

CHAPTER 2 - THE ROUTEING PROCESS AND ALTERNATIVES

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There are no Technical Appendices associated with this Chapter.

2. THE ROUTEING PROCESS AND ALTERNATIVES

2.1 Introduction

2.1.1 This Chapter describes the routeing process and consideration of reasonable alternatives that have been undertaken, in accordance with Regulation 5(2)(d) and Schedule 4, paragraph 2 of the EIA Regulations.

2.1.2 The following stages are described in this Chapter, along with their respective outcomes:

- The approach to the routeing and alignment selection stages of the project;
- The route selection stage;
- The alignment selection stage; and
- Design solutions considered.

2.2 Development Considerations

2.2.1 The Applicant has obligations under section 9 of the 1989 Act to 'develop and maintain an efficient, co-ordinated and economical system of electricity transmission'.

2.2.2 The Applicant, operating under licence held by Scottish Hydro Electric Transmission plc under the Electricity Act 1989, 'when formulating proposals to generate, transmit, distribute or supply electricity' is required, under Schedule 9 to:

- "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest"; and
- "do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects".

2.2.3 Furthermore, the requirements of the Construction (Design and Management) Regulations 2015¹ (CDM Regulations) require that the project design aims to minimise hazards and reduces risks during construction.

2.2.4 Taking account of these obligations, the Applicant has considered technical, economic and environmental factors in evaluating the reasonable alternatives for the Proposed Development, with the objective of identifying a proposed alignment and associated Limit of Deviation (LOD) which is technically feasible and economically viable and which causes the least disturbance to the environment and to the people who live, work, visit and enjoy recreation within it.

2.3 Design Solution

2.3.1 Due to the electricity generation capacity of the Coire Glas Pumped Storage Scheme, which requires to be transmitted to the National Electricity Transmission System, a 400 kV double circuit connection is required. The proposed engineering solution is a 400 kV double circuit OHL supported by steel lattice structures as this technology would provide a high capacity, low loss transmission circuit. This connection will use the same technology as the 400 kV circuits that currently connect into Fort Augustus Substation from Beauly and Tummel.

2.3.2 Other OHL solutions such as wood poles, steel poles and New Suite of Transmission Towers (NeSTS) towers have not been considered as feasible design solutions for the proposed 400 kV OHL, as these structures are not designed for 400 kV construction and accordingly are not suitable to carry the infrastructure required to support a double circuit 400 kV OHL. These structures have been considered as part of the design solution for

¹ <http://www.legislation.gov.uk/uksi/2015/51/contents/made> (accessed 20/03/2023)

the diversion and rerouting of the lower voltage 132 kV Fort Augustus to Fort William and 132 kV Invergarry Tee OHLs (as described in Section 3.7 of **Chapter 3: Project Description**).

- 2.3.3 A 400 kV underground cable connection is also not considered to be a feasible option for the proposed 400 kV double circuit due to both economic and technical reasons. Cables are more expensive to install and operate than overhead lines and the terrain over which it would need to be installed offers significant engineering challenges, with associated environmental impacts. There are also significant challenges post construction associated with undergrounding cables. For example, when there is any maintenance or repairs required on the cable, locating and repairing faults underground can be difficult, with longer timescales for repair work.

2.4 Approach to Route and Alignment Selection

- 2.4.1 Guidelines for the routing of new high voltage OHLs have been established within the electricity supply industry. These guidelines are known as the 'Holford Rules' and have been widely used throughout the UK since the 1960s. The 'Holford Rules' set out a hierarchical approach to routing which advocates avoiding areas of high amenity value, minimise changes in direction, takes advantage of topography and minimises visual interaction with other transmission infrastructure. These principles of the Holford Rules are discussed in greater detail in paragraph 2.4.5 below.
- 2.4.2 The Applicant has developed its own guidance, based on the principles set out in the Holford Rules, but broadening the basis for routing decisions to reflect contemporary practice, and, to provide a framework to ensure environmental, technical and economic considerations are identified and appraised at each stage of the routing process.
- 2.4.3 The approach to route and alignment selection has therefore been informed by SSEN Transmission's guidance². The guidance splits the routing stage of a project into four principal stages, as follows:
- Stage 0: Routing Strategy Development³;
 - Stage 1: Corridor Selection;
 - Stage 2: Route Selection; and
 - Stage 3: Alignment Selection.
- 2.4.4 Each stage is an iterative process and involves an increasing level of detail and resolution, bringing cost, technical and environmental considerations together in a way which seeks to achieve the best balance at each stage. The stages that are carried out can vary depending on the type, nature of and size of a project and consultation is carried out at each stage of the process. The Guidance does provide flexibility, and in relation to the Proposed Development, consultation at Stages 2 and 3 were combined.
- 2.4.5 In accordance with the steps outlined in the Holford Rules⁴ and SSEN Transmission guidance², the following principles have been taken into account during the route (where practicable) and alignment stages of the Proposed Development:
- Avoid if possible major areas of highest amenity value (including those covered by national and international designations and other sensitive landscapes);
 - Avoid by deviation, smaller areas of high amenity value;
 - Try to avoid sharp changes of direction and reduce the number of larger angle towers required;

² SSEN Transmission (March 2018), Procedures for Routing Overhead Lines of 132kV and above (updated in September 2020 to include underground cables of 132 kV and above)

³ Setting out the proposed strategy for the routing stage of a particular project.

⁴ Scottish Hydro Electric Transmission Limited (SHETL). (October 2004). *The Holford Rules: Guidelines for the Routing of New High Voltage Overhead Transmission Lines with NGC 1992 and SHETL 2003 Notes; Revision 1.01*

- Avoid skylining the route in key views and where necessary, cross ridges obliquely where a dip in the ridge provides an opportunity;
- Target the route towards open valleys and woods where the scale of poles or towers will be reduced and views broken by trees (avoid slicing through landscape types and try to keep to edges and landscape transitions);
- Consider the appearance of other lines in the landscape to avoid a dominating or confusing wirescape effect; and
- Approach urban areas through industrial zones and consider the use of undergrounding in residential and valued recreational areas.

