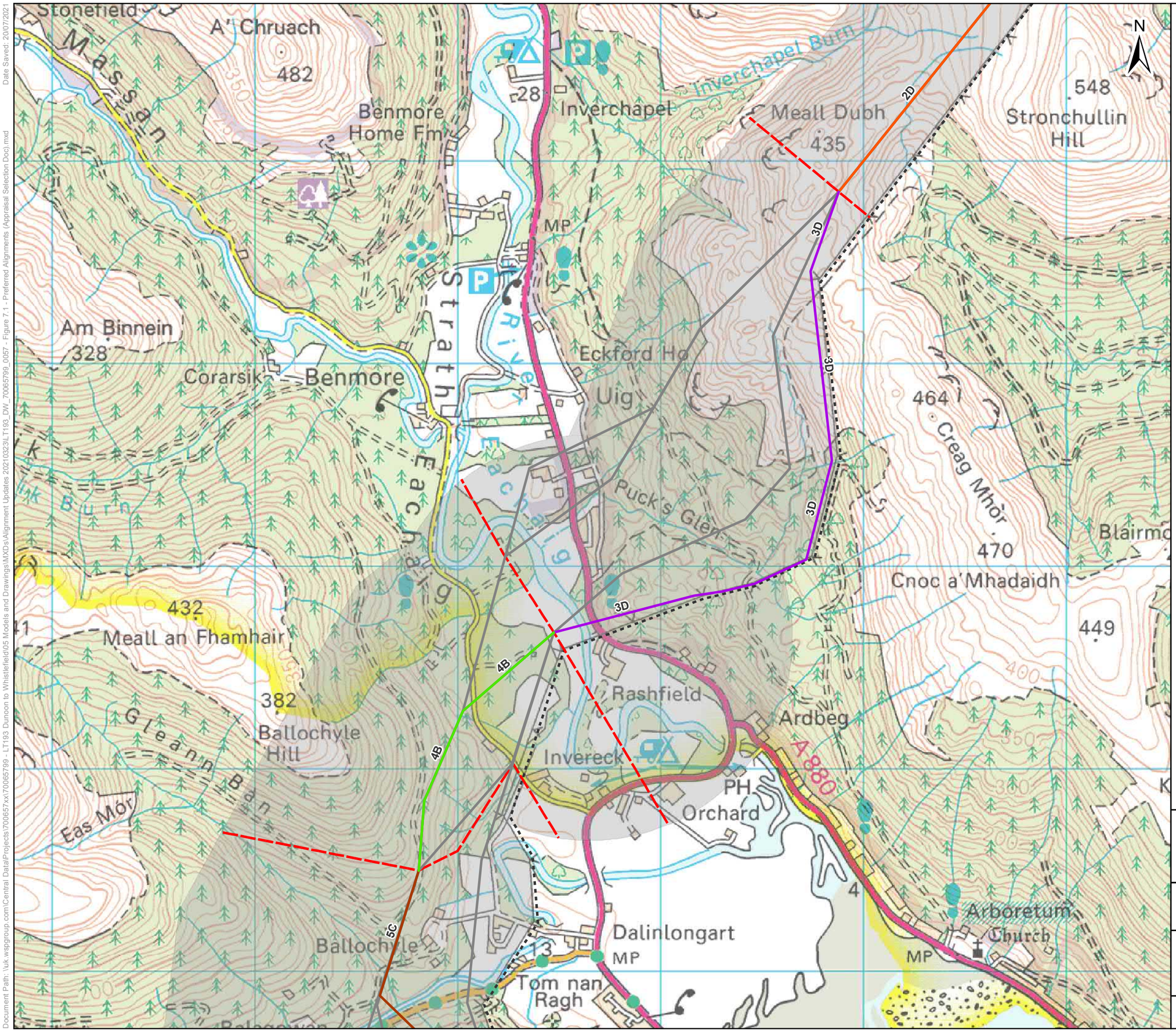
Project:

LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title

Figure 6.1
Preferred Alignment
Sheet 2 of 4

Date:	20 July 2021			Scale:	18,000 @ A3
Drawn:	EC	Checked:	CE	Approved:	JB



Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 6.1 Preferred Alignment Sheet 3 of 4

Date: 20 July 2021 | Scale: 18,000 @ A3

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Key

- Tower 15 on Whistlefield - Dunoon 132kV OHL
- Existing Dunoon Substation
- Existing OHL
- Proposed Route
- Section 1 Preferred Alignment
- Section 2 Preferred Alignment
- Section 3 Preferred Alignment
- Section 4 Preferred Alignment
- Section 5 Preferred Alignment
- Section 6 Preferred Alignment
- Other Alignments
- Section Split

N

0 0.5 1 km

Client: Scottish & Southern Electricity Networks

Project: LT193 Dunoon to Whistlefield 132kV OHL Rebuild

Title: Figure 6.1 Preferred Alignment Sheet 4 of 4

Date: 20 July 2021 Scale: 18,000 @ A3

Drawn: EC Checked: CE Approved: JB

Date Saved: 20/07/2021

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APPENDIX 2 – SUMMARY RAG TABLES

Environmental Summary RAG Rating Table

Alignment Option	RAG Impact Rating – Environmental														
	Landscape and Visual			Natural Heritage					Cultural Heritage		People	Land Use			Planning
	Designations	Character	Visual	Designations	Protected Species	Habitats	Ornithology	Geology, Hydrology & Hydrogeology	Designations	Cultural Heritage Assets	Proximity to Dwellings	Agriculture	Forestry	Recreation	Proposals
1															
2A															
2B															
2C															
2D											°				
3A															
3B															
3C															
3D															
4A															
4B															
4C															
4D															
5A															
5B															
5C															
5D															
6A			**												
6B															

Engineering Appraisal Summary RAG Rating Table

Alignment Option	RAG Impact Rating - Engineering						
	Infrastructure Crossings		Ground Conditions		Construction/ Maintenance		Proximity
	Major Crossings	Road Crossings	Terrain	Peat	Access	Angle Towers	Clearance Distance
1							
2A							
2B							
2C							
2D							
3A							
3B							
3C							
3D							
4A							
4B							
4C							
4D							
5A							
5B							
5C							
5D							
6A							
6B							

Economic Summary RAG Rating Table

Alignment Options	RAG Impact Rating – Costs							
	Capital						Operational	
	Construction	Diversion	Public Road Improvements	Felling	Land Assembly	Consents Mitigation	Inspection	Maintenance
1								
2A								
2B								
2C								

Alignment Options	RAG Impact Rating – Costs							
	Capital						Operational	
	Construction	Diversion	Public Road Improvements	Felling	Land Assembly	Consents Mitigation	Inspection	Maintenance
2D								
3A								
3B								
3C								
3D								
4A								
4B								
4C								
4D								
5A								
5B								
5C								
5D								
6A								
6B								

Preferred Alignment Option Summary RAG Rating Table

Constraint Type	Topic	Specific aspect of the topic	Alignment Option					
			1	2D	3D	4B	5B	6B
Environmental	Landscape and Visual	Designations						
		Landscape Character						
		Visual amenity						
	Natural Heritage	Designations						
		Protected Species						
		Habitats						
		Ornithology						
		Geology, Hydrology and Hydrogeology						
	Cultural Heritage	Designations						
		Cultural Heritage Assets						
	People	Proximity to Dwellings						
	Land Use	Agriculture						

Constraint Type	Topic	Specific aspect of the topic	Alignment Option					
			1	2D	3D	4B	5B	6B
		Forestry						
		Recreation						
	Planning	Proposals						
Engineering	Environmental Design	Major crossings						
		Road crossings						
	Ground Conditions	Terrain						
		Peat						
	Construction/ Maintenance	Access						
		Angle towers						
	Proximity	Clearance distance						
Economic	Capital	Construction						
		Diversions						
		Public Road Improvements						
		Felling						
		Land Assembly						
	Operational	Inspections						
		Maintenance						