2.5 Corridor Selection (Stage 1)

2.5.1 The Study Corridor for the entire Coire Glas Grid Connection Project was largely defined by a broad area centred on the start point of the grid connection (the consented Coire Glas Pumped Storage Scheme), and end point (connection to the National Electricity Transmission System at Fort Augustus Substation), and the general direction the OHL connection would require to be routed between the two. The Study Corridor, illustrated on **Figure 2.1**, was developed to enable the identification of feasible route options between the connection points.

2.6 Route Selection (Stage 2)

2.6.1 The route selection stage of the project involves the identification of route options (circa 1 km wide), and an appraisal of the environmental, technical and economic constraints of these route options, prior to arriving at a preferred route for the purposes of consultation.

2.6.2 The route selection assessment for the Proposed Development was conducted in parallel with the site selection assessment for the proposed new Coire Glas Switching Station and the proposed new Loch Lundie Substation. Since the preferred site of these developments had not been determined when the route selection stage was being undertaken, route options were split as follows:

- Coire Glas to Loch Lundie: Routes between a defined search area for the proposed new Coire Glas Switching Station and a defined search area for the proposed new Loch Lundie Substation; and
- Loch Lundie to Fort Augustus: Routes between a defined search area for the proposed new Loch Lundie Substation and the existing Fort Augustus Substation.

Route Identification and Appraisal

2.6.3 Route options were identified following desk-based review and site walkovers, giving due consideration to the principles set out in the Holford Rules and SSEN Transmission guidance, as described in Part 2.4 of this Chapter.

2.6.4 Indicative route options were identified at 1 km widths to allow for subsequent identification of alignments during the next stage of the process (Stage 3).

2.6.5 Appraisal of route options involved systematic consideration against the topic areas noted below:

- **Environment / Consenting**
 - Natural Heritage
 - Designations;
 - Protected Species;
 - Habitats;
 - Ornithology; and
 - Hydrology / Geology.

- Cultural Heritage:
 - Designations; and
 - Cultural Heritage Assets.
- Proximity to Dwellings:
 - Residential Properties
- Landscape and Visual:
 - Designations;
 - Landscape Character; and
 - Visual Amenity.
- Land Use:
 - Agriculture;
 - Forestry; and
 - Recreation.
- Planning
 - Policy; and
 - Proposals
- **Technical / Engineering**
 - Infrastructure Crossings;
 - Major Crossing; and
 - Road Crossings.
 - Environmental Design;
 - Elevation;
 - Atmospheric Pollution;
 - Contaminated Land; and
 - Flooding.
 - Ground Conditions;
 - Terrain; and
 - Peat.
 - Construction Maintenance;
 - Access; and
 - Angle Towers;
 - Proximity
 - Clearance Distance;
 - Windfarms;
 - Communications Masts;
 - Urban Environments; and
 - Metallic Pipes
- **Cost**
 - Capital;
 - Construction;
 - Diversions;
 - Public Road Improvements;

- Tree Felling;
- Land Assembly; and
- Consent Mitigations.
- Operational
 - Inspections; and
 - Maintenance.

2.6.6 A Red-Amber-Green (RAG) rating was applied to each topic area for each route option, indicating potential constraint to development.

2.7 Summary of Route Option Appraisal (Stage 2)

2.7.1 The following part of this Chapter summarises the route options appraised during Stage 2 of the routeing process. Route Options are illustrated on **Figure 2.1**. Further detail on each route option, including an appraisal of constraints, is included in the Coire Glas Grid Connection Project: Consultation Document⁵.

Coire Glas to Loch Lundie

2.7.2 Three potential route options between the proposed new Coire Glas Switching Station Search Area and the proposed new Loch Lundie Substation Search Area were identified within the Study Corridor, as follows:

1. Route Option CG-LL1 - the most westerly route being considered between the proposed Coire Glas Switching Station Search Area and the proposed Loch Lundie Substation Search Area.
2. Route Option CG-LL2 - the central route being considered between the proposed Coire Glas Switching Station Search Area and the proposed Loch Lundie Substation Search Area.
3. Route Option CG-LL3 - the most easterly route being considered between the proposed Coire Glas Switching Station Search Area and the proposed Loch Lundie Substation Search Area.

Preferred Route

2.7.3 Following the route stage assessment, the preferred route option put forward between the proposed new Coire Glas Switching Station Search Area and the proposed new Loch Lundie Substation Search Area was Route Option CG-LL1 due principally to the lesser landscape and visual impacts associated with this option, and technical challenges associated with CG-LL3. Unlike the other options considered, Route Option CG-LL1 would not likely have an adverse impact on the special qualities of the Loch Lochy and Loch Oich Special Landscape Area (SLA) and the number and sensitivity of visual receptors that could potentially be impacted by this route would be fewer than other options. All route options considered would be required to be routed through forestry and woodlands, including areas listed on the AWI and/or recorded on the NWSS.

Loch Lundie to Fort Augustus

2.7.4 Three potential route options between the proposed new Loch Lundie Substation Search Area and the existing Fort Augustus Substation were identified within the Study Corridor, as follows:

1. Route Option LL-FA1 - the most westerly route being considered between the proposed new Loch Lundie Substation Search Area and the existing Fort Augustus Substation.
2. Route Option LL-FA2 - the central route being considered between the proposed Loch Lundie Substation Search Area and the existing Fort Augustus Substation and following the route of the existing Fort-Augustus to Fort William OHL.

⁵ Coire Glas Grid Connection Project: Consultation Document: (May 2022), produced by SSEN Transmission. Available at <https://www.ssen-transmission.co.uk/projects/project-map/coire-glas-connection-project/>

3. Route Option LL-FA3 - the most easterly route being considered between the proposed Loch Lundie Substation Search Area and the existing Fort Augustus Substation.

2.7.5 As Route Option LL-FA2 follows the route of the existing Fort-Augustus to Fort William OHL, two scenarios were initially considered by the Applicant, as follows:

- Scenario A: The existing Fort-Augustus to Fort William OHL would be retained and the new 400 kV OHL for the Coire Glas Grid Connection Project would be constructed alongside this existing 132 kV OHL between the new Loch Lundie Substation and the existing Fort Augustus Substation.
- Scenario B: The existing Fort-Augustus to Fort William OHL would be decommissioned and dismantled as part of a wider rationalisation project in this area between the new Loch Lundie Substation and the existing Fort Augustus Substation.

2.7.6 During the route options process the Applicant determined that Scenario A did not constitute a realistic option, and was therefore discounted. Scenario B was therefore the only scenario progressed in relation to Route Option LL-FA2.

Preferred Route

2.7.7 Following the route stage assessment, the preferred route option put forward between the proposed new Loch Lundie Substation Search Area and the existing Fort Augustus Substation was Route Option LL-FA2 (under Scenario B). This conclusion is largely due to the rationalisation scenario considered, whereby the Proposed Development would replace, rather than be in addition to, the existing 132 kV Fort Augustus to Fort William OHL, leading to several reduced potential environmental constraints in comparison with other options, including reduced cumulative landscape and visual impacts and settings impacts on cultural heritage designations. In addition, Route Option LL-FA2 (under Scenario B) could potentially utilise, or partially utilise, the wayleave of the existing 132 kV Fort Augustus to Fort William OHL through Inchnacardoch Forest rather than require an entirely new wayleave.

2.7.8 Route Option LL-FA1 was deemed to be less preferable from a technical perspective, due to the higher elevation of this route option on the approach to Fort Augustus Substation, which would likely result in challenging ground conditions and potentially substantial cut and fill works. In addition, it would be extremely challenging to connect an OHL from Route Option LL-FA1, which would approach the Fort Augustus Substation from the north, into the existing 400 kV infrastructure located within the south-western corner of the substation. To achieve this, a substantial sealing end compound would be required on the hillside to the north of Fort Augustus Substation. A 400 kV underground cable route would also be required down the hill towards the substation and then across Auchterawe Road, where it would be in close proximity to some of the properties located near Fort Augustus Substation.

2.7.9 Following the identification of LL-FA2 (under Scenario B) as the preferred route, a further exercise was undertaken to identify how the existing 132 kV Fort Augustus to Fort William OHL would be rationalised⁶. The most feasible option identified was to construct the new 400 kV OHL in a separate parallel corridor to the existing 132 kV Fort Augustus to Fort William OHL and then transfer the 132 kV OHL across to the new OHL upon completion. This would mean that the new 400 kV would not be able to utilise the full operational corridor of the existing 132 kV OHL and a new wayleave would need to be created through Inchnacardoch Forest to allow for the construction of the new 400 kV OHL. This new wayleave would run parallel to the wayleave for the existing 132 kV Fort Augustus to Fort William OHL and would mean that the new 400 kV OHL development would impact a greater area of classified woodland than predicted in the RAG assessment. Construction would also be required to take place on previously undisturbed habitats.

⁶For a more detailed description of the rationalisation options considered, please refer to the Coire Glas Grid Connection Project: Consultation Document: (May 2022), produced by SSEN Transmission. Available at <https://www.ssen-transmission.co.uk/projects/project-map/coire-glas-connection-project/> [Last Accessed 22/03/2023]

2.7.10 However, habitats would be reinstated following the removal of the existing towers and there may be some opportunities to replant part of the existing 132 kV Fort Augustus to Fort William wayleave once the existing 132 kV OHL has been dismantled and removed. Route Option LL-FA2 (under Scenario B) was therefore still considered the preferred route overall.

Route Selection Stage Conclusion

2.7.11 The preferred routes (Route Option CG- LL1 and Route Option LL-FA2) identified during the appraisal of route options at Stage 2 was taken forward to Stage 3: Alignment Selection of the routeing process, as illustrated on **Figure 2.2**.

2.8 Alignment Selection (Stage 3)

2.8.1 The alignment selection stage of the Proposed Development sought to determine an alignment (subject to indicative LOD which would be subject to further review during the EIA stage) within the preferred route(s) identified during the route selection stage of the project. The following tasks were undertaken during the alignment selection stage:

- Desk-based review and targeted site survey by project landscape architects, ecologists, ornithologists, archaeologists, geologists and hydrologists to review alignment options and provide advice on variations or micrositing opportunities for positioning of towers and indicative construction access;
- Targeted Phase 1 / National Vegetation Classification (NVC) habitat surveys and protected species surveys to supplement existing data;
- Workshops with the Applicant and environmental consultants to discuss alignment options and variants, prior to the identification of a preferred alignment;
- Site reconnaissance visits by the Applicant's engineering team and environmental consultants to review alignment options; and
- Meetings with statutory consultees (as required) to present the preferred alignment and seek preliminary feedback.

2.8.2 Within the preferred routes (CG-LL1 and LL-FA2), a 'Baseline Alignment' was identified by the Applicant's engineers on the basis of it being the most technically feasible and economically viable alignment, giving due consideration to a range of environmental, technical and economic criteria during the construction and operation phases of a new OHL. Amendments to the Baseline Alignment, referred to as 'Alignment Variations', were then developed by the project team to avoid localised constraints. The Baseline Alignment and Alignment Variations are illustrated on **Figure 2.3**.

2.9 Summary of Alignment Selection Appraisal (Stage 3)

2.9.1 The following part of this Chapter summarises the alignment options and design solutions appraised during the alignment selection stage of the routeing process.

Coire Glas to Loch Lundie

Baseline Alignment - Overview

2.9.2 The Baseline Alignment between the proposed site of the new Coire Glas Switching Station and the proposed site of the new Loch Lundie Substation (hereafter referred to as 'the CG-LL Baseline Alignment') represents the preferred alignment within the preferred route (Route Option CG-LL1) from an engineering perspective. This was the alignment that met engineering requirements which considers the constructability of the OHL from a technical and health and safety perspective. This alignment was selected due to the favourable terrain, avoidance of any major infrastructure and ease of access to existing tracks.

- 2.9.3 On the approach to the proposed site of the new Loch Lundie Substation, along the southern banks of Loch Lundie, the CG-LL Baseline Alignment would run parallel to the southern side of the existing 132 kV Quoich to Aberchalder OHL and the existing 132 kV Fort Augustus to Skye OHL⁷.

Baseline Alignment – Summary of Environmental Constraints

- 2.9.4 No regionally, nationally, or internationally designated sites for nature conservation are crossed by the CG-LL Baseline Alignment. Loch Garry and Loch Lundie, which are both component lochs of the West Inverness-shire Lochs Special Protection Area (SPA) / Site of Special Scientific Interest (SSSI), lie approximately 380 m and 200 m from the CG-LL Baseline Alignment respectively. Garry Falls SSSI, which lies where the River Garry emerges from Loch Garry, is also located within 1 km of the CG-LL Baseline Alignment.
- 2.9.5 The area between the proposed site of the new Coire Glas Switching Station and the car park at White Bridge is almost all recorded in the Caledonian Pinewood Inventory as being within the Glen Garry Caledonian Pinewood Buffer Zone. Some parts of the Baseline Alignment would also pass through areas classified as Caledonian Pinewood Regeneration Zone. The CG-LL Baseline Alignment to White Bridge would also pass through areas listed on the Ancient Woodland Inventory (AWI).
- 2.9.6 Woodland, and woodland edge habitat, crossed by the CG-LL Baseline Alignment provides suitable habitat for pine marten, badger, red squirrel and bat species, whereas riparian zones provide suitable habitat for otter. In the open moorland area between Munerigie Wood and the proposed site of the new Loch Lundie Substation, the CG-LL Baseline Alignment would cross extensive areas of wet heath habitat, as well as smaller areas of blanket mire and acid flush habitat. Both wet heath and blanket mire are Annex 1 habitats.
- 2.9.7 Around Loch Lundie, ornithological constraints are focussed on the qualifying species of the West Inverness-Shire Lochs SPA/SSSI (Black-throated Diver and Common Scoter), of which Loch Lundie is a part of, as well as Red-throated Diver. Black Grouse is also present around Loch Lundie.
- 2.9.8 The CG-LL Baseline Alignment would not be located within or affect any designated landscapes.
- 2.9.9 The CG-LL Baseline Alignment would pass within approximately 300 m of the properties at Glenluie, located within the forestry at White Bridge, and within approximately 150 m to the north and west of a small cluster of properties scattered along the minor road between Faichem and Munerigie. Other visual receptors would include the Faichemard Farm Caravan and Camping Site, recreational users near River Garry, where there are several woodland trails and rafting and white water canoeing is popular, users of the A87 and users of a Scottish Hill Track which runs along the eastern banks of Loch Lundie.

Baseline Alignment - Technical Considerations

- 2.9.10 The principal technical considerations of the CG-LL Baseline Alignment include the influence of the River Garry crossing, the A87 crossing, altitude, requirement for temporary works scaffolding, as well as access and accommodation works.

Alignment Variations

- 2.9.11 A number of Alignment Variations to the CG-LL Baseline Alignment were considered, to either mitigate a potential effect, or to provide an alternative for consideration by the project team during the selection of a preferred alignment. These variants are set out in Table 2.1 and shown on **Figure 2.3**.

⁷It is anticipated that both of these existing OHLs would be dismantled following completion of the proposed Skye Reinforcement Project but both were included in the baseline for the route and alignment stage assessments.

Table 2.1: CG-LL Alignment Variations

Variant	Description	Reason for Variation	Variant Taken forward? (Y/N)
CG-LL Alignment Variation 1	<p>CG-LL Alignment Variation 1 is similar to the CG-LL Baseline Alignment, except from the northern side of the proposed Coire Glas Switching Station. Here it would briefly travel in a westerly direction for approximately 0.2 km, where it would cross a minor watercourse and the main forestry haul road, (which is classified as a Scottish Hill Track).</p> <p>The Alignment Variation would then change direction to a north-westerly direction through the forestry at White Bridge for approximately 1 km, where it would travel to the west of the properties at Glenluie before rejoining the CG-LL Baseline Alignment (at NGR NH 227378, 801216).</p>	<p>The reason for this Alignment Variation is to reduce potential impacts of established Caledonian Pinewood, as recorded in the Caledonian Pinewood Inventory.</p> <p>A disadvantage of this Alignment Variation is it would potentially bring the OHL infrastructure slightly closer to the property at Glenluie.</p> <p>Overall, due to the importance and sensitivity of the Caledonian Pinewood within Glengarry Forest, it is considered that CG-LL Alignment Variation 1 is preferable to the Baseline Alignment as the variation would reduce potential impacts on this habitat type. CG-LL Alignment Variation 1 was therefore taken forward as part of the preferred alignment.</p>	<p>Y</p>
CG-LL Alignment Variation 2	<p>CG-LL Alignment Variation 2 would diverge from the CG-LL Baseline Alignment within the forestry at White Bridge, at a location to the north of Glenluie (NGR NH 227413, 801248).</p> <p>The Alignment Variation would travel in an east-north-easterly direction for approximately 0.7 km, crossing the River Garry and several recreational routes. CG-LL Alignment Variation 2 would then change direction and travel in a north-easterly direction for approximately 0.6 km, crossing the A87 before travelling through Munerigie Wood.</p> <p>The Alignment Variation would then change direction again and travel in an east-north-easterly direction for approximately 0.1 km, where it would re-join the CG-LL Baseline Alignment at the edge of Munerigie Wood, at the point where the CG-LL Baseline Alignment crosses the forestry track between Faichem and Munerigie.</p>	<p>There were several reasons for the inclusion of this Alignment Variation, as follows:</p> <ul style="list-style-type: none"> • To avoid the OHL running parallel to a minor tributary of the River Garry located within the Forestry at White Bridge; • To utilise a natural forestry clearing within the Forestry at White Bridge, on the approach to the western bank of the River Garry; • To avoid ancient oak trees identified on site on the western bank of the River Garry; • To further increase the distance of the OHL from properties at Faichem; and • To avoid a sharp angle in the alignment, at the point where the CG-LL Baseline Alignment crosses the forestry track between Faichem and Munerigie. 	<p>Y</p>

		<p>Disadvantages of this Alignment Variation include that this alignment would be located closer to the West Inverness-shire Lochs SPA/SSSI (at Loch Garry) and the Garry Falls SSSI, although it is anticipated that direct effects on the Garry Falls SSSI could be avoided.</p> <p>This Alignment Variation would also be in closer proximity to the location of a planning application for a new property to be built at the Blar an Eas Salt Store.</p> <p>Given the above, it is considered that CG-LL Alignment Variation 2 is preferable to the Baseline Alignment from an environmental perspective and this variation was taken forward as part of the preferred alignment.</p>	
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Preferred Alignment – Coire Glas Switching Station to Loch Lundie Substation

2.9.12 In selecting the preferred alignment for the OHL between the proposed Coire Glas Switching Station and the proposed Loch Lundie Substation consideration has been given to a variety of environmental, technical and economic considerations. On balance, it was determined that the CG-LL Baseline Alignment with the variations of both CG-LL Alignment Variation 1 and CG-LL Alignment Variation 2 should be taken forward as the preferred alignment between the new Coire Glas Switching Station and the new Loch Lundie Substation.

Loch Lundie to Fort Augustus

Baseline Alignment - Overview

2.9.13 The Baseline Alignment between the proposed site of the new Loch Lundie Substation and the Fort Augustus Substation (hereafter referred to as 'the LL-FA Baseline Alignment') represents the preferred alignment within the preferred route (Route Option LL-FA2) from an engineering perspective.

2.9.14 From the proposed Loch Lundie Substation Site, the LL-FA Baseline Alignment would run parallel to the eastern side of the existing 132 kV Fort Augustus to Fort William OHL⁸ and the existing 132 kV Fort Augustus to Skye T OHL⁹. This was the alignment that met the engineering requirements which considers the constructability of the route OHL from a technical and health and safety perspective. This alignment was selected due the favourable terrain, avoidance of any major infrastructure and ease of access to existing tracks.

Baseline Alignment - Summary of Environmental Constraints

2.9.15 No regionally, nationally, or internationally designated sites for nature conservation are crossed by the LL-FA Baseline Alignment. Loch Lundie, which forms the most westerly extent of the West Inverness-shire Lochs SPA/SSSI, lies approximately 160 m from the LL-FA Baseline Alignment at its closest point.

2.9.16 The LL-FA Baseline Alignment would pass through areas of woodland that are recorded on the NWSS (largely classified as PAWS) and listed on the AWI. Between Torr Dhuin and Fort Augustus Substation, the alignment would pass through areas of woodland that are recorded on the NWSS as native pinewood.

2.9.17 Woodland, and woodland edge habitat provides suitable habitat for badger, red squirrel, pine marten and bat species. Loch Lundie and riparian zones associated with watercourses provide suitable habitat for otter, particularly along the banks of the Invervigar Burn and its tributaries. Wet heath and mire habitats in the area may also provide suitable habitat for water vole.

2.9.18 The LL-FA Baseline Alignment would pass through large areas of coniferous plantation, although areas of semi-natural mixed and broadleaved woodland are also present. Open ground crossed by the LL-FA Baseline is dominated by wet heath and blanket mire communities, with smaller areas of dry heath and semi-improved grassland. Both habitats are identified as Annex 1 habitats.

2.9.19 Ornithological constraints are focussed on the qualifying species of the West Inverness-Shire Lochs SPA/SSSI (Black-throated Diver and Common Scoter), of which Loch Lundie is a part of, as well as Red-throated Diver. Black Grouse are also present around Loch Lundie.

⁸ It is proposed that as part of the Coire Glas Grid Connection Project that this OHL would be dismantled to the north of the proposed Loch Lundie Substation site following completion of the proposed new 400 kV OHL.

⁹ It is anticipated that this OHL would be dismantled following completion of the proposed Skye Reinforcement Project but it was included as part of the baseline for the route and alignment stage assessments.

- 2.9.20 Published priority peatland mapping suggests that approximately 3 km of the southern extent of the LL-FA Baseline Alignment would be located within Class 2 Priority Peatland. Peat probing along the LL-FA Baseline Alignment determined peat depths ranging from between 0 m and 5.1 m, with areas of deeper peat noted west of the proposed location of the new Loch Lundie Substation and to the east of Loch Lundie.
- 2.9.21 There are no designated or non-designated heritage assets within the Baseline Alignment or associated LOD. However, there are four Scheduled Monuments of high sensitivity within 500 m of the LL-FA Baseline Alignment: the Torr Dhuin Fort (SM 794) and three sections of the Caledonian Canal near Kyltra Lock (SM 6496, SM 6497 and SM 5291). The LL-FA Baseline Alignment would have a potential for setting effects on each of these designated heritage assets, particularly Torr Dhuin.
- 2.9.22 The LL-FA Baseline Alignment would not be located within or affect any designated landscapes. The LL-FA Baseline Alignment would directly affect LCT 237 (Rocky Moorland – Lochaber) and LCT 225 (Broad Steep-Sided Glen). Both of these LCT are considered to have some sensitivity to development of this type, but this sensitivity would be lowered by the presence of existing grid infrastructure in the area surrounding Loch Lundie.
- 2.9.23 There are no dwellings within close proximity of the LL-FA Baseline Alignment, except on the approach to the existing Fort Augustus Substation, where there are approximately twelve properties located along the Auchterawe Road. Other visual receptors include several core paths in the surrounding area.

Baseline Alignment - Key Technical Considerations

- 2.9.24 Technical considerations refer, as a minimum, to the capacity and voltage of the circuit which will dictate the choice of conductor and tower suite, which in turn may inform foundation requirements, span lengths, angle points, and construction requirements. Other considerations will also include altitude, terrain, requirement for temporary works scaffolding as well as access and accommodation works.

Alignment Variations

- 2.9.25 A number of Alignment Variations to the LL – FA Baseline Alignment were considered, to either mitigate a potential effect, or to provide an alternative for consideration by the project team during the selection of a preferred alignment. These Alignment Variations are set out in Table 2.2 and shown on **Figure 2.3**.

Table 2.2: LL-FA Alignment Variations

Variant	Description	Reason for Variation	Variant Taken forward? (Y/N)
LL- FA Alignment Variation 1	<p>LL-FA Alignment Variation 1 is similar to the LL-FA Baseline Alignment, except it would follow the exact route of the existing Fort Augustus to Fort William OHL between the new Loch Lundie Substation and the point where the LL-FA Baseline Alignment diverges from the route of the existing 132 kV OHL at Torr Dhuin (where it would connect to the LL-FA Baseline Alignment).</p>	<p>Whilst the LL-FA Alignment Variation 1 would have some advantages compared to the LL-FA Baseline Alignment through the use of the existing wayleave, ultimately it was not deemed to be a feasible option (as discussed in paragraphs 2.7.9 - 2.7.10).</p>	N
LL- FA Alignment Variation 2	<p>LL-FA Alignment Variation 2 would connect to the north-eastern corner of the new Loch Lundie Substation within the forestry at Drynachan to the north of Invergarry. Alignment Variation 2 would travel through the forestry in a north-easterly direction for approximately 0.8 km before changing direction to a north-north-easterly direction within a clearing in the forestry. Alignment Variation 2 would continue through the forestry for approximately 0.6 km. A new wayleave corridor would be required to be felled through coniferous plantation to the north of Invergarry to accommodate this alignment.</p> <p>After exiting the northern extent of the forestry at Invergarry, Alignment Variation 2 would continue to travel in the same direction for a further 1.3 km, where it would connect to the Baseline Alignment within the area of open moorland to the north-east of Loch Lundie.</p>	<p>The primary reason for this Alignment Variation is to remove the requirement for the felling of the edge of the western extent of the forestry at Drynachan, which may result in windthrow within the plantation or require management felling to a new wind firm edge. Alignment Variation 2 takes advantage of the broken nature of the forestry and is routed through an open area of the forestry, which would reduce the potential area of woodland loss.</p> <p>Alignment Variation 2 would also have a lesser effect on the landscape around Loch Lundie compared to the Baseline Alignment, as well as users of the Core Paragath along the eastern banks of Loch Lundie.</p> <p>Alignment Variation 2 would also increase the distance between the proposed OHL and the West Inverness-shire Lochs SPA/SSSI, in comparison with the LL-FA Baseline Alignment.</p> <p>Given the above, it is considered that LL-FA Alignment Variation 2 is preferable to the Baseline Alignment from an environmental perspective and this variation was be taken forward as part of the preferred alignment.</p>	Y

<p>LL- FA Alignment Variation 3 / 3A / 3B</p>	<p><u>Alignment Variation 3</u></p> <p>LL-FA Alignment Variation 3 would diverge from the Baseline Alignment within the forestry at Inchnacardoch Forest at NGR NH 33724, 806435. The variation would travel through the forestry in an east-north-easterly direction for approximately 1.3 km to reach the banks of the River Oich, which forms part of the Caledonian Canal, near Kyltra Loch.</p> <p>Alignment Variation 3 would then change direction to a north-easterly direction for approximately 0.5 km, running parallel to the eastern bank of the River Oich towards the FLS forestry area to the east of Auchteraw.</p> <p>Two minor variations to Alignment Variation 3 were proposed at its northern extent:</p> <p><u>Alignment Variation 3A</u></p> <p>LL-FA Alignment Variation 3A represents a scenario where Alignment Variation 3 would connect back into the Baseline Alignment. From Alignment Variation 3, Alignment Variation 3A would change direction to a north-north-easterly direction for 0.4 km to rejoin the Baseline Alignment within the FLS forestry area to the east of Auchterawe.</p> <p><u>Alignment Variation 3B</u></p> <p>LL-FA Alignment Variation 3B represents a scenario where Alignment Variation 3 would connect into Alignment Variation 5. From LL-FA Alignment Variation 3, Alignment Variation 3B would continue in a north-easterly direction for 0.2 km to join LL-FA Alignment Variation 5 within the FLS forestry area to the south of the Fort Augustus Substation.</p>	<p>The primary reason for Alignment Variation 3/3A/3B is to increase the distance of the OHL from the property near Torr Dhuin.</p> <p>Alignment Variation 3/3A/3B would also remove the more elevated and prominent towers on the approach to Auchterawe, which could have some beneficial effects for visual receptors in this area.</p> <p>However, Alignment Variation 3/3A/3B would have a greater impact on landscapes surrounding the Caledonian Canal at Kyltra Lock and would affect the connection between these landscapes and the fort as a landmark. It would also have a greater impact on sensitive visual receptors, including users of the Caledonian Canal, Great Glen Way and properties at Coltry and Kyltra Lock.</p> <p>Although Alignment Variation 3/3A/3B would pass to the southern side of the Torr Dhuin SM rather than the northern side, it would still cross within close proximity to, and have potential for setting effects on, this designated heritage asset, as well as the three designated heritage assets associated with the Caledonian Canal.</p> <p>Felling of PAWS and woodland that is listed on the NWSS as upland mixed ashwood would be required.</p> <p>This variation would also be located on extremely steep terrain which would be very challenging during the construction phase. There would be considerable cut and fill requirement for the access roads and working platforms and there may also be a requirement to install protection measures along the hillside to protect the River Oich from falling debris.</p> <p>Given the above, it is not considered that Alignment Variation 3/3A/3B is preferable to the Baseline Alignment from an environmental or technical perspective.</p>	<p>N</p>
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<p>LL- FA Alignment Variation 4 / 4A / 4B</p>	<p><u>LL-FA Alignment Variation 4</u></p> <p>LL-FA Alignment Variation 4 would diverge from the Baseline Alignment within the forestry at Inchnacardoch Forest at approximately NGR NH 234261, 806873. The variation would travel through the forestry to the north-east of Torr Dhuin in an east-north-easterly direction for approximately 0.8km, exiting the forestry near the FLS Car Park and Picnic Area.</p> <p>Two minor variations to Alignment Variation 4 were proposed:</p> <p><u>Alignment Variation 4A</u></p> <p>LL-FA Alignment Variation 4A represents a scenario where Alignment Variation 4 would connect back into the Baseline Alignment. Alignment Variation 4A would re-join the Baseline Alignment at approximately NGR NH 235064, 807214, located 0.06km to the north-east of Alignment Variation 4, at a location near the FLS Car Park and Picnic Area.</p> <p><u>Alignment Variation 4B</u></p> <p>LL-FA Alignment Variation 4B represents a scenario where Alignment Variation 4 would connect into Alignment Variation 5. From Alignment Variation 4, Alignment Variation 4B would continue in an east-north-easterly direction for a further 0.3 km, to join Alignment Variation 5 within the FLS forestry area to the east of Auchterawe.</p>	<p>The primary reason for Alignment Variation 4/4A/4B is to increase the distance from the property near Torr Dhuin.</p> <p>Alignment Variation 4/4A/4B would be largely similar to the Baseline Alignment but the towers would cross higher ground near Torr Dhuin and would therefore be potentially slightly more prominent in the setting of landscapes around Auchterawe, with greater potential to affect the role of Torr Dhuin Fort and SM as a landmark, with potential effects on its setting. This variation may also have a greater impact on some visual receptors in the surrounding area, including users of recreational routes around Torr Duin Fort and some properties in Auchterawe, although it may be further from others.</p> <p>The technical issues associated with this variation would be similar to the Baseline Alignment, with the exception being the decent down the hillside towards Fort Augustus would be much steeper and would increase the cut and fill requirements for the access roads and working platforms.</p> <p>Although this Alignment Variation would have some potential negative impacts on the setting of the Torr Dhuin Scheduled Monument and other visual receptors in the surrounding area, it is considered that the proximity of the Baseline Alignment to the property at Torr Dhuin would not be acceptable. LL-FA Alignment Variations 4 and 4B were therefore taken forward as part of the preferred alignment.</p>	<p>LL- FA Alignment Variation 4 and 4B to be taken forward.</p>
<p>LL- FA Alignment Variation 5</p>	<p>Alignment Variation 5 would diverge from the Baseline Alignment near the FLS Carpark and Picnic and continue in an east-north-easterly direction for a further 0.2 km, before changing direction, to a north-easterly direction as it enters the FLS forestry area to the east of Auchterawe. Alignment Variation 5 would then continue through this area of forestry for approximately 0.7 km, crossing a FLS forestry access track (which is also used as a recreational route) twice, before changing direction again to north-north-westerly direction, to</p>	<p>The primary reason for Alignment Variation 5 is to remove the requirement for the felling of the edge of the north-western extent of the forestry to the south of Fort Augustus Substation. Alignment Variation 5 also takes advantage of the broken nature of the forestry and is routed through an open area of the forestry, which will reduce the potential area of woodland loss. Alignment Variation 5 would be routed through the same areas of woodland that are recorded on the NWSS as native pinewood as the Baseline Alignment.</p>	<p>Y</p>

	<p>approach the south-western corner of the existing Fort Augustus Substation.</p>	<p>Variation Alignment 5 would also be slightly preferable to the LL-FA Baseline Alignment because towers would be further from the properties along Auchterawe Road and a near-by property in the open field to the west of the Fort Augustus Substation.</p> <p>Considering the above, it is considered that overall, LL-FA Alignment Variation 5 is preferable to the Baseline Alignment from an environmental perspective and this variation was taken forward as part of the preferred alignment.</p>	
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Preferred Alignment – Loch Lundie to Fort Augustus

2.9.26 In selecting the preferred alignment between the new Loch Lundie Substation and the existing Fort Augustus Substation, consideration has been given to a variety of environmental, technical and economic considerations. On balance, it was determined that the LL-FA Baseline Alignment with the variations of LL-FA Alignment Variation 2, LL-FA Alignment Variation 4/4B and LL-FA Alignment Variation 5 should be taken forward as the preferred alignment.

2.10 Consultation on Route and Alignment Stages

2.10.1 In May 2022, a combined Consultation Document^{Error! Bookmark not defined.} was issued for the entire Coire Glas Grid Connection Project, to document the route and alignment selection stages of the Proposed Development and the site selection assessments for the proposed Coire Glas Switching Station and the proposed Loch Lundie Substation.

2.10.2 A consultation event for the Coire Glas Grid Connection Project, including the route and alignment stage of the Proposed Development, was held in May 2022 at the following times and locations:

Glengarry Community Hall, Invergarry	04 th May 2022	15.00 – 19.00
Fort Augustus Village Hall, Fort Augustus	05 th May 2022	15.00 – 18.45
Virtual Exhibition	09 th May	17.00 – 19.00

2.10.3 Comments received from stakeholders in response to the Consultation Document^{Error! Bookmark not defined.}, or following public consultation events, were documented in the Report on Consultation¹⁰, published in April 2023. Key consultation responses provided by statutory consultees, non-statutory consultees and the local community in relation to the route and alignment stages of the project are detailed below.

Key Consultation Responses: Coire Glas to Loch Lundie

2.10.0 In the consultation responses relating to the section of the OHL between the proposed Coire Glas Switching Station and Loch Lundie Substation, concerns were raised about the impact of the preferred route and preferred alignment on Caledonian Pinewood and other sensitive ecological and woodland receptors where the OHL would pass through Glengarry Forest. Specifically, FLS (West) advised that the operational corridor of an OHL within this area would have ‘a substantial detrimental impact on the integrity of the Caledonian Pinewood, and the ongoing work of restoring the woodland through reconnecting the core areas’.

2.10.1 FLS (West) also advised that Caledonian Pinewood is considered to be an irreplaceable habitat and that restoration or compensatory planting would not be considered suitable mitigation for the loss of this habitat type and noted that whilst veteran or granny pines may be the most striking feature of this habitat, these alone do not make up a pine woodland, which have a mix of age structure, species and habitats. The Woodland Trust also opposed the proposed preferred route option on the basis of potential damage to and loss of a number of woodlands designated on the AWI, including areas of Glengarry Pinewood.

¹⁰ Coire Glas Grid Connection Project: Report on Consultation: (April 2023), produced by SSEN Transmission

- 2.10.2 FLS (West) and other consultees also noted the importance of the narrow remnant of temperate rainforest habitat on both sides of the River Garry, as restoration of this habitat type is very high on the Scottish Government's agenda.
- 2.10.3 Both NatureScot and RSPB consultation responses state that the construction and operation of a new 400 kV OHL at Loch Lundie has the potential to disturb SPA black-throated diver, and other Schedule 1 species. These responses also highlight that the Loch Lundie area is already constrained with constructed and planned OHLs and raises concerns in relation to cumulative impacts on the qualifying features of the SPA.
- 2.10.4 NatureScot also advised that if the preferred alignment is taken forward to the EIA stage of the project, it should be microsituated to ensure that potential impacts on the Garry Falls SSSI are avoided.
- 2.10.5 BT initially advised that a fixed BT radio link exists from Invergarry to Fort Augustus has been identified within the path of the preferred alignment and that they would require full details of heights and co-ordinates for all structures in order to assess the true impact on this Radio Link and provide an accurate decision. However, since this initial consultation response was received, BT have undertaken a further desk study and advised that they have no objection to the Proposed Development (see **Chapter 5: Scoping and Consultation** for further details).
- 2.10.6 Mountaineering Scotland endorsed Route Option CG-LL1 as the preferred route option, as this route indicates minimal visual impact of the proposed 400 kV towers from walkers accessing Ben Tee and Sròn a Choire
- 2.10.7 A few community consultation responses raised concerns about the potential impacts of a 400 kV OHL and associated works on tourism and recreation in the Invergarry area.

Key Consultation Responses: Loch Lundie to Fort Augustus

- 2.10.8 Both NatureScot and RSPB consultation responses state that the construction and operation of a new 400 kV OHL at Loch Lundie has the potential to disturb SPA black-throated diver, and other Schedule 1 species. These responses also highlights that the Loch Lundie area is already constrained with constructed and planned OHLs and raises concerns in relation to cumulative impacts on the qualifying features of the SPA.
- 2.10.9 The consultation response received from HES, as well as several of the community responses, raised concerns about the impacts of the preferred alignment between Loch Lundie and Fort Augustus on the Torr Dhuin fort SM. HES stated the preferred alignment of the 400 kV OHL would likely dominate inward views towards the Torr Dhuin SM, with the impact being in particular derived from the positioning of one steel lattice tower on elevated ground to the immediate northwest of the fort. HES confirmed that they are content that setting impacts on other heritage assets within their remit within the vicinity of the proposals, such as the Caledonian Canal (SM6496 & SM6497) would not raise issues of national interest. The consultation response received from FLS (North) advises that they consider the preferred alignment to be acceptable from a forestry and woodland perspective, but they are aware of the feedback from HES and will take advice from their landscape architect in respect of this issue.
- 2.10.10 Several community responses raised concerns about the section of the 400 kV OHL as it approaches Forst Augustus Substation at Auchterawe on a variety of grounds, including safety, noise and telecommunications (interference), wildlife, cultural heritage, local tourism and recreation. The Applicant will provide a further update on the entire Coire Glas Grid Connection Project to the local community as part of the PAN consultation events that will be undertaken for the Loch Lundie Substation and Coire Glas Switching Stations in April 2023, following submission of the section 37 application for the Proposed Development.

2.11 Proposed Route and Alignment

Coire Glas – Loch Lundie

2.11.1 Following review of consultation responses, SSEN Transmission determined that largely as a result of the technical requirements for the project, in particular the proposed location of the new Coire Glas Switching Station, the preferred route and alignment between the new Coire Glas Switching Station and the new Loch Lundie Substation as outlined in paragraphs 2.7.11 and 2.9.12 were taken forward as the proposed route and alignment for the EIA Stage of the Project, as illustrated on **Figure 2.4**. This was the route that met the engineering requirements which considers the constructability of the route from a technical and health and safety perspective. This alignment was selected due the favourable terrain, avoidance of any major infrastructure and ease of access to existing tracks. Since the submission of the Consultation Report, further consultation has been undertaken with FLS (West) in conjunction with Coire Glas Hydro Pumped Storage Ltd (CGHPSL), due to the unique interface between the Coire Glas Grid Connection Project (including the Proposed Development) and the consented Coire Glas pumped storage scheme. This consultation has focused on developing a solution that is both technically feasible to construct for both the Applicant and CGHPSL, whilst also trying to minimise the potential effects of these developments on sensitive woodland habitat, including the Caledonian Pine Forest and woodland listed on the AWI within Glengarry Forest.

Loch Lundie to Fort Augustus Substation

2.11.2 Following review of consultation responses, the Applicant determined that, subject to further consideration of environmental constraints and sensitivities during the EIA stage of the project, the preferred route and alignment detailed in paragraphs 2.7.11 and 2.9.26 between the new Loch Lundie Substation and the existing Fort Augustus Substation were taken forward as the proposed route and alignment for the EIA Stage of the Project, as illustrated on **Figure 2.4**. Since the submission of the Consultation Report, further consultation has been undertaken with HES to try to minimise the potential setting effect on the Torr Dhuine Scheduled Monument through design solutions and micro-siting of towers, as described in **Chapter 5: Scoping and Consultation**.

2.12 Further Consideration of Alternatives during the EIA Process

2.12.1 The work that was undertaken during the route and alignment stages of the project enabled a rigorous consideration of reasonable alternatives with respect to route options, alignment selection and the consideration of different detailed design solutions available for the project.

2.12.2 The consideration of alternatives during the EIA stage of the project focussed on tower positions and the siting of ancillary infrastructure as a result of more detailed environmental and engineering information, including NVC habitat survey and peat probing results.

2.12.3 Changes to the design of the alignment of the route for the Proposed Development during the EIA stage of the project were generally minor in nature given the work undertaken during the alignment selection stage. It included the siting of infrastructure away from sensitive habitats or deeper areas of peat where practicable, whilst given cognisance to the technical requirements for constructing and operating the Proposed Development